2021

Health Equity in Nashville

Metro Public Health Department

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Metro Public Health Department

Directors' Foreword

With this report we are pleased to help focus attention in the community and guide our efforts toward achieving health equity in Nashville and Davidson County.

The 2021 report is a follow-up to the 2015 Health Equity Report produced by the Metro Nashville Public Health Department and the Robert Wood Johnson Foundation Center for Health Policy at Meharry Medical College. The 2015 report helped inform important discussions around equity in the Nashville community. Several discussion points were highlighted, including:

- What are the health equity issues in our community?
- What conditions within our community produce health inequities?
- What groups, organizations, and sectors are (or should be) engaged in addressing issues of health equity?
- What are our goals for moving toward health equity?
- How can we measure health equity and monitor changes over time?

This updated report was produced by the MPHD Division of Epidemiology in collaboration with the Division of Prevention and Wellness and describes disparities in Davidson County's health profile based on indicators applied in the Community Health Profile 2021. The COVID-19 pandemic is a new health crisis that also bears examination through an equity lens and is newly included in this report. A special word of thanks goes to Tracy Buck, Director of the Division of Prevention and Wellness, for facilitating the collaborative process. MPHD epidemiologists Abraham Mukolo, Justin Gatebuke and Brook McKelvey took the lead in data collection, analysis, and report preparation.

This epidemiologic perspective on health equity provides an entry point for discussion and helps drive planning and implementation of projects by MPHD in our community. This data-directed perspective also will be particularly useful to program managers, grant writers, community advocates and policy-makers engaged in data-informed strategies for addressing the root causes of health inequities in Davidson County.

We invite your engagement in these issues as we seek to become a community in which all people achieve their full potential for health and well-being.

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Introduction

Healthy People 2020 described *health equity* as the "attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities." [1]

The presence or absence of equity can be demonstrated in part by pointing to disparities in certain health indicators between population groups. Disparities are described in Healthy People 2020 as "particular type[s] of health difference[s] that [are] closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion." The concept of equity in our community becomes more tangible through this report as we review such disparities within specific measures of health, or indicators.

MPHD presents this equity report as a framework to guide the continuing the discussion about health equity in Davidson County. The report is useful as a reference for the department and other organizations and agencies engaged in promoting the health of our community, to assist in identifying health needs and measuring progress toward meeting those needs.

Health outcomes such as infant mortality or deaths due to heart disease are straightforward, understandable measures of health in a community, and the following pages will address a selection of health outcomes and their differential impact on certain populations in Davidson County. This report will also examine some of the upstream factors that may lead to these differential outcomes. These upstream factors include social determinants of health like household socio-economic status and the opportunities and hazards encountered in a person's environment. Personal behaviors and choices also play a role, and some examples will be reviewed. When considered together, the social determinants of health, health risk and promoting behaviors, and health outcomes can aid in greater understanding and help identify points of possible intervention or improvement in community health.

The first section of this report presents a selection of 14 measures of socio-economic status and neighborhood or environmental conditions. Among these, we observed that the proportion of Hispanic residents with at least a high school education consistently lags that of non-Hispanic residents by 30%. There is also an enduring gap in completing a high school education between non-Hispanic White (94.5% in 2019) and non-Hispanic Black (88.7%) residents. The proportion of White residents with a bachelor's degree or higher was 55.3% in 2019, while among Black residents the proportion was 29.6%. Another tool for comparison is the mapping of differences. We can observe that high unemployment tends to cluster in certain census tracts, with high rates up to 22% in North Nashville and isolated tracts in the northeastern and southeastern parts of Davidson County, and as low as 0.1% in other zones, particularly clustered in the county's southwestern quadrant. The measure of children living in poverty is also meaningful, as a childhood lived in poverty is more likely to be associated with traumatic experiences and a lack of opportunities that may carry negative consequences enduring into adulthood. In 2019, 39% of non-Hispanic Black and Hispanic children in the county lived in poverty, as compared to 13% of non-Hispanic White children. Another indicator, percentage of persons without health insurance, appears linked to these other indicators, with

[1] https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities, accessed March 24, 2021

much higher proportions of uninsured among those without a high school education (36.2% in 2019), or those who are unemployed (34%) or at the lowest income levels (16.8%).

We begin to see that these individual measures of socio-economic status are firmly linked to each other and can help us formulate a more complete picture of the difficulties of maintaining good health in low SES circumstances. Similarly, the neighborhood where people live is an important factor in promoting health and providing or denying opportunities. For example, fear of crime or other violence can restrict movement and physical activity, discourage the location of businesses such as grocery stores, and deny employment opportunities among a population. One neighborhood health indicator demonstrates that the rate of crime varies substantially across the county, with the highest risk of crime occurring in neighborhoods of North Nashville and extending along transportation corridors toward the northeastern and southeastern portions of the county. Likewise, some of these same zones experience lack of access to healthy foods, as demonstrated by the indicator of distance from a supermarket; residents in these zones instead often shop for food in convenience stores, which may not provide fresh, healthy choices.

The report's second section presents indicators related to health risk or prevention behaviors. Examples include the incidence of the preventable sexually-transmitted infections chlamydia and gonorrhea. These diseases disproportionately affect young adult women and men, respectively, and incidence is markedly higher among non-Hispanic Black residents than non-Hispanic White and Hispanic residents. Incidence for Chlamydia was 1,617 per 100,000 non-Hispanic Black population in 2018, 441/100,000 among non-Hispanic White, and 618/100,000 among the Hispanic population. Similar measures for incidence of gonorrhea in 2018 were 655, 138, and 94. Indicators of teen pregnancy and birth rates demonstrate downward trends overall but a growing racial divide. For example, the teen pregnancy rate per 1,000 females aged 15-17 years in 2014 was 18.3 among Black residents and 14.8 White; in 2018 the difference in pregnancy rate had grown to more than 10, with 21.6 pregnancies per 1,000 (Black) and 9.9 per 1,000 (White).

Among the incidence rates that are stratified by race, ethnicity, and gender for cervical, colorectal, and breast cancers, the greatest disparities relate to the incidence of colorectal cancer, with consistently higher rates among men and the non-Hispanic Black population. Non-Hispanic White women historically experience a higher incidence of breast cancer; however, there is higher incidence and mortality among Black women younger than 60. This is consistent with national patterns and is partially related to screening rates and the prevalence of certain breast cancer types. Cervical, colorectal, and breast cancers are examples of cancers that are preventable or more easily treatable if detected early in the course of illness through diagnostic screening. Rates of screening among Davidson County's population are displayed by census tract but are not available in demographic categories. Screening rates are generally lower in the areas of higher poverty, including in Southeast and North Nashville, pointing to the continued need to promote cancer prevention among more vulnerable populations.

In the final section of the report, indicators are aimed at providing a snapshot of equity issues among health outcomes such as adverse birth outcomes, infant mortality, cancer and heart disease deaths, and death due to car crashes and violence. One group of indicators focuses on preventable hospitalizations and emergency visits for chronic disease complications, providing one way to gauge the accessibility and quality of primary care in a community. The rate of preventable hospitalizations due to diabetes complications, hypertension, COPD, and heart failure among non-Hispanic Black adults was 2,320 visits per 100,000 population, more than double the rates among other race and ethnicity groups in 2018. Likewise, emergency department visit rates for heart disease and diabetes among this same population in 2018 far exceeded the rates among non-Hispanic White and Hispanic adults. Infant mortality, another outcome indicator, is widely referenced as a measure of overall community health status. Leading causes of death during an infant's first year are birth defects, preterm birth and low birth weight, maternal pregnancy complications, sudden infant death syndrome, and injuries, along with other less frequent etiologies. Birth outcomes tend to

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improve as communities address the social, behavioral, and health risk factors contributing to infant mortality. In 2018, after steady improvement during previous decades, the infant mortality rate was 5.7 per 1,000 live births across the U.S., 6.9 per 1,000 live births in Tennessee, and 7.1 in Davidson County. The rate of mortality for non-Hispanic Black infants in Davidson County was 12.6 deaths per 1,000 live births; among non-Hispanic White infants mortality rate was 4.2. Death rates due to heart disease among adults is another health outcome indicator with community-wide implications. The age-adjusted rate among men in 2018 in Davidson County was 282 per 100,000 population, roughly 50% higher than among comparably aged women. The 2018 rate among the Black population was 265 per 100,000, and among the White population was 212. Because there are many modifiable risk factors for heart disease, including diet and exercise, indicators such as these help us to target prevention efforts and education among populations that are more adversely affected.

The COVID-19 pandemic dramatically affected the health of our community in 2020. Many of the preexisting disparities between racial and ethnic groups in Davidson County contributed to a disproportionately high impact on disadvantaged communities, and preliminary measures of these impacts are covered in this report.

Clearly, many of the measures covered in this health equity report indicate marked health disadvantages for racial and ethnic minority populations in Davidson County, particularly among Black residents. There are notable exceptions; drug-induced accidental deaths and deaths due to suicide occur at higher rates among the White population. It is important to acknowledge that the pursuit of health equity may require us to give special attention to the groups who suffer the most, but not to the point where we neglect the needs of other populations. Public health is served when we work towards good outcomes and the promotion of health for all.

The full report contains a wide selection of indicators and more detailed information. The report's sampling of information is drawn from publicly available sources, which are noted to enable further study. We encourage organizations and individuals concerned with the health of Nashville's residents and health equity in our community to review the report and use these and other indicators to help identify areas of need and to refine interventions based on progress.

Davidson County Demographics

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Davidson County is growing and becoming increasingly diverse. For example, the population increased from 668,347 residents in 2014 to 694,144 residents in 2019 (Table 1 below). The population increase was due to increases among Hispanics, Asian, residents of some other race and those of two or more races. The proportions of Non-Hispanic White and Black residents declined by 1.4% and 2.6% respective between 2014 and 2019.

Table 1. Population Distribution by Race and Ethnicity, Davison County 2014-2019

	2014	2015	2016	2017	2018	2019	% Change 2014-2019
Total population	668,347	678,889	684,410	691,243	692,587	694,144	3.9%
Race/Ethnicity							
Hispanic (of any race)	9.9%	10.0%	10.1%	10.3%	10.4%	10.4%	5.1%
NH White	56.8%	56.5%	56.3%	56.1%	56.0%	56.0%	-1.4%
NH Black or African American	27.4%	26.8%	27.3%	26.6%	26.7%	26.7%	-2.6%
American Indian and Alaska Native	0.3%	0.4%	0.2%	0.2%	0.1%	0.3%	0.0%
Asian	3.2%	3.1%	3.8%	3.5%	3.7%	3.8%	18.8%
Native Hawaiian and Other Pacific Islander	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	
Some other race	0.3%	0.6%	0.2%	0.3%	0.7%	0.5%	66.7%
Two or more races	1.9%	2.6%	2.1%	2.9%	2.3%	2.2%	15.8%

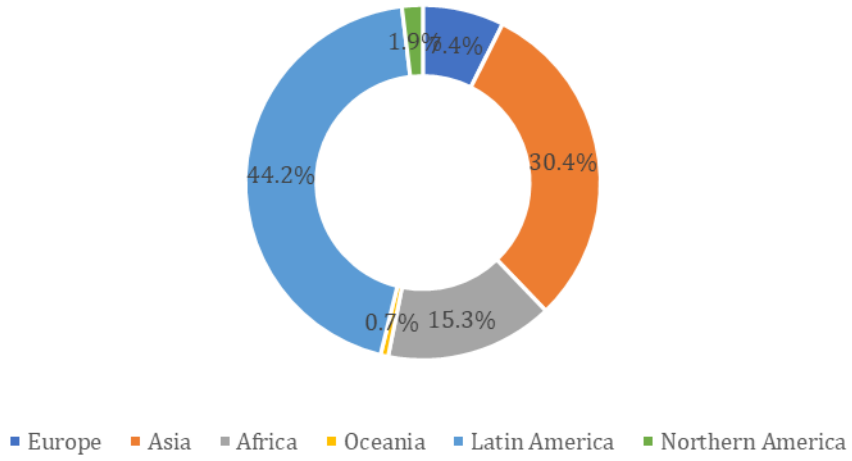
Data Source: U.S. Census Bureau. (2014–2019). American Community Survey, 1–year Estimates. Demographic and Housing Estimates Table DP05.

Half of the population in Davidson County is under age 35. The overall the age structure of residents remained relatively unchanged, except for the percentage of the population aged 65 years or older which increased from 11.2% in 2014 to 12.5% in 2019

In 2019, about 13.6% of Davidson County residents were foreign born, and 62.7% of these were not U.S. citizens. About 44% of the foreign-born residents were from Latin America, 30% Asia and 19.2% Africa (**Figure 1**). **Figure 2** shows that between 2015 and 2019 the increase in the proportion of the foreign-born population was among those born in Latin America (from 42% to 44.2%), Asia (from 28.3% to 30.4%) and Europe (from 4.6% to 7.4%). The percentage of foreign-born residents that were born in Africa decreased from 23.3% in 2015 to 15.3% in 2019.

Davidson County Demographics

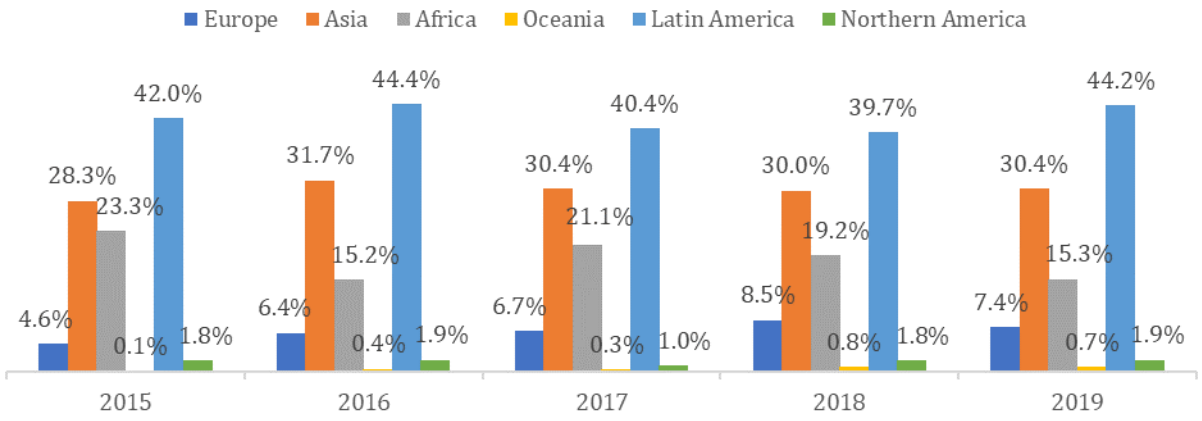
Figure 1. Percentage of Foreign-Born Davidson County Residents by World Region of Birth 2019



Data Source: U.S. Census Bureau. (2019). American Community Survey, 1–year estimates. Selected Social Characteristics in the United States, Table DP02

In 2019 about 5.3% of Davidson County adult residents were veterans, and 10.9% of all residents lived with a disability. Approximately 9% did not speak English very well, and these persons represent 52% of the population that spoke a language other than English at home. The proportion of the population that is linguistically isolated (i.e., do not speak English very well) in Davidson County was 3 times higher compared to the state's average of 3.1%. The national average in 2019 was 8.2%.

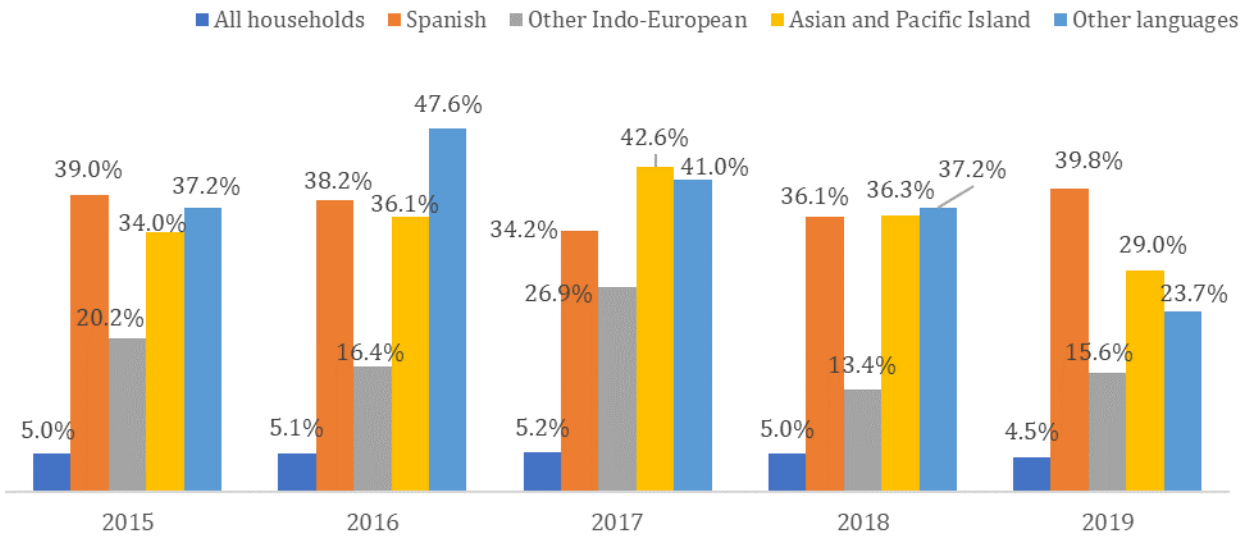
Figure 2. Percentage of Foreign-Born Davidson County Residents by World Region of Birth 2015-2019



Data Source: U.S. Census Bureau. (2015-2019). American Community Survey, 1–year estimates. Selected Social Characteristics in the United States, Table DP02

According to **Figure 3** below linguistic isolation tends to be highest among Spanish, Asian and Pacific Islander households. Between 2015 and 2019 at least 34.2% of Spanish speaking households were linguistically isolated. During the same time period the percentage of linguistically isolated households decreased among Asians from 34% in 2015 to 29% in 2019 and among other Indo-European residents from 20.2% in 2015 to 15.6% in 2019.

Figure 3. Percentage of Linguistically Isolated Households, 2015-2019



Data Source: U.S. Census Bureau. (2015–2019). American Community Survey, 1–year estimates. Limited English Speaking Households, Table S1602.

In general, households that are linguistically isolated may have difficulty accessing services such as transportation, healthcare, and social services. In addition, linguistic isolation may limit educational or employment opportunities, which impact health, earnings and overall quality of life. Furthermore, members of linguistically isolated households may have difficulty receiving information or services in an emergency, putting their health or life at risk. Linguistically and culturally appropriate healthcare and public support services help to mitigate linguistic isolation and its negative consequences on health and well-being, thus preventing health inequities. In the context of Healthy People 2030, healthcare providers are encouraged to "equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others,"[2] and adopt health literacy universal precautions. The latter is an assumption that "all patients may have difficulty comprehending health information and accessing health services"[3] and so require tailored, appropriate accommodations.

[2] Organizational Health Literacy More Essential than Ever for Preventing and Managing Chronic Disease. Content last reviewed October 2020. Agency for Healthcare Research and Quality, Rockville, MD. [Accessed on 10/16/20]. Available from: https://www.ahrq.gov/news/blog/ahrqviews/managing-chronic-disease.html

[3] AHRQ Health Literacy Universal Precautions Toolkit. Content last reviewed September 2020. Agency for Healthcare Research and Quality, Rockville, MD. [Accessed on 10/16/20].
Available from: https://www.ahrq.gov/health-literacy/improve/precautions/index.html

Disparities in the Social Determinants of Health

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Overview

Social determinants of health (SDOH) are conditions and environments in which people live, and include the social, economic and physical environments, all of which can have a significant influence on health and well-being. The social environment refers to patterns of social engagement and feelings of security and well-being, which can be affected by the places where people live, work, worship and play. The economic environment refers to the availability of fiscal resources that can enhance the quality of life, and the physical environment refers to the tangible and visible conditions of neighborhoods, schools, workplaces, and other material surroundings. Other examples of SDOH include safe and affordable housing, access to quality education, public safety, availability of healthy foods, access to preventive and healthcare services, health promoting social norms and attitudes, and opportunities for recreational and leisure-time activities.

Differences in the conditions in which people live, work and play explain in part why some people are healthier than others, and why public health and its partners are striving to create social, physical and economic environments that promote good health for all. Addressing social determinants of health is not only important for improving overall health, but also for reducing health differences that are often linked to social and economic disadvantages.

Socio-Economic Status

Socioeconomic status (SES) refers to the social and economic factors (i.e., education, income, occupation) that influence what positions individuals or groups hold within the structure of a society. Examining the distribution of SES indicators such as poverty, income, employment and educational achievement provides contextual information that can help explain or predict trends in health disparities and how they may change over time for different social groups in Davidson County. Examining income inequality and poverty, for example, provides an indication of whether economic conditions are improving or worsening, and for whom, and helps assess the potential health implications of those trends. Together, SES indicators help to measure equity in the opportunity and capacity to access community-level resources needed to improve health. As stated by the U.S. Department of Health and Human Services (Healthy People 2020 initiative), "(a)ll Americans deserve an equal opportunity to make the choices that lead to good health."[4]

Data presented and discussed in this section address the following questions:

- What is the state of social and economic determinants of health in Davidson County?
- Do the social and economic determinants of favorable or unfavorable health outcomes in Davidson County differ by sex, race/ethnicity, age or geographic location?

Data for five indicators (Education, Unemployment rate, GINI index, Poverty and Health insurance coverage) were selected to most accurately reflect the current state of social determinants of health in Davidson County. A more detailed listing of SES indicators and related trends is found in the Community Health Profile 2020.

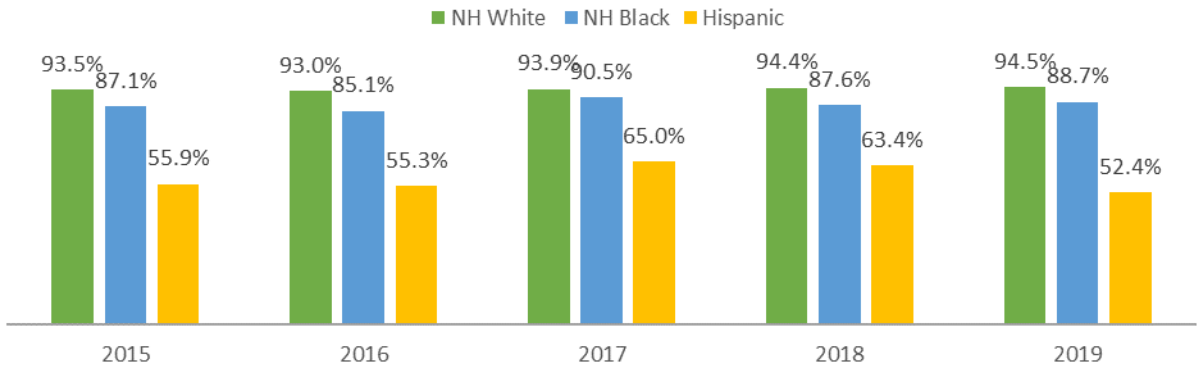
Healthy People 2020. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion [Accessed on 10/16/20].
Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

Disparities in Educational Achievements

Academic success is a strong indicator for overall well-being and is a predictor and determinant of health outcomes. Studies have found relationships between the level of education and various health risk factors, including smok-ing, drinking, diet and exercise, illegal drug use, household safety, use of preventive medical care, and care for hypertension and diabetes.

Figure 4 below shows the percentage of adult residents of Davidson County with high school or higher education between 2015 and 2019 by race/ethnicity. The lowest percentage of adults with high school or higher education was consistently among Hispanic residents and the highest percentage among Non-Hispanic White residents. In 2015 the percentage with high school or higher education among Non-Hispanic White residents (93.5%) was 1.7 times higher than that among Hispanics (55.9%). The high school or higher achievement gap between Hispanic and Non-Hispanic White residents decreased between 2015 and 2017 primarily because the proportion of Hispanic residents achieving high school or higher education increased to 65% in 2017. However, in 2019 the percentage decreased to 52.4 among Hispanics and increased slightly among Non-Hispanic White residents, again widening the gap between these two groups. The high school achievement gap between Non-Hispanic White and Non-Hispanic Black residents was relatively stable over the 5 years period. Each group experienced not more than a 1.6 percentage point increase in the high school or higher achievement rate between 2015 and 2019.

Figure 4. Percentage of residents 18 years and older with high school or higher education by race/ethnicity, Davidson County 2015-2019

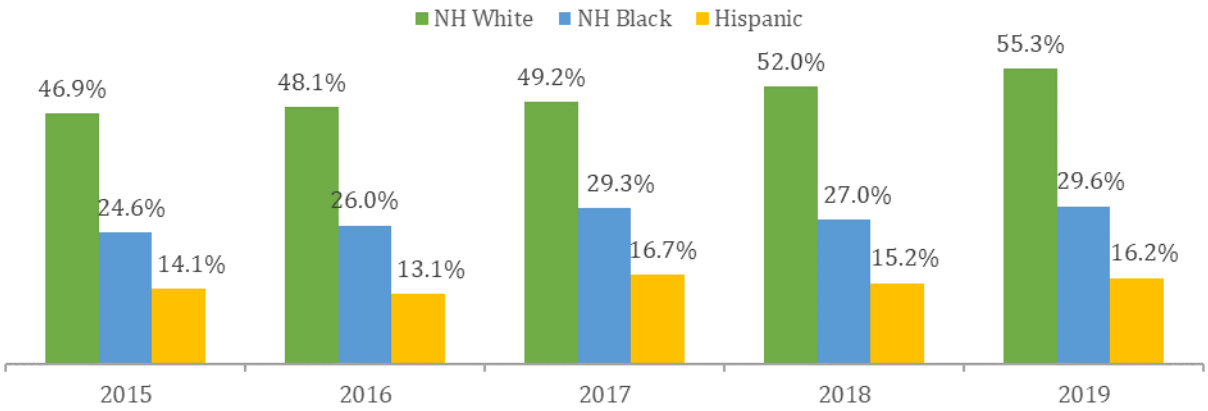


Data Source: U.S. Census Bureau. (2015–2019). US Census Bureau. American Community Survey 1–year estimates. Educational Attainment, Table S1501.

In general, the percentage of residents aged 18 years and older with a bachelor's degree or higher in Davidson County increased from 35.9% in 2015 to 42.9% in 2019 (Data not shown). This change could be due to the decrease in the proportions with some college or no degree and those with less than high school education. This suggests that more residents of Davidson County are achieving higher levels of education over time. The US Department of Education's Institutes of Education Sciences estimated that college enrollment nationwide would increase by about 15% between 2014 and 2025.

Figure 5 below shows the percentage of adult residents of Davidson County with a bachelor's degree or higher by race/ethnicity.

Figure 5. Percentage of residents 18 years and older with bachelor's degree or higher by race/ethnicity, Davidson County 2015-2019



Data Source: U.S. Census Bureau. (2015–2019). US Census Bureau. American Community Survey 1–year estimates. Educational Attainment, Table S1501.

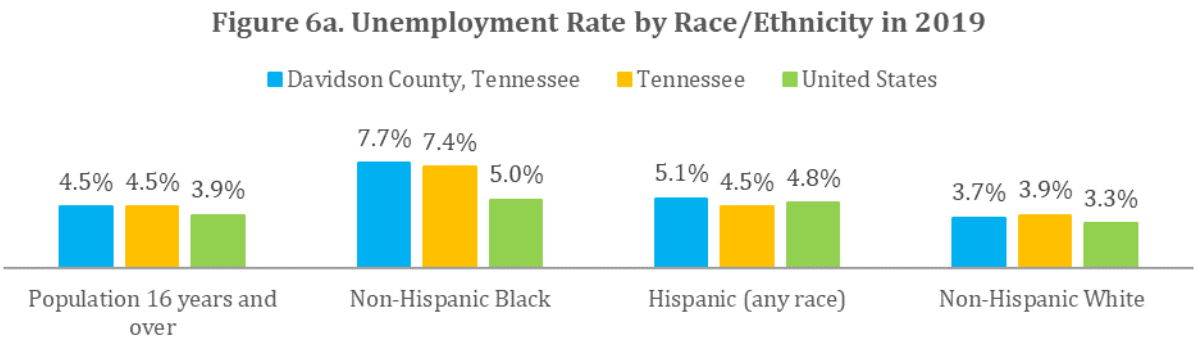
Between 2015 and 2019 the percentage with a bachelor's degree or higher in Davidson County was highest among Non-Hispanic Whites and lowest among Hispanics. The achievement gap between Non-Hispanic Whites and Hispanic residents increased from 3.3 times (32.8% absolute difference) in 2015 to 3.4 times (39.1% absolute difference) in 2019. On average, the percentage with a bachelor's degree among Non-Hispanic Black residents was about 1.8 times lower than that among Non-Hispanic White residents in 2015 through 2019.[5]

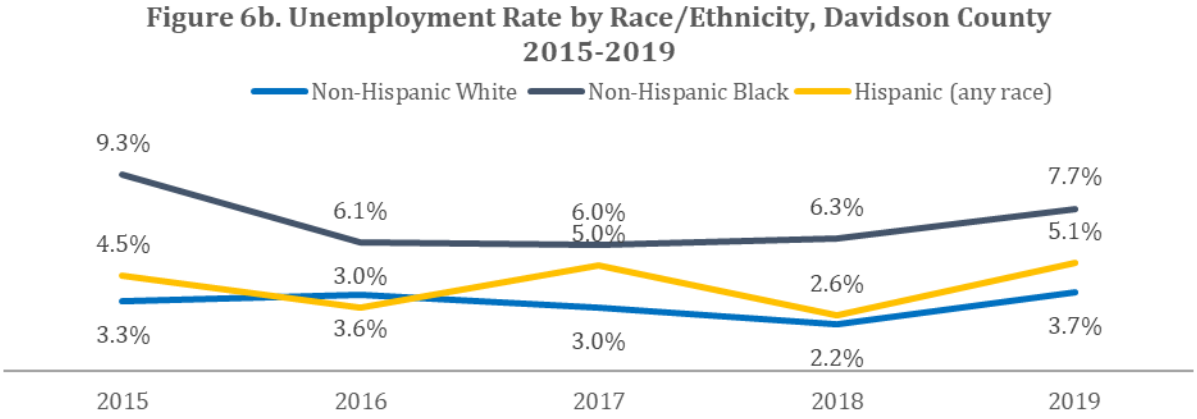
The racial/ethnic distribution of educational achievements indicates that the gains in academic achievements observed in 2015 through 2019 (**Figure 5** above) were likely lowest among Hispanic residents. For example, there was a 14% increase in the percentage with a bachelor's degree among Hispanic residents compared to an increase of 20% among Non-Hispanic Black and 18% among Non-Hispanic White residents. Racial/ethnic differences in academic success are a strong indicator of disparities in overall well-being and are a predictor and determinant of differences in health outcomes. As stated before, people who are better educated have lower morbidity and mortality rates, and generally have better physical and mental health.

Disparities in the Unemployment Rate

The unemployment rate is the percentage of the labor force that is not employed but is available for work and actively looking for work opportunities. The Census Bureau's American Community Survey makes this determination annually for the 4 weeks ending with the week of the survey. The unemployment rate is an important indicator of the state of the local economy. A high unemployment rate has both individual and societal impacts. "When unemployment is high, some people become discouraged and stop looking for work; they are then excluded from the labor force."[6] Individuals can experience severe economic strain, mental stress, and reduced access to healthcare. A high unemployment rate also strains financial support systems, such as unemployment benefits and food assistance, which places a burden on the entire community.

The overall unemployment rate for Davidson County (population 16 years and over) decreased from 6.4% in 2014 to 3.9% in 2019, a cumulative decrease of 39% (data not shown). The county's unemployment rate was consistently lower than for both the state and nation. The nation's unemployment rate decreased by about 32% from 7.2% in 2014 to 4.5% in 2019. **Figure 6b** below indicates that the annual unemployment rate in Davidson County differed by race/ethnicity each year from 2015 to 2019.

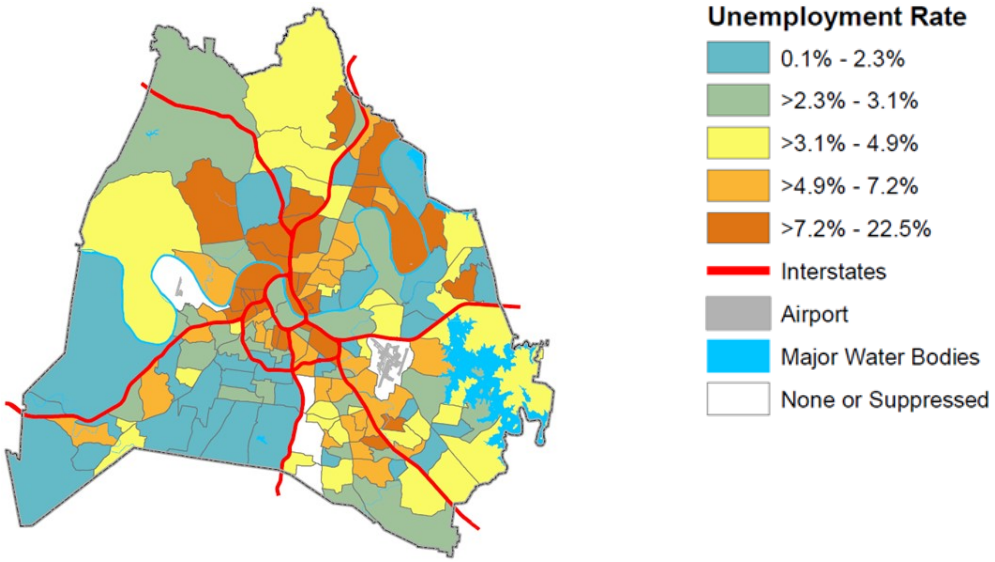




Data Source: U.S. Census Bureau. (2015–2019). American Community Survey 1–year estimates. Selected Economic Characteristics; Table S2301.

Geographic differences in the average unemployment rate during the period 2014-2018 are shown on the map below (**Figure 7)**. On average, there was an absolute difference of 22.4 percentage points in the unemployment rate between the census tract with the lowest and highest unemployment rate. The geographic clustering of areas of high or low unemployment tends to be related to census tract characteristics such as racial/ ethnic segregation in housing, and differences in educational achievement and economic opportunity.

Figure 7. Five-year Average Unemployment Rate by Census Tract, Davidson County, 2014-2018



Data Source: U.S. Census Bureau. (2018). American Community Survey 5–year estimates. Selected Economic Characteristics; Table S2301. Geography layer from Metro Planning Department.

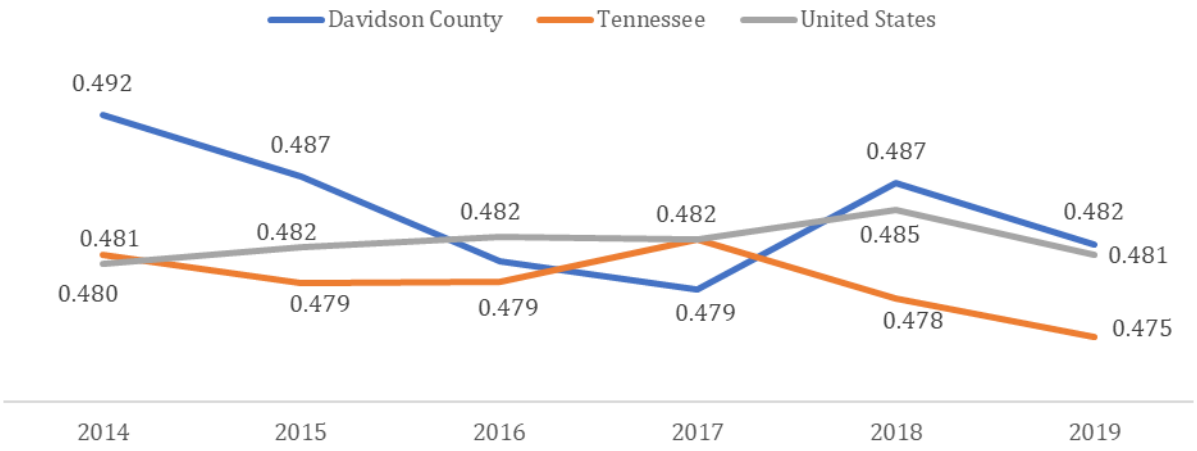
Geographic and racial/ethnic differences in unemployment can indicate structural inequalities in employment prospects, job stability, and the ability to recover from recessions or to benefit from improvements in the local job market. These geographic and racial/ethnic differences in unemployment rates and trends suggest local inequities in job security and employment prospects and, consequently, in financial well-being. It has been noted that the health of a population group can be directly enhanced by employment opportunities that provide health insurance coverage, paid sick leave, and parental leave, in addition to safe, stable and equitably rewarding work conditions (HealthyPeople2020.gov).

Income Inequality

The GINI Index is the most referenced measure of income inequality. It measures the extent to which the income distribution among a population is different from one where each proportion of the population earns the same proportion of the total income. The GINI Index has been used to measure health inequality by estimating the distribution of health risk, among populations or groups. The index ranges from 0 (complete equality) to 1 (complete inequality, where one person has all the income and others have none). So, the higher the index score, the higher the income inequality.

Figure 8 below shows that income inequality in Davidson County decreased from a score of 0.492 in 2014 to a score of 0.479 in 2017 and then rose to 0.482 in 2019. On average Davidson County's income inequality was lower than the national average between 2016 and 2017. The overall trend indicates that for 6 years (2014-2019), the gap in Davidson County decreased marginally by about 2%. This state of income inequality is consistent with national trends for the same 6-year period.

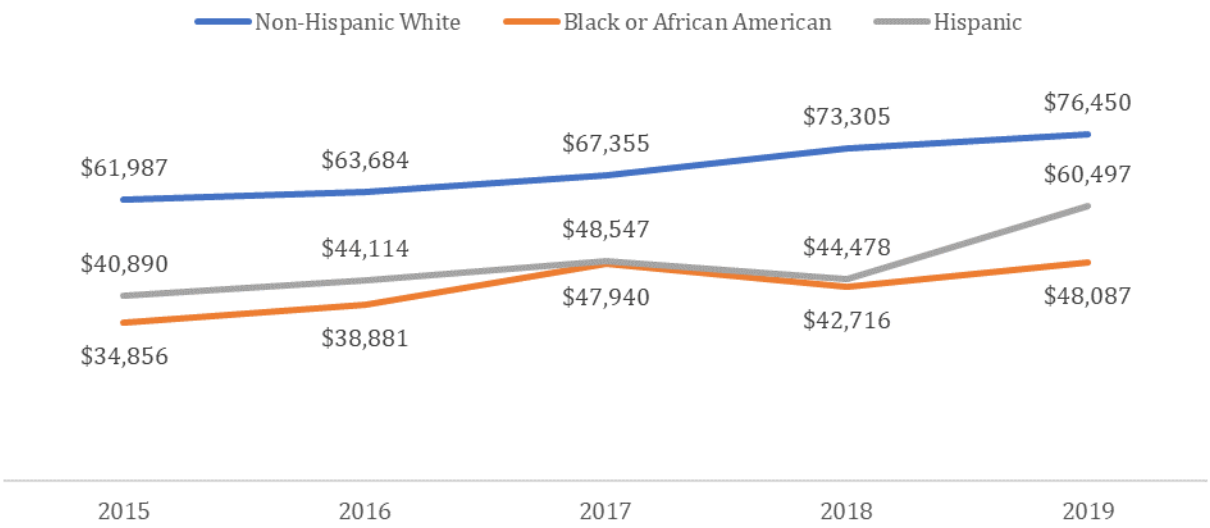
Figure 8. GINI Index of Income Inequality 2015-2019



Data Source: U.S. Census Bureau. (2015–2019). American Community Survey 1–year estimates. GINI Index of Income In-equality, Table B19083.

The GINI index available from the Census Bureau is not disaggregated by sex, race/ethnicity, age or sub-county units of geography. However, the key component of the GINI index, household income, is disaggregated. Between 2015 and 2019 the median household income increased in Davidson County, the state and nationwide, with Davidson County incomes growing at a faster rate relative to the state and nation (Data not Shown). **Figure 9** indicates that, Non-Hispanic White households in Davidson County had the highest median household income consistently between 2015 and 2019. Hispanics of all races and Non-Hispanic Black residents had comparable median household incomes, until 2018 when the median household income among Hispanics increased sharply from $44,478 to $60,497 in 2019, narrowing the gap with Non-Hispanic White households. Non-Hispanic Black households experienced a 38% increase in the median household income between 2015 and 2019. However, the gap in the median household income between Non-Hispanic White and Non-Hispanic Black households was stable throughout the 5-years period shown ($27,131 in 2015 and $28,363 in 2019.)

Figure 9. Median Household Income in Davidson County by Race/Ethnicity 2015-2019



Data Source: U.S. Census Bureau. (2015–2019). American Community Survey, 1–year estimates. Median Income in the Past 12 Months, Table S1903.

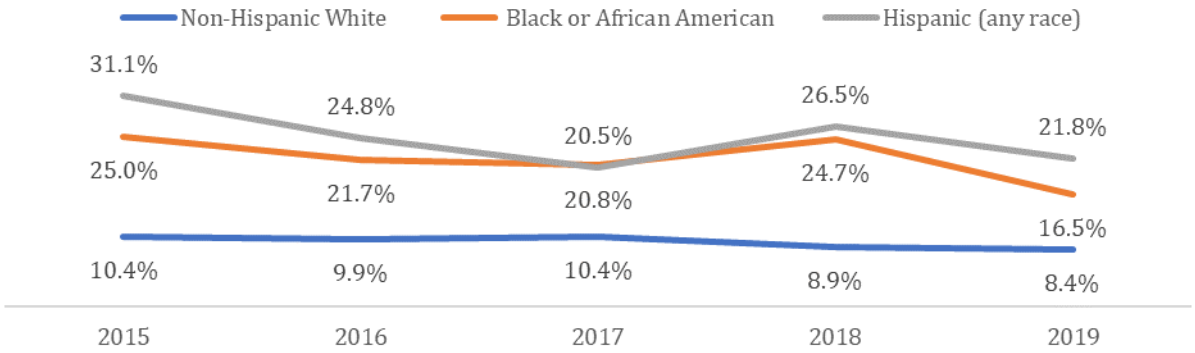
The GINI index, therefore, indicates that the increases in household incomes observed in Davidson County and nationwide across all major racial/ethnic groups particularly from 2005 to 2019,[7] have not meaningfully closed the historic income gap;, income gains among the middle and low income households have been relatively modest in comparison to income gains among high-income households.[8] It has been noted that income is well-recognized to be associated with morbidity and premature mortality internationally and within the United States.[9] Therefore, income inequality and racial/ethnic disparities in household income can reveal inequalities both in the health outcomes and economic well-being of communities, households, and individuals. Later in the report (on pages 63-67) the correlation between the percent of the population living in poverty (a dimension of income distribution) and low cancer screening rates is demonstrated.

Disparities in Adult & Child Poverty

In 2019 about 12.4% of Davidson County residents lived below the federal poverty level. This percentage was lower than that for the state (13.9%), and similar to that for the nation (12.3%). About 17.5% of Davidson County children 17 years or younger lived below the poverty line, compared to 11.2% of adults 18 to 64 years old and 10.2% of those aged 65 and older (9.4%). The likelihood that someone will experience poverty in the United States varies by race and ethnicity. In a 2017 State of the Union report, the Stanford's Center on Poverty and Inequality notes "One in four blacks, one in four Native Americans and one in five Hispanics are classified as poor. By contrast, only 1 in 10 whites and 1 in 10 Asians are poor."

A similar magnitude of difference exists in Davidson County, primarily between the proportions of White and non-White residents, as shown in **Figure 10** below. Although higher than among Non-Hispanic White residents, the percent of people living in poverty decreased among Hispanic and Non-Hispanic Black residents between 2015 and 2017, then increased in 2018 and decreased in 2019. Among Non-Hispanic White residents, the decrease was steady, from 10.4% in 2015 to 8.4% in 2019. Differences in the stability of poverty rates can be both a cause and a consequence of racial and ethnic disparity in employment stability, wealth and health.

Figure 10. Percentage of People Living Below Poverty Line* by Race/Ethnicity 2015-2019

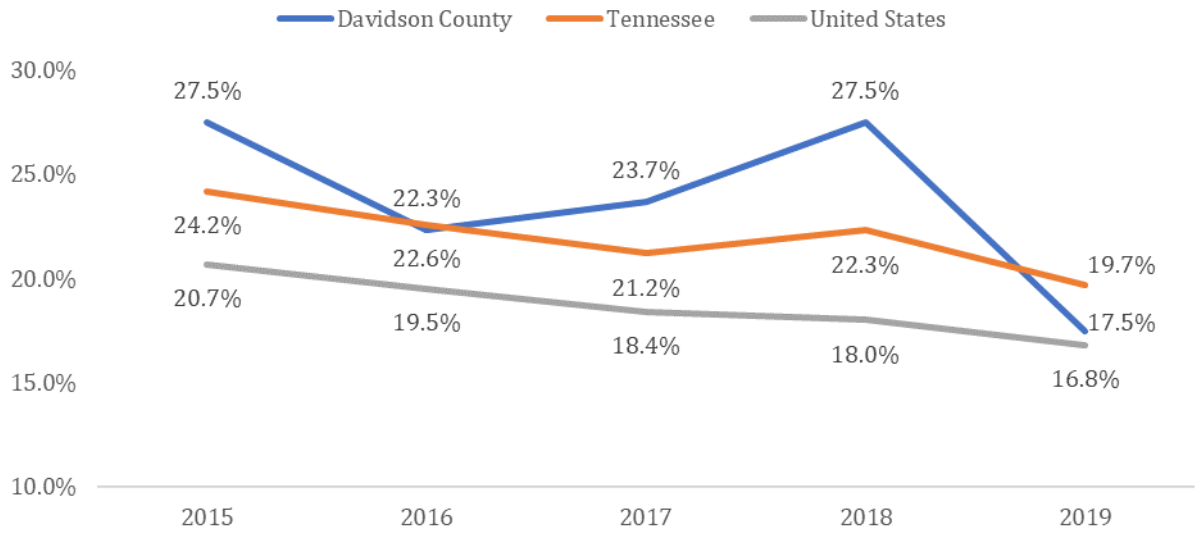


Data Source: U.S. Census Bureau. (2015–2019). American Community Survey 1–year estimates. Poverty Status in the last 12 months; Table S1701.
* Within 100% of the federal poverty threshold.

Family income has been shown to affect a child's well-being. Compared to their peers, children in poverty are more likely to have physical health problems like low birth weight or lead poisoning and are also more likely to have behavioral and emotional problems. Children in poverty also tend to exhibit cognitive difficulties, as shown in achievement test scores, and are less likely to complete basic education.

In 2019, about 17.5% of children aged under 18 years in Davidson County were classified as living below the federal poverty level compared to 19.7% across the State of Tennessee and 16.8% nationwide (**Figure 11)**. The data indicate that child poverty in Davidson County decreased from 27.5% in 2015 to 22.3% in 2016, rose to 27.5% in 2018 and then dropped to 17.5% in 2019.

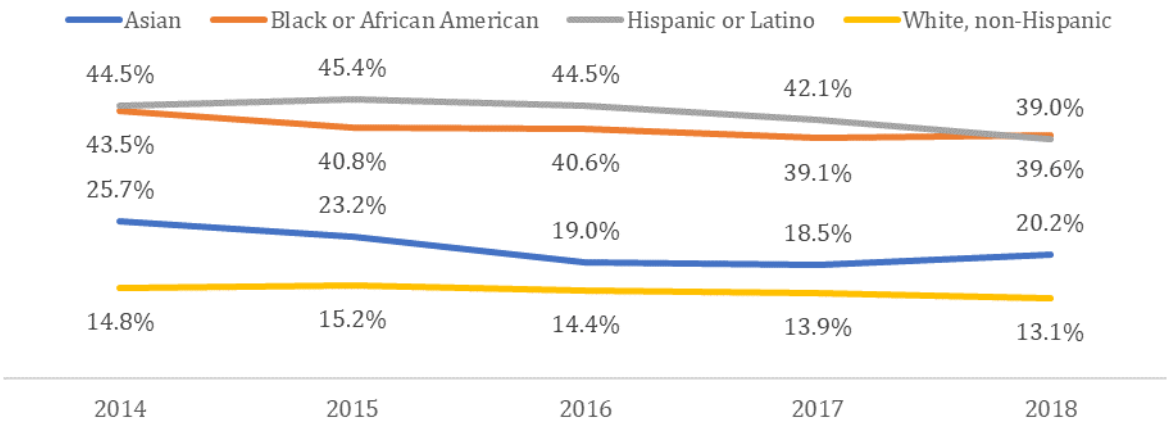
Figure 11. Percentage of Children Under 18 Years Living Below the Poverty Level,* 2015-2019



Data Source: American Community Survey 1-year estimate. Table S1701
* Within 100% of the federal poverty threshold

Figure 12 below indicates that more children than adults tend to live in poverty, particularly among Non-White residents. On average 44.5% of Hispanic and 43.5% of Black or African American children lived below the federal poverty level in 2014, compared to 25.7% of Asian and 14.8% Non-Hispanic White children. The percent of children in poverty declined across all racial/ethnic groups in Davidson county from 2014 through 2018, most significantly among Asian children (21.4% cumulative decrease), followed by Hispanic children (12.4% decrease). The decrease was 9.7% among Non-Hispanic White and 9% among Black or African American children.

Figure 12. Percentage of Children Under 18 Years Living Below the Poverty Level,* 2014-2018



Data Source: www.healthynashville.org. * 100% of the federal poverty threshold. Estimates are 5-year estimates of the percentage of the population.

Trauma research indicates that adverse childhood experiences (ACEs), particularly when compounded by other co-existing traumas that tend to plague poor households (such as living in unstable or unsafe homes/community settings, financial instability, poor neighborhood infrastructure), can have negative consequences in adulthood.[10] The overall health of the population, and health equity, can be improved by instituting and resourcing trauma-informed policies and programs of action that address the root causes of childhood poverty and protect children from adverse childhood experiences in general. A recent policy statement by the American Medical Association defines " **trauma-informed** care as a practice that recognizes the widespread impact of trauma on patients, identifies the signs and symptoms of trauma, and treats patients by fully integrating knowledge about trauma into policies, procedures, and practices and seeking to avoid re-traumatization."[11] As noted elsewhere, "(i)mportant elements of trauma-informed care include understanding how trauma affects health, routinely screening for ACEs and trauma, using culturally responsive assessments, promoting resilience and protective factors, addressing trauma-related somatic and mental health issues, and ensuring appropriate linkage to services and supports for identified issues."[12] Investing in early childhood development to finance quality preschool education, instituting strength-based student support frameworks in schools to promote retention and graduation, and supporting second chance job-focused training for adults who experienced disruptions in their childhood education also address root causes of health inequities.[13]

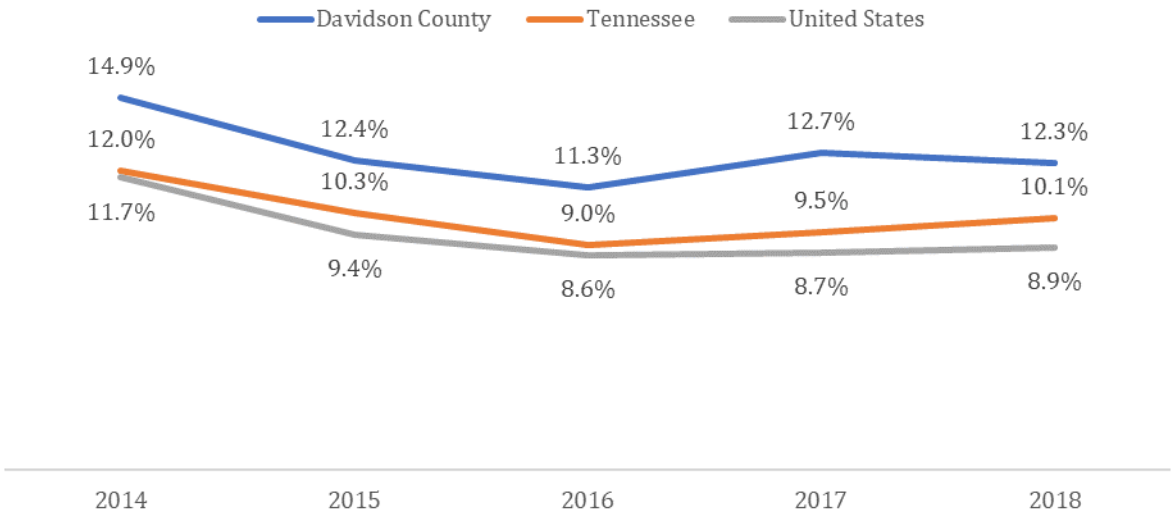
Disparities in Health Insurance Coverage

Having or not having health insurance coverage, and the type of health insurance, determine the opportunity to access comprehensive, quality healthcare services, which is critical for promoting and maintaining health, preventing and managing disease, reducing unnecessary disability and premature death, and achieving health equity.[14] Lack of access to healthcare can result in unmet health needs, delays in receiving appropriate care, financial burdens, preventable hospitalizations, and failure to obtain health screenings and preventive services. Inequities in health insurance coverage can result in

disparities in the ability to benefit from policies that improve healthcare infrastructure, expand service capacity, improve care coordination and reduce costs. Such policies need to also expand health insurance coverage, including non-employer-sponsored insurance options.

In 2018 about 12.3% of Davidson County residents did not have health insurance, down from 14.9% in 2014. During this period, the county's uninsured rate was consistently higher than the rate for the state and nation (**Figure 13** below.)

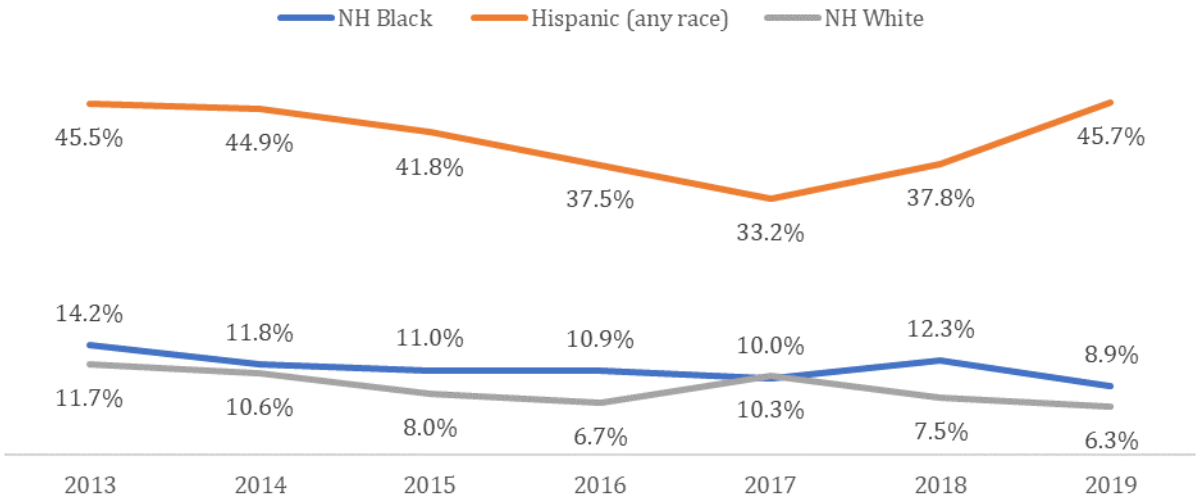
Figure 13. Percentage of Population Without Health Insurance, 2014-2018



Data Source: U.S Census Bureau. (2014–2018). American Community Survey 1–year estimates. Selected Economic Characteristics; Table DP03

In 2019 about 93.7% of Non-Hispanic White residents had insurance coverage compared to 91.1% of Non-Hispanic Black and 54.3% of Hispanic residents (**Figure 14** below). Overall, this represents a cumulative coverage increase of 21.3% among Non-Hispanic White and 19.1% among Non-Hispanic Black residents between 2015 and 2019. Among Hispanic residents, the percentage uninsured deceased from 41.8% in 2015 to 33.2% in 2017 and then increased (by 37.8%) to 45.7% uninsured in 2019. The age range defining adults for these data changed in 2017 from 18 to 64 years to 19 to 64 years. Therefore, trends that include pre-2017 data should be interpreted with caution as estimates may not be comparable across the transition period.

Figue 14. Percentage of Adults Ages 18-64* Without Health Insurance by Race, Davidson County, 2015-2019



Data Source: U.S Census Bureau. (2015–2019). American Community Survey 1–year estimates. Health Insurance Coverage Status; Table S2701.
*The age range for table S2701 changed in 2017 from 18 to 64 years to 19 to 64 years. Therefore, trends that include pre-2017 data should be interpreted with caution as estimates may not be comparable across the transition period.

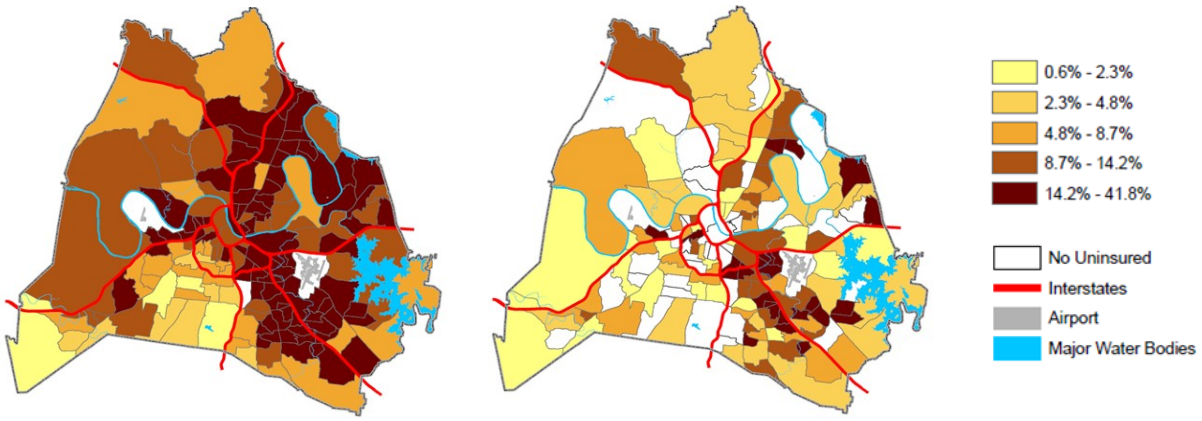
Minority racial/ethnic populations are more likely to lose health insurance coverage, particularly during the transition from childhood to adulthood.[15] The long-term stability of differences in insurance coverage can impede progress towards eliminating racial/ethnic differences in healthcare access and utilization.

The geographic distribution of insurance coverage for children (**Figure 15)** indicates a concentration of census tracts with high percentages of uninsured children in the Southeast and Northeast portions of the county. These are also areas with high concentrations of low-income households with foreign born members. Among adults, the lowest percentage of the uninsured in 2014 through 2018 was in the more affluent census tracts located in the South and Southwestern borders of Davidson County. The geographic distribution of health insurance coverage can account for geographic differences in healthcare access and outcomes.

Figure 15. Percentage of Uninsured Population by Census Tract, Davidson County, 2014-2018

Ages 19 to 64 years

Ages under 19 years



Data Source: U.S Census Bureau. (2018). American Community Survey 5–year estimates. Health Insurance Coverage Status; Table S2701. The age range for table S2701 changed in 2017 from 18 to 64 years to 19 to 64 years. Therefore, trends that include pre-2017 data should be interpreted with caution as estimates may not be comparable across the transition period.

Health insurance coverage also varies by educational achievement, employment status, household income and poverty status. **Table 2** shows the absolute change in the percent uninsured in Davidson County between 2015 and 2019. In 2019 the highest percentage of the county's population aged 26 and older that did not have health insurance coverage was among those with less than high school education (36.2%), and the estimate for this group was 22.1 percentage points higher than in 2015. In 2019, the lowest percentage of the population aged 26 and older uninsured was among those with a bachelor's degree or higher (4.9%) and the estimate for this group was 7.1 percentage points lower than in 2015. Among unemployed persons aged 19 to 64 years, 34% had no health insurance coverage in 2019 and this estimate was 2.3 times higher than in 2015. About 12.7% of employed adults aged 19 to 64 years had no health insurance in 2019, which was 2.8 percent lower than the 2015 estimate. It is likely that between 2015 and 2019 the loss of health insurance coverage was greater among the unemployed than the employed. This is likely because employer-sponsored insurance is the primary health insurance for most adult Americans. [16]

Table 2 also shows that the percentage of the population with health insurance coverage increases with increasing levels of annual household income. Between 2015 and 2019 the percent of the population uninsured in Davidson County decreased for all annual household income levels, except for those with incomes less than $25,000 among whom the percent insured increased from 12.4% to 16.8%.

Table 2. Percentage of Population Uninsured by Educational Achievement, Employment Status, Household Income and Poverty Status, Davidson County, 2015 and 2019

Population Characteristic	2015 (%)	2019 (%)	Absolute Change
Education Level **(Population aged 26 years and over)**			
Less than high school graduate	14.1	36.2	22.1
High school graduate	33.9	18.9	-15.0
Some college or associate degree	21.7	11.4	-10.3
Bachelor's degree or higher	12.0	4.9	-7.1
Employment Status **(Population aged 19 to 64 years)**			
Employed	15.5	12.7	-2.8
Unemployed	14.7	34.0	19.3
Annual Household Income			
Less than $25,000	12.4	16.8	4.4
$25,000 to $49,999	17.5	14.4	-3.1
$50,000 to $74,999	17.8	15.9	-1.9
$75,000 to $99,999	11.8	9.5	-2.3
$100,000 and over	9.0	6.4	-2.6
Poverty Status			
Below 100% of the poverty threshold	11.9	20.9	9.0
Below 138% of the poverty threshold	12.5	21.5	9.0
138% to 399% above the poverty threshold	20.9	13.1	-7.8
≥400% above the poverty threshold	19.0	5.3	-13.7

Data Source: U.S Census Bureau. (2015–2019). American Community Survey 1–year estimates. Health Insurance Coverage Status; Table S2701

Table 2 also shows that the level of health insurance coverage varies even among the population classified as poor. In 2015, the highest proportion without health insurance was among those living between 138 and 399 percent above the federal poverty threshold (20.9%) and the lowest was among those living below 100% of the poverty level (11.9%). In 2019 this trend reversed. In 2019 the percent living below 100% of the poverty threshold with no health insurance was 1.8 times higher than in 2015. Among those living between 138 and 399 percent above the poverty threshold the percent uninsured was 1.6 times lower in 2019 than 2015. Perhaps these trends are a reflection of changes in the social safety-nets and eligibility for reduced-cost health insurance.

Among the insured, not all are equal. National data indicates that the quality of the insurance coverage (as measured by the offer rate, premiums and deductibles) varies by employer type, size and length of operation, particularly among employer-sponsored health plans. The latter are the primary sources of health insurance for most Americans. Since employer accessibility is not entirely a personal choice (as there can be socially prescribed barriers to entry/access, especially to more rewarding, stable employers), the quality of health insurance covered is also likely to be as socially and geographically structured as the patterns of insurance coverage observed in Davidson County.[17] According to the Medical Expenditure Panel Survey Insurance Component 2017 Chartbook, the percentage of employees offered health insurance was 99% at firms with 100 or more employees but only 48% at smaller employers (with less than 50 employees). In 2017, the average annual premium for employer-sponsored insurance nationwide was estimated at $6,368 for single coverage, $12,789 for employee-plus-one coverage and $18,687 for family coverage.[8]
In comparison, the average annual premium in 2004 was lower than in 2017 by about 72% for single coverage, 81% for employee-plus-one coverage, and about 86% for family coverage. The 2017 Chartbook also shows that an estimated 12% of single and 9% of family enrollees nationwide in 2004 were in a high-deductible health plan. However, in 2017 about 53% of single and 52% of family enrollees had this type of plan. Hence, more and more low-income workers forgo employer-sponsored health insurance that they are eligible for.[18] The Chartbook also shows that workers' insurance options vary by type of work or industry. Therefore, even when available, the distribution of employer-sponsored health insurance is increasingly socio-economically structured.

According to Healthy People 2020, fixing health insurance coverage is not enough to improve rates of access to health care and health equity.[19] Other barriers to healthcare also need to be addressed, including inconvenient and unreliable transportation, geographic disparities in provider shortages or off-hour availability, linguistic and cultural inappropriateness of services, and employment contracts that do not incentivize doctor visits.

Implications of Inequities in Socioeconomic Status

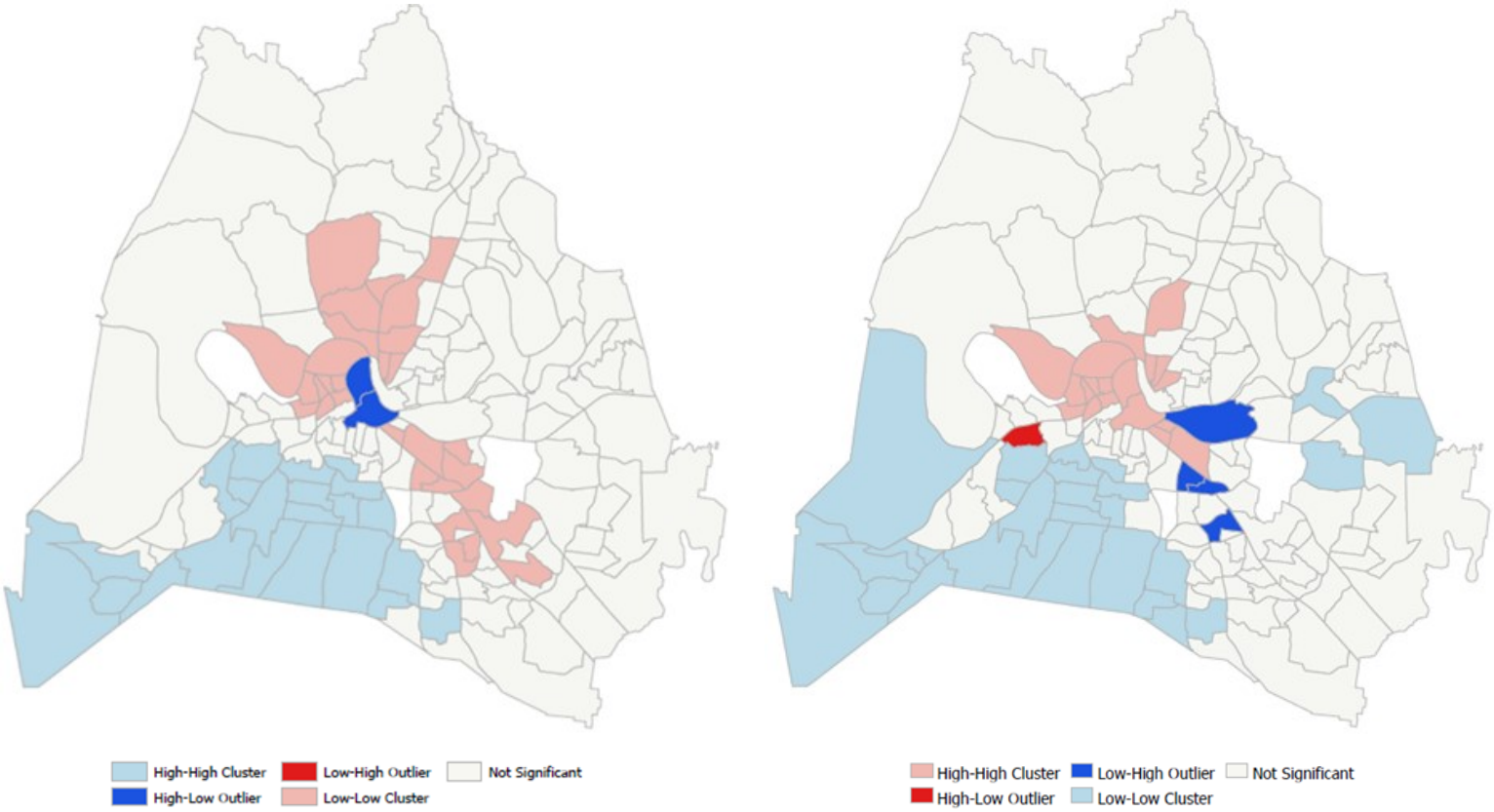
When viewed collectively, the demographic and geographic characteristics of socioeconomic status (SES) indicate that individual elements of SES are seldom experienced in isolation. Rather they cluster among and distinguish subgroups of the population, creating persistent social and geographic divides between the privileged (or haves) and disadvantaged (have nots). As noted, "(t)hose who live in chronically stressful environments often cope with stressors by engaging in unhealthy behaviors that may have protective mental-health effects. However, such unhealthy behaviors can combine with negative environmental conditions to eventually contribute to morbidity and mortality disparities among social groups.[20]

The arrival of significant numbers of affluent newcomers in a neighborhood has been coined gentrification.[21] Although local data on gentrification are not readily available, one short-to-medium term indicator could be the dual classification of a neighborhood as high income and high poverty area. **Figure 16** shows how census tracts in Davidson County can be clustered by median household income and the percentage of the population living below the federal poverty line. [22]

Each map shows 4 clusters. For example, **Figure 16(a)** included the following clusters: High income tract next to High income tracts (High-High cluster), High income tract next to Low-Income tracts (High-Low outlier), Low-income tract next to high-income tracts (Low-High outlier), Low income tract next to Low income tracts (Low-Low cluster). Similar clustering is done for poverty rates (**Figure 16b**). Classic segregation by socio-economic status would result in a perfect match between these income and poverty clusters, i.e., high-income neighborhoods (**Figure 16a**) would have zero to low poverty rates (**Figure 16b**) and while low-income neighborhoods would have high poverty rates. However, the two maps reveal a few anomalies, the most prominent being around the core of Nashville which is classed as a High-Low outlier for income (**Figure 16a**) and High-High cluster for poverty (**Figure 16b**). That is, the area is both a high-income cluster and a high poverty cluster. Neighboring census tracts (immediately north) fit the low-income high-poverty cluster. This suggests that the area in and around Nashville's core likely has significant income inequality, most probably due to the entrance of high-income residents in a traditionally low-income high-poverty area. More rigorous analyses are needed to more accurately capture and validate this observation. Therefore, these maps should be interpreted with caution.

Figure 16. Census Tract Clusters by Median Household Income and Percent of Population Living Below the Federal Poverty Line, Davidson County, 2018

(a) Income Clusters	(b) Poverty Clusters



Gentrification trends (locally and nationwide) have shown that physical spaces can be significantly, positively transformed by economic forces that displace the socially disadvantaged natives of those spaces.[23] This merely relocates the extant social and geographic divides without improving overall population health. Hence, advancing health equity might require bold political decision-making and public investments that protect vulnerable subgroups from being geographically displaced as the economic, educational, community and health opportunities are expanded in historically disadvantaged and impoverished neighborhoods.

Neighborhood – Physical and Community Context of Health

According to the National Collaborative for Health Equity, "(d)ifferences in neighborhood conditions powerfully predict who is healthy, who is sick, and who lives longer. And because of patterns of residential segregation, these differences are the fundamental causes of health inequities among different racial, ethnic, and socioeconomic groups."[24] A series of studies conducted by the Joint Center for Political and Economic Studies across a widely diverse sample of U.S. communities, demonstrated "that social, economic, and environmental conditions in low-income and non-white neighborhoods make it more difficult for people in these neighborhoods to live healthy lives." In this report census tracts are used to geographically distinguish neighborhoods in Davidson County.

Section Questions:

- What is the state of the physical, environmental and community context in which the residents of Davidson County live, work and play?
- How equitably distributed are these characteristics among various social groups?

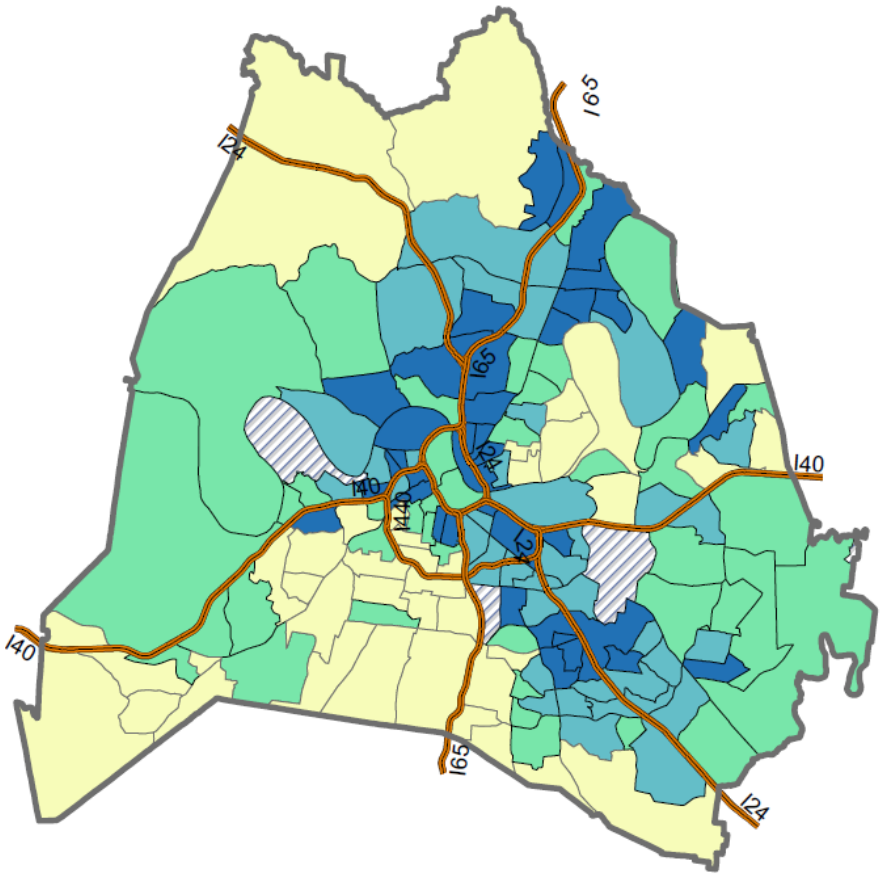
This section of the report focuses on a few indices that are derived using statistical composites of the physical, environmental, social and economic indicators of neighborhood/community vitality. Specifically, the social vulnerability index, and indices of economic, educational, community and health opportunity. The section also evaluates subpopulation differences in the distribution of the consequences of these neighborhood features, such as the crime rate, ease of access to healthy food, poisoning and injury due to environmental hazards.

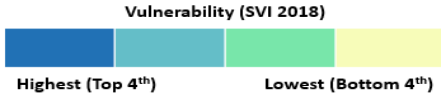
Vulnerability Index

The Centers for Disease Control and Prevention (CDC) defines social vulnerability as "the resilience of communities when confronted by external stresses on human health, stresses such as natural or human-caused disasters, or disease outbreaks."[25] People and communities that are socially vulnerable are more likely to die or less likely to recover from disaster events or disease outbreaks. It has been noted that "social vulnerability is the product of social and place inequalities." The social vulnerability index, a tool for measuring social vulnerability, was developed by the CDC for use in emergency management.[26] It combines census tract level data from the Census Bureau on 15 socioeconomic and demographic variables to quantify social vulnerability. Higher scores represent higher levels of vulnerability and so are less desirable. The additive model computes a summary score for each census tract. The contributions of each of these 15 variables to the census tract level index score varies by census tract – some component variables increase while others moderate a census tract's vulnerability.[27] It has been shown that almost half of the variability in social vulnerability among U.S. counties is accounted for by the level of development of the built environment, age, race/ethnicity, and sex. [28]

The social vulnerability index is applied here to indicate how the interaction among socioeconomic status, household composition, race/ethnicity/language, and housing and transportation, distinguish census tracts that are the most and least vulnerable to natural disasters or disease outbreaks. **Figure 17** below shows the social vulnerability index score of each of the 161 census tracts in Davidson County using a 4-point scale distinguishing the highest from lowest level of social vulnerability. The score is based on the 2018 census data.

Figure 17a. CDC's Overall Social Vulnerability Index 2018, Davidson County, Tennessee



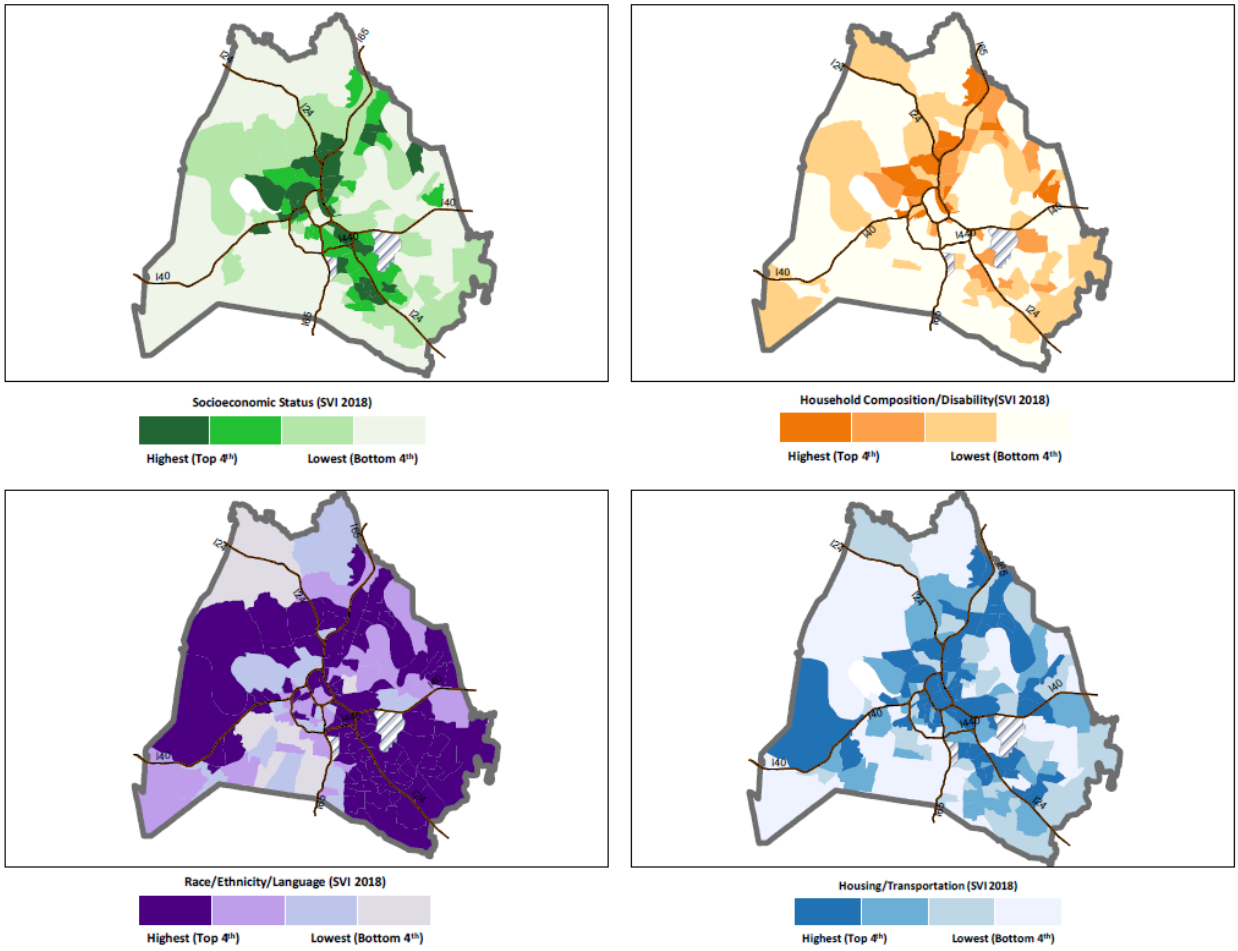


https://svi.cdc.gov/data-and-tools-download.html

Based on this index (**Figure 17a**), the most socially vulnerable census tracts seem to be concentrated along the Interstate Highway 24 in the south of Davidson County, and around the ring of interstate highways that mark Downtown Nashville, extending north-northeast along Interstate Highway 65. **Figure 17b** below shows the maps of each of the four component themes of the social vulnerability index:

1. Socioeconomic status map - a composite measure of the population below poverty, unemployed, low income, no high school diploma;
2. Household composition & disability map - a composite measure of the population aged 65 or older, aged 17 or younger, older than age 5 with a disability, single-parent households;
3. Minority status & language map - a composite measure of the population proportion that is racial/ethnic minority, speak English "less than well"; and
4. Housing type & transportation map - a composite measure of households in multi-unit structures, mobile homes, crowding, have no vehicle, or live in group quarters.

Figure 17b. Figure CDC's Themes' Vulnerability Index 2018, Davidson County, Tennessee



Data Source: CDC's Social Vulnerability Index 2018 Shapefiles. https://svi.cdc.gov/data-and-tools-download.html

The geographic distribution of social vulnerability due to socio-economic status matches closely that of household composition/disability, and of housing/ transportation. The race/ethnicity/language related vulnerability map indicates that the least racial/ ethnically and linguistically diverse census tracts are located in the southern and northern borders of Davidson County. These are census tracts with the lowest percentage of the population of minority racial/ ethnic background or who do not speak English well. A closer examination of the distinctions between the four maps, especially the bottom two compared to the top two maps, indicates the added effects of the inter-action among race/ethnicity/language and housing type/transportation particularly for census tracts north-west of I40 West. In these census tracts social vulnerability might be associated with the combination of a high percentage of minority racial/ethnic households and a high percentage of households in multi-unit housing. Given the increasing cost of single-family units in Davidson County, it is likely that low-to-middle-income households, among whom racial/ethnic minorities are overrepresented, are disproportionately represented in areas with the more affordable multi-unit housing. Therefore, achieving equity requires an understanding of the multidimensional nature of opportunity and social vulnerability in Davidson County and how these might be changing over time.

Opportunity Index

The Opportunity Index summarizes statistics on opportunity across four dimensions: economy, education, health and community. The economy dimension is a weighted score of the unemployment rate, median household income, percent of population below poverty level, income inequality, access to banking, percent spending less than 30 percent of income on housing-related costs, and percent households with highspeed internet service. Education includes preschool enrollment, and high school and college graduation rates. The community dimension is a composite of youth unemployment, adult volunteerism and voter registration, and the rate of crime, medical doctors and fresh produce suppliers. The health dimension is a composite of health insurance coverage, low birth weight, and deaths from drug/alcohol use and suicide. The higher the score, the greater the quality of the opportunity, and is therefore more desirable. As shown in **Table 3**, the overall opportunity index and dimension scores for Davidson County are comparable to the State's index and dimension scores. Davidson County lags the nation in the overall opportunity index, and the education, community, health scores, which are further explored below.

Table 3. The 2018 Opportunity Index and its Dimensions for Davidson County, the State of Tennessee and Nation

Index and Dimensions	Davidson	Tennessee	National
Opportunity Score	49.7	49.4	53.1
Economy Score	55.6	54.9	55.4
Education Score	52.3	53.3	55.2
Community Score	46.6	44.5	47.6
Health Score	44.4	44.9	54
Economy			
Unemployment Rate (%)	2.1%	2.8%	3.7%
Median Household Income ($)	$45,940	$44,178	$52,431
Poverty (% of population below poverty line)	17.7%	15.8%	14.0%
80/20 Ratio (Ratio of household income at the 80th percentile to that of the 20th percentile)	4.5	4.6	4.9
Banking Institutions (commercial banks, savings institutions, and credit unions per 10,000 residents)	4	4.2	3.7
Households Spending Less than 30% of Household Income on Housing Costs (%)	64.9%	71.8%	67.6%
High-Speed Internet (% of households)	84.8%	77.1%	81.9%
Education			
Preschool (% ages 3 and 4 in school)	41.6%	40.1%	48.0%
On-Time High School Graduation (% of freshmen who graduate in four years)	80.1%	88.8%	84.2%
Associate Degree or Higher (% of adults 25 and older)	44.5%	33.4%	39.6%
Community			
Youth Not in School and Not Working (% ages 16-24)	11.3%	13.1%	11.7%
Youth Not in School and Not Working (number ages 16-24)	9,360	103,631	4,599,118
Volunteerism (% of adults ages 18 and older)	-	27.4%	27.5%
Voter Registration (% of population 18 and older registered to vote)	-	63.2%	61.7%
Violent Crime (per 100,000 population)	1104.6	632.9	386.3
Medical Doctors (per 100,000 population)	93.2	72.3	75.4
Grocery Stores and Produce Vendors (per 10,000 population)	1.8	1.7	2.1

Data Source: Data sources: https://opportunityindex.org/ The index was jointly developed by Child Trends and the Forum for Youth Investments Opportunity Nation Campaign.

Index and Dimensions		Davidson	Tennessee	National
	Health			
	Low Birth Weight (% of infants born weighing less than 5.5 lbs)	8.8%	9.2%	8.2%
	Health Insurance Coverage (% of population under age 65 without health insurance)	14.2%	9.0%	8.6%
	Deaths Related to Alcohol / Drug Abuse or Suicide (per 100,000 population)	33.6	39.6	32.4

Economic Opportunity Index

Table 2 indicates that overall, economic opportunities in Davidson County are comparable to the state and nation, and are more favorable with respect to a lower unemployment rate (County, 2.1%; Nation, 3.7%), lower percentage of rent burdened renters (County, 4.5%; Nation, 4.9%) and higher percentage of households with high speed internet subscriptions (County, 84.8%; Nation, 67.6% nation). Despite this, Davidson County's poverty rate of 17.7% is higher than the state (15.8%) and nation's (14.0%) rates.

Educational Opportunity Index

Table 2 indicates that Davidson County lags the nation in preschool enrollment (41.6% vs.48% respectively) and timely high school graduation rates (80.1% vs. 84.2%). In the latter, Davidson County lags even further to the overall state graduation rate of 88.8%. However, the county has a higher percentage of adults 18 years and older with an associate degree or higher (44.5%) compared to the state (33.4%) and nation (39.6%). As shown earlier (pages 12-14), there are racial/ethnic disparities in educational achievement, indicating social inequities in educational opportunity or the capacity to exploit existing educational opportunities. Achieving health equity in Davidson County requires actions that address the root causes of these opportunity and capacity differences across sub-populations.

Community Score

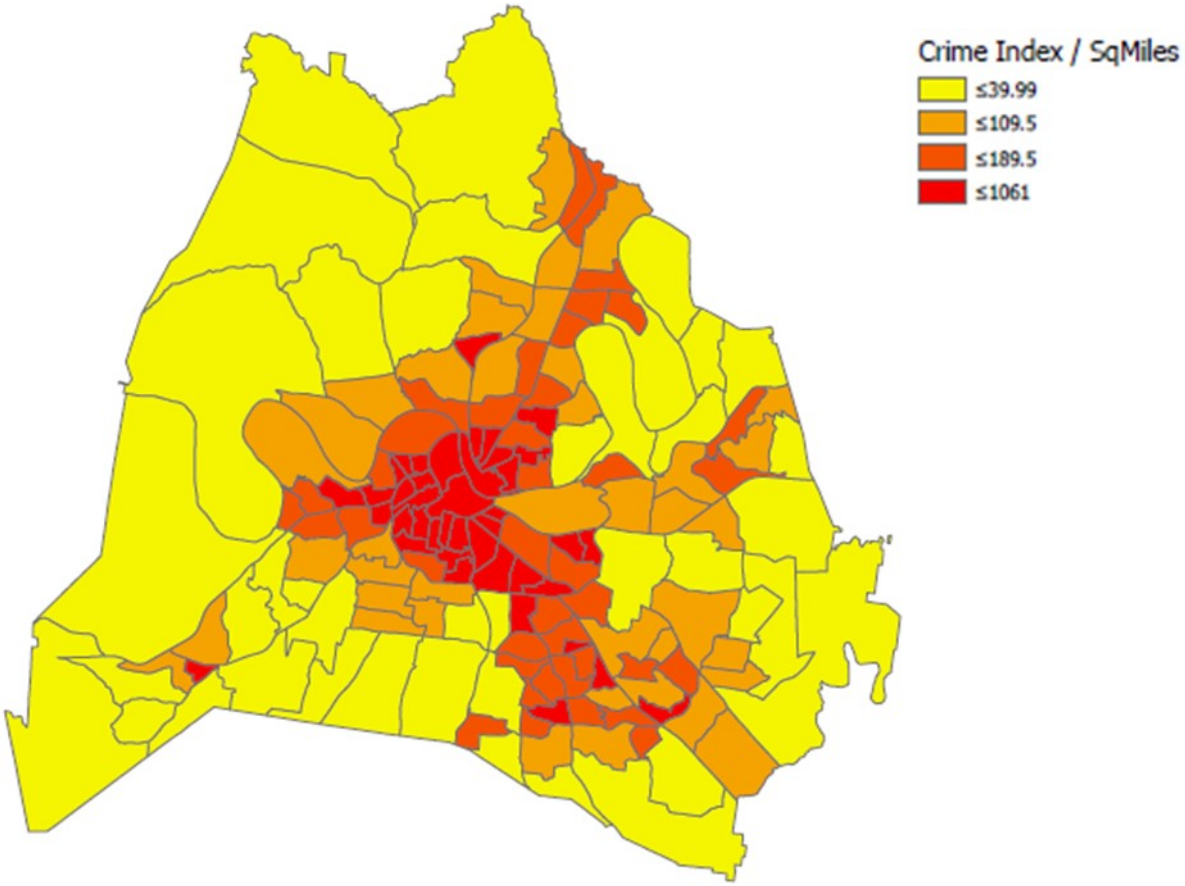
Davison County's violent crime rate is 2.9 times higher than the national average of 386.3 violent crimes per 100,000 population. The county has about 14% fewer grocery stores and produce vendors per 10,000 population compared to the national average of 2.1 per 10,000. However, the county has 24% more medical doctors per 100,000 population than the national average of 75.4 per 100,000.

Unfortunately, the opportunity index and the scores for each of the 4 dimensions are not available at the sub-county level. The county level estimates are also not stratified by age, sex and race/ethnicity. However, given the patterns of social vulnerability shown above (pages 28-30), which are derived from the same data types and sources, it is highly likely that these economic, educational and community opportunities are also inequitably distributed across the county and among subgroups of the population. Achieving health equity in Davidson County requires actions that address the root causes of these opportunity and capacity differences across subpopulations. This also requires investment in efforts to collect relevant local data and develop subcounty measures of opportunity and community capacities/resources. The likely implications of these opportunity patterns on the distribution of health risks and outcomes are explored below and in subsequent sections of the report.

Crime Index

Figure 18 below shows the estimated overall crime rate per census tract in Davidson County based on the crime index. The latter indicates the relative risk of crime occurring in a census tract and is measured against the overall risk at a national level. It is not a quantification of actual crimes but is the product of a mathematical model developed by the Environmental Systems Research Institute (ESRI) to estimate the probability of a crime occurring in a given geographic area relative to its occurrence nationwide.[29] Values above 100 indicate the area has an above-average risk of crime occurring compared to the United States (U.S.) as a whole. Values below 100 indicate the area has a below-average risk of crime occurring compared to the U.S. The Crime Index provides an assessment of the relative risk of seven (7) major crime types: murder, rape, robbery, assault, burglary, larceny, and motor vehicle theft. The ESRI model uses crime data from the Federal Bureau of Investigation's (FBI) Uniform Crime Report and demographic data from the U.S. Census and Applied Geographic Solutions (AGS). ESRI produces final index estimates at the census block level and these are then weighted by population and aggregated to the national totals. The aggregate index is a useful measure of the overall crime rate in an area (e.g., census tract) relative to the national crime rate for seven serious crimes against the person and property. The crime index estimates displayed in **Figure 18** were generated using crime data for 2012 through 2018, and ESRI forecasts for 2020 and 2025.

Figure 18. Nashville Crime Index by Census Tract, Davidson County, 2012-2018



Data Source: U.S. Census Bureau, Census 2010 Summary File 1. ESRI forecasts for 2020 and 2025. Applied Geographic Solutions (AGS) (2020A)

Based on **Figure 18**, the relative risk of crime occurring at the census tract level in Davidson County in 2012-2018 varied from about 39.99 per square mile (60.01 points below the national average) to about 1,061 per square mile (961 points above the national average). The absolute difference between the highest and lowest crime index value in 2012-2018 was 1,021.01 points. This means that in 2012-2018 the highest crime index value in Davidson County was 26.5 times higher than the lowest crime index value --- that is, there were census tracts in which the relative risk of crime occurring per square mile was almost 27 times higher than in census tracts with the lowest risk. Census tracts with high crime index values were clustered just north, west and south of Nashville's central business district, extending northeast along I65N, southeast along I24S and east along I40E. Elsewhere in Davidson County the risk of crime occurring in 2012-2018 was about 60 points below the national average.

The crime index does not specify which of the seven crime types (murder, rape, robbery, assault, burglary, larceny, and motor vehicle theft) account for the overall index value estimated for each census tract. Therefore, comparisons should be made with caution. Secondly, the crimes that are excluded from the crime index estimation could be of greater concern in some areas that have been assigned low values on this crime index. Therefore, these index values may not match the local/community estimates or perceptions of the crime rate. Furthermore, the distribution of index values could have been influenced by the scale applied on the map. However, index values were adjusted for variance in the size of census tracts.

From the perspective of public health, the crime index map (**Figure 16**) indicates the degree of geographic disparity in exposure to an important health risk factor. Generally, people experience and might be traumatized by crime in a community at various levels: as victims, direct witnesses, or from hearing about events from other community members. The negative outcomes of exposure to or fear of crime and crime-related violence include premature death, injuries, mental distress (including behavioral problems, depression, anxiety, and post-traumatic stress disorder), reduced quality of life, damage to the community infrastructure and other built environments, and reduced economic activity. Studies of Adverse Childhood Experiences (ACEs) indicate that the negative consequences of childhood exposure to crime and violence persist into adulthood including greater risk for substance use, risky sexual behavior, and other unsafe behaviors. Crime rates tend to vary by neighborhood characteristics: Low-income neighborhoods are more likely to be affected by crime than high-income neighborhoods.[30]

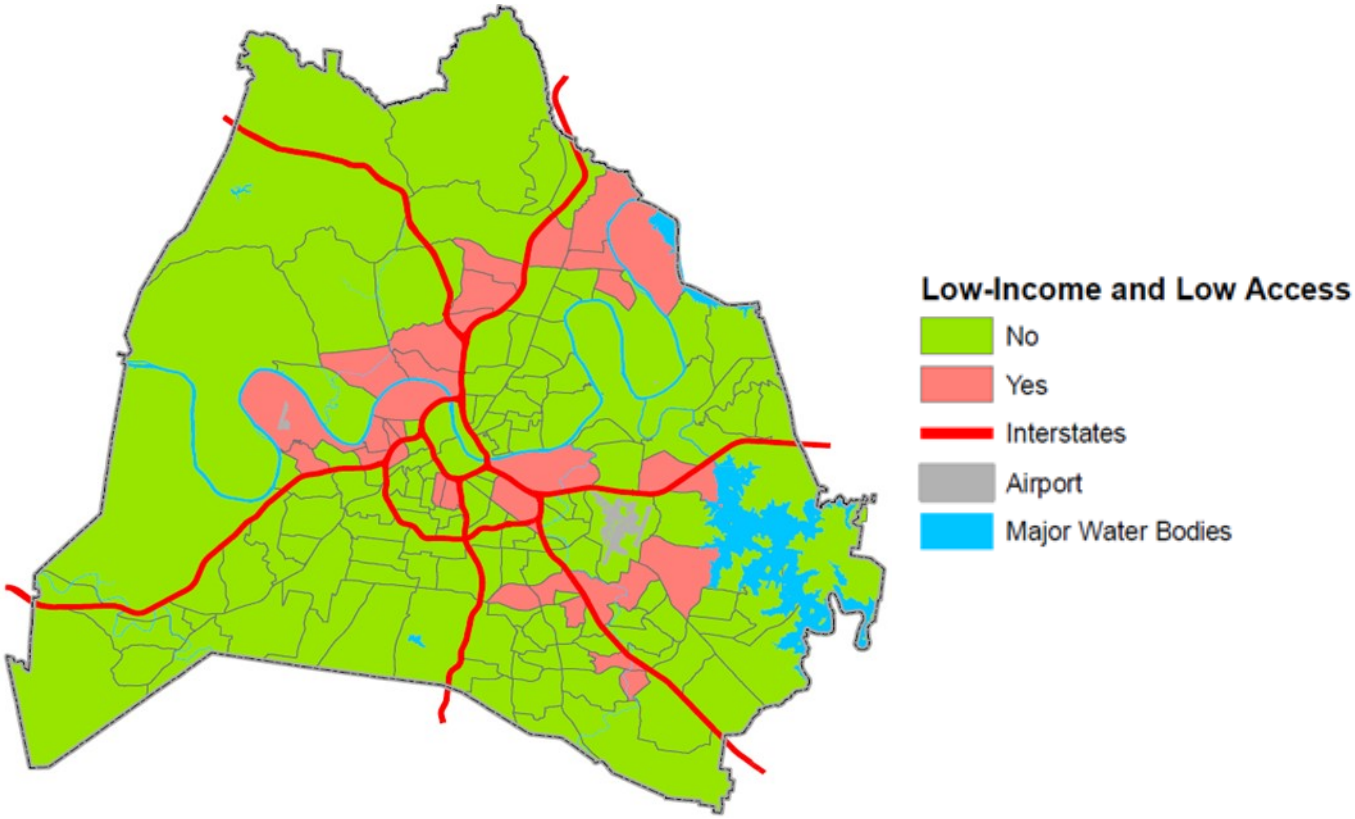
Food Security/Food Access

An indicator that is closely related to the community score in the opportunity index presented above is food security or access to healthy food among subgroups and geographic units of Davidson County. The percentage of people living with food insecurity (i.e., is a household-level economic and social condition of limited or uncertain access to adequate food)[31] in Davidson County decreased from 17.4% in 2013 to 14.6% in 2017. The percent of food insecure children also decreased from 23.2% in 2013 to 18.1% in 2017. Children exposed to food insecurity are of concern given the implications that scarce food resources pose to a child's health and development. Children who are food insecure are more likely to be hospitalized and may be at higher risk for developing chronic diseases such as obesity, anemia and asthma. In addition, food-insecure children may also be at higher risk for behavioral and social issues including fighting, hyperactivity, anxiety and bullying.[32] It has been noted that in 2017, about 20% of children who were food insecure were likely also ineligible to receive public assistance.[33] Expanding eligibility for public assistance is critical to protecting and maintaining children's health, particularly in low income households.

Data from the United States Department of Agriculture indicates that in 2015 about 22% of Davidson County residents lived more than one mile from a supermarket or large grocery store if in an urban area, or more than 10 miles from a supermarket or large grocery store if in a rural area.[34] This state of existence is defined as having low access to healthy food. The accessibility, availability, and affordability of healthy food is not evenly distributed across geographies. Low-income and underserved areas often have limited numbers of stores that sell healthy foods. People living farther away from grocery stores are

less likely to access healthy food options on a regular basis and thus more likely to consume foods which are readily available at convenience stores and fast food outlets. The map below (**Figure 19**) shows the distribution of census tracts with low-income and low-access to healthy food, defined as census tracts with at least 500 (or 33% of) low-income residents who meet criteria for low access to healthy food.

Figure 19. Census Tracts with Low-Income and Low-Access to Healthy Food, Davidson County, 2015[35]



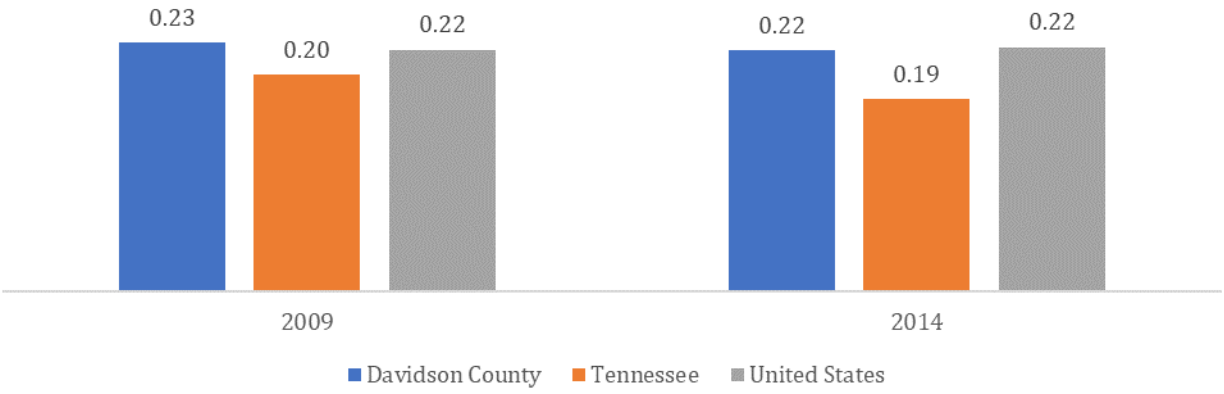
Neighborhoods immediately north of the Downtown area of Nashville, north of the ring marking the intersections of the inter-state highways 40, 65 and 24, and stretching northeast along I65 and east along I40, as well as some tracts in the southeast near I24 have low-income and low access to healthy food. The reader will note that these are also census tracts that in 2018 had the highest social vulnerability index score.

Density of Grocery Stores

There is a strong correlation between the density of grocery stores in a neighborhood and the nutritional and dietary patterns of its residents. The availability and affordability of healthy and varied food options in the community increases the likelihood that residents will have a balanced and nutritious diet. Low-income and under-served communities often have limited access to stores that sell healthy food, especially high-quality fruits and vegetables. Moreover, rural communities often have a high number of convenience stores, where healthy and fresh foods are less available than in larger, retail food markets.[36] Fast food outlets are more common in low-income neighborhoods and studies suggest that they strongly contribute to the high incidence of obesity and obesity-related health problems in these communities.[37]

Figure 20 below shows that on average there were about 2 grocery or supermarket stores per 10,000 residents in 2009, and that this density was similar to that for the state and nation, and was relatively unchanged through 2014.

Figure 20. Number of Grocery and Supercenter Stores per 10,000 residents, 2009 and 2014



Data Source: (1) U.S. Department of Agriculture (2017). Food Environment Atlas https://www.ers.usda.gov/data-products/food-environment-atlas/data-access-and-documentation-downloads.aspx; (2) CDC Wonder: Bridged-Race Population Estimates: https://wonder.cdc.gov/bridged-race-population.html.

Nashville, the seat of Davidson County, has experienced significant growth in housing development,[38] often followed by an increasing density of grocery stores, supermarkets and establishments that serve more nutritious food options. However, this growth appears to be displacing low-income households, who are being priced out of their neighborhoods and into low-income and rural sections of the county or neighboring counties.[39] This likely increases their food insecurity and further limits their access to food, public transportation and essential services. Therefore, more up-to-date data are needed in order to fully capture the disparate impacts of the recent increases in economic and housing expansion activities on the well-being and health of various social groups in Davidson County.

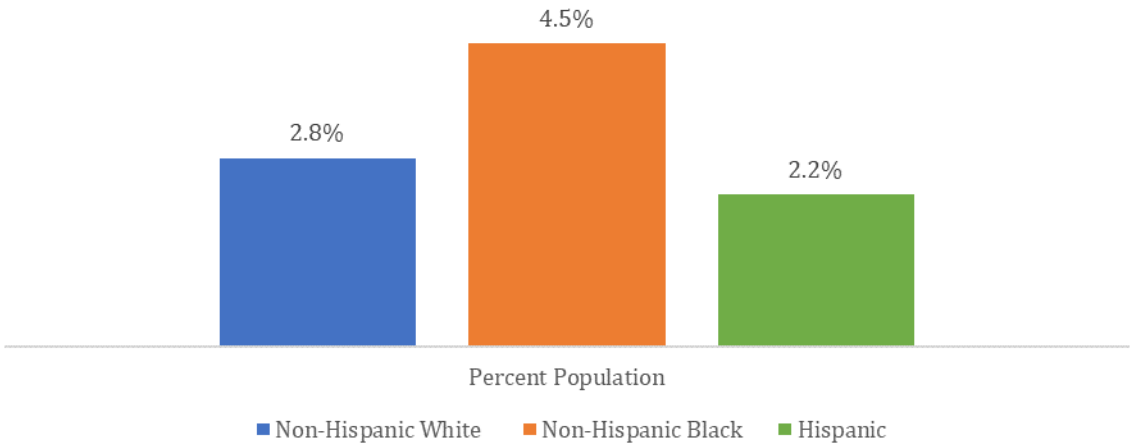
Environmental Hazards

The environment plays a pivotal role in the health of communities. Clean air and water can help prevent morbidity and premature death. The Environmental Protection Agency (EPA) estimates that the Clean Air Act Amendments will prevent over 230,000 early deaths nationally in 2020. Reductions in ambient particulate matter in the air will also prevent 200,000 heart attacks, 2,400,000 asthma exacerbations, 5,400,000 missed school days, and 17,000,000 lost workdays. Clean water protections ensure local water supplies remain free of harmful industrial chemicals and waste, and water treatment plants adequately monitor and treat the water that is available for use by residents and businesses in the area. Differences in exposures to environmental hazards (including unsafe dwellings, workplaces and roads) and differential access to clean air and water results in disparities in preventable illness and death. This is illustrated here, for Davidson County, using two indicators of exposure to environmental hazards, and rates of avoidable injuries. As a recipient of Federal Government funds, MPHD is obligated under Title VI of the Civil Rights Act to promote and protect environmental justice.

Residential Proximity to Major Highways

Motor vehicle traffic is considered a major source of local variability in air pollution levels, particularly in urban areas.[40] Living close to major highways increases exposure to air pollutants from motor vehicle exhaust, such as ultrafine particulates, black carbon, nitrogen oxides and carbon monoxide. Substantial evidence indicates a link between residential proximity to major highways (particularly residing or spending a substantial amount of time within 150 meters of freeways or multilane highways) and adverse health outcomes, including asthma or respiratory difficulties in children, some heart diseases in adults, dementia among older adults, and even birth outcomes.[41] The CDC estimates that about 4% of the U.S. population lives within 150 meters (about 2 city blocks) of a major highway.[42] **Figure 21** below shows the percentage of Davidson County residents whose home addresses are within 150 meters of a major highway (primarily the Interstate Highways).

Figure 21. Percentage of Population Residing within 150 Meters of a Major Highway by Race/Ethnicity, Davidson County, 2020



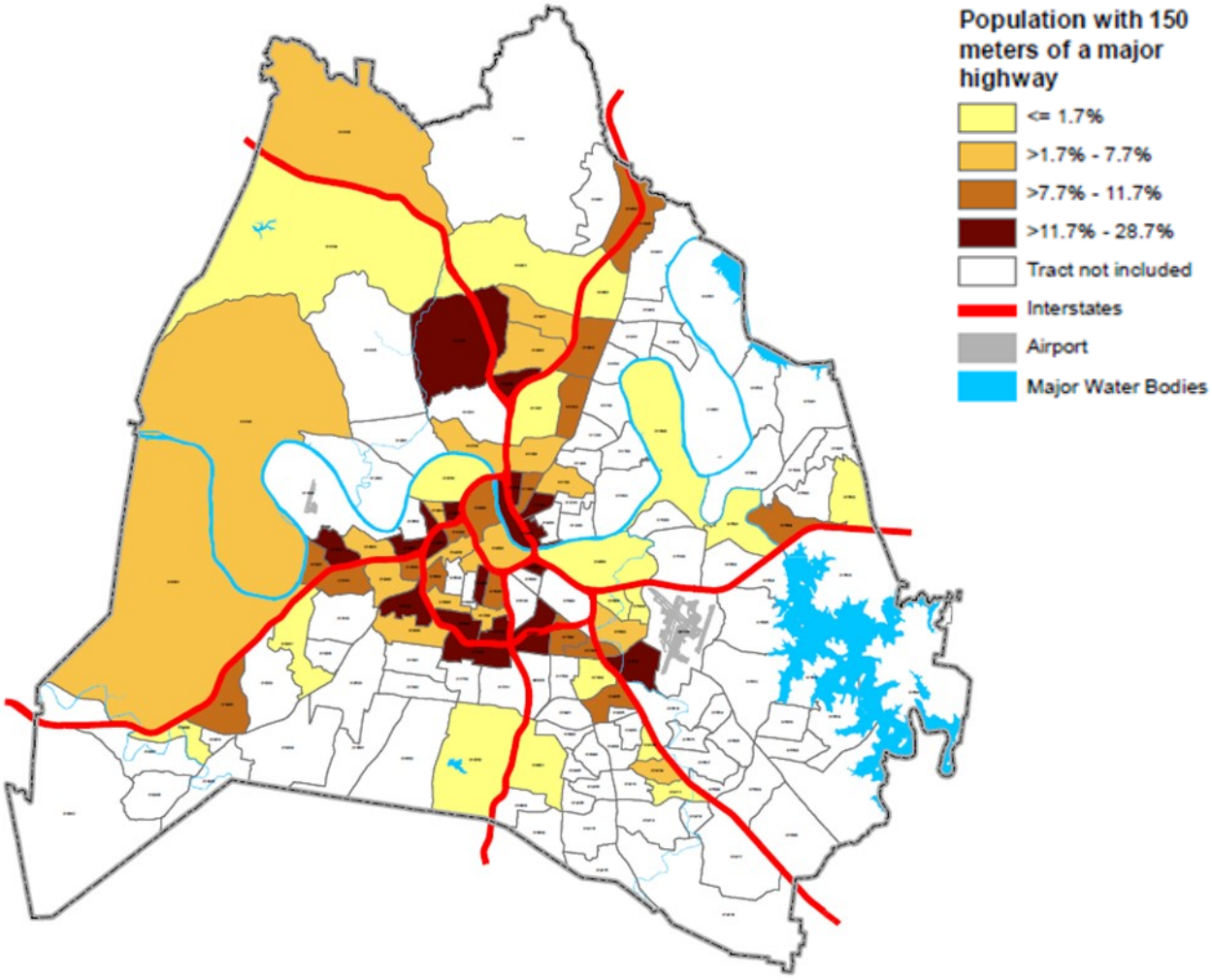
Data Source: Population data from the American Community Survey, U.S. Census Bureau. Residential location and highway mapping from ESRI

On average about 3.2% of residents in Davidson County live within 150 meters of a major highway. About 4.5% of Non-Hispanic Black residents live within this proximity compared to 2.8% of Non-Hispanic White and 2.2% of Hispanic residents. These patterns of racial/ethnic disparities in proximity to major highways mirror national patterns. For example one CDC report found that in 2010 "(t)he greatest disparities were observed for race/ethnicity, nativity, and language spoken at home; the populations with the highest estimated percentage living within 150 meters of a major highway included members of racial and ethnic minority communities, foreign-born persons, and persons who speak a language other than English at home."[43] Health risks of exposure to air pollutants are further elevated among some groups, including children, seniors, low-income populations, and people with medical conditions, such as asthma and cardiovascular disease. The magnitude of exposure to traffic pollution within the 150 meter buffer depends on traffic volume, frequency and type (e.g., heavy duty tracks), and this can be compounded at major highway intersections or roadway grade transition points. The length of time living in proximity of a major highway also increases the amount of exposure, with long-term residents experiencing higher risks of adverse health effects.

It has been shown that exposure to environmental pollutants might vary between geographic areas of different socioeconomic status. Residential proximity to highways is therefore likely socially structured, reflecting housing segregation and, thus, is inequitably distributed across race and ethnicity, income, or housing tenure. The history of interstate highway construction in Davidson County indicates that highway location decisions favored areas with low-income populations and low property values.[44, 45] Given housing segregation by race and income, which have persisted over time,[46, 47] the determinants of disparities in proximity to major highways in 2020 likely persist since the original construction.

Figure 22 shows the percentage of the population in each census tract that lives within 150 meters of a major highway in Davidson County. Census tracts with 0% are labeled as "Tract not included" in the map legend. The major highways considered are all the Interstate highways (I24 [North & South], I40 [East & West], I440 and I65 [North & South]), and parkways (155 or Briley, Ellington, and Vietnam Veterans Boulevard) in Davidson County. About 3.16% of the projected 722,816 residents (i.e., 31.6 per 1,000 population) in 2020 live within 150 meters of a major highway. As expected, the highest percentage of residents living within 150 meters of a major highway is in census tracts in which the major highways intersect (e.g., intersection of Briley East, I24N and I65N) or run closely parallel to each other (e.g., I440 and Briley South). Most of these locations are within the core of Nashville, areas that have recently experienced major housing development and shifts in the density and composition of the population. The potential association between proximity to a major highway and environmental health outcomes is explored in the section on asthma prevalence including rates of emergency room visits for asthma among children (page 71).

Figure 22. Percent Population Within 150 meters of a Major Highway per Census Tract, Davidson County, 2020



The CDC recommends some of the following measures to reduce traffic emissions and their impacts on health:[48]

- increasing access to alternative transportation options, such as mass transit, rideshare programs, walking, and cycling;
- providing incentives for individuals to reduce the vehicles miles they travel;
- retrofitting diesel engines;
- promoting the use of electric and low emission vehicles;
- creating roadside barriers and improved ventilation systems for existing homes and buildings;
- and implementing land-use policies that limit new development close to heavy traffic areas.

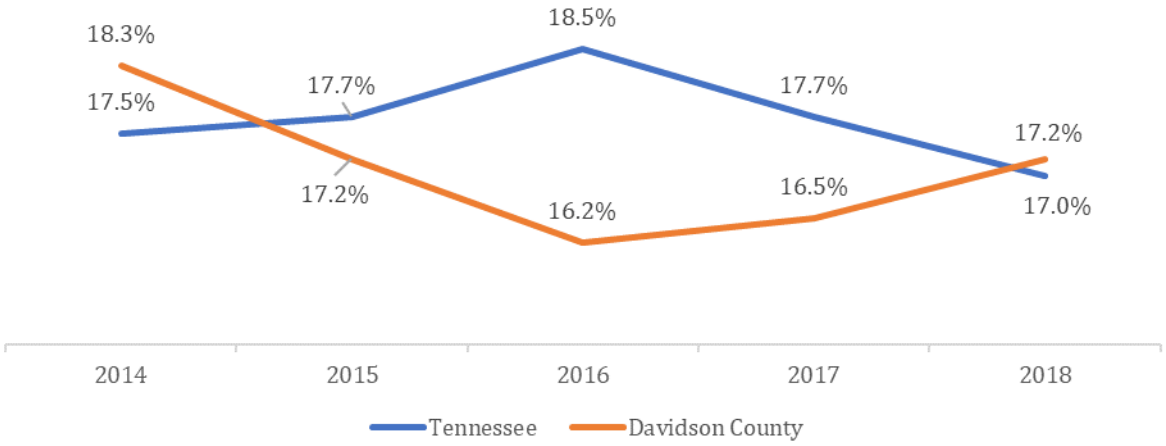
Health equity requires that these prevention efforts be focused in areas with the most socially disadvantaged populations. Given the underlying socio-economic and structural determinants of exposure to traffic pollutants, these environmental interventions need to be integrated within a broader policy and program framework that addresses social vulnerability and disadvantage. This ensures that the economic and social forces that usher in roadside barriers, improved ventilation systems for existing homes and buildings, and cleaner air in these locales, do not inadvertently displace the poor and socially disadvantaged who have been impacted by extended periods of exposure to traffic pollutants.

Lead Poisoning

Lead poisoning occurs when lead builds up in the body, often over months or years. Even small amounts of lead can cause serious health problems. Children younger than 6 years are especially vulnerable to lead poisoning, which can severely affect mental and physical development. At very high levels, lead poisoning can be fatal. Since lead poisoning builds slowly over time without obvious symptoms, screening is an important public health activity.

Figure 23 below depicts the percentage of children under the age of 6 who were screened for elevated blood lead levels between 2014 and 2018. From 2014 to 2016 this percentage decreased from 18.3% to 16.2% and then rose to 17.2% in 2018. At the state level, an almost reverse pattern is depicted. Due to small numbers, which generate unreliable rates, data for demographic subgroups and sub-county units are not presented.

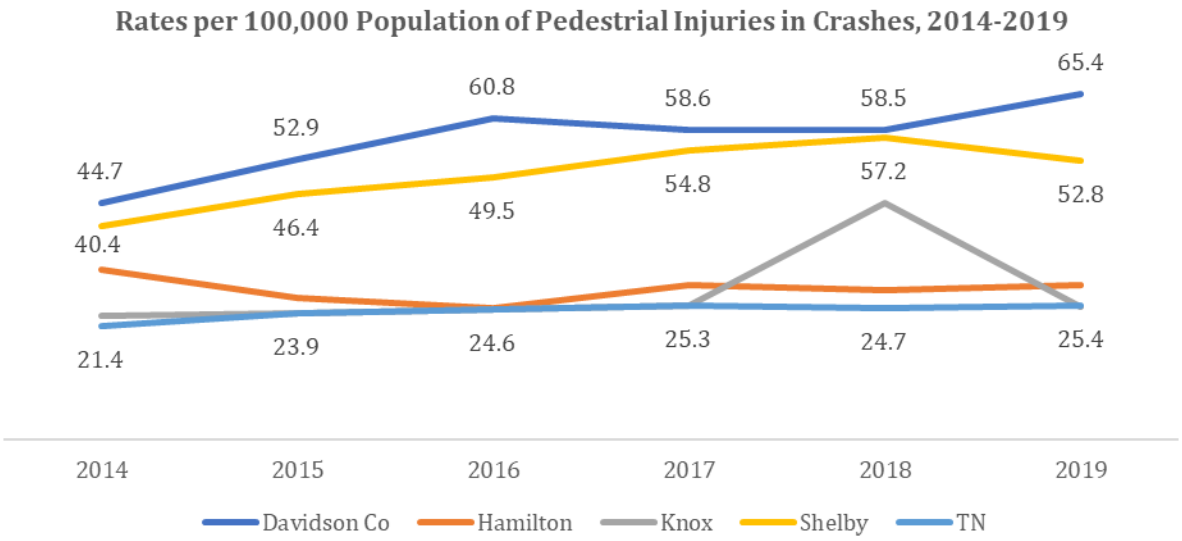
Figure 23. Percent of Children Under Age 6 Who Were Screened for Elevated Lead Levels



Data Source: The Annie E. Casey Foundation, KIDS COUNT Data Center.

Pedestrian Injury Rate

Pedestrian safety is a public health concern. Adequate pedestrian infrastructure, such as crosswalks, crossing signals, sidewalks, bus shelters, and other pedestrian-oriented infrastructure can create a safer environment for pedestrians and reduce the risk of injury and death. Therefore, the pedestrian injury rate can serve as an indicator for local traffic conditions. Figure 24 shows pedestrian injury in Tennessee and Davidson county, though does not provide results for demographic subgroups and subcounty units.



Data Source: Tennessee Department of Safety & Homeland Security (2020). Pedestrians and Other Pedestrians Involved in Tennessee Traffic Crashes by Year and County 2007 – 2019. Retrieved from: https://www.tn.gov/content/dam/tn/safety/documents/Pedestrians.pdf

In Davidson County, the number of pedestrians injured in crashes involving a vehicle and pedestrian increased from 44.7 per 100,000 population in 2014 to 65.4 per 100,000 population in 2019 (an increase of 46.7%) (**Figure 24**). At the state level pedestrian injury crashes increased by 23.8%.

Pedestrian injury rates in Davidson County were higher than the state and most of the other major large counties (Knox, Hamilton and Shelby counties). In 2014 the rate in Davidson county was 2.1 times higher than the state rate, 1.9 times higher than Knox County, and 11% higher than Shelby County rates. In 2019, the county rate was 2.5 times higher than the state rate, 2.6 times higher than Knox County and 24% higher than Shelby County rates. This indicates that traffic conditions in Davidson County were increasingly unsafe for pedestrians between 2014 and 2019.

Disparities in Health Risk and Promoting Behaviors

2021 Health Equity in Nashville
Metro Public Health Department

Overview

This section describes disparities in behaviors that strongly and adversely impact health (referred to as behavioral risk factors) and behaviors that protect or enhance health (such as regular cancer screening) among various subgroups of the population in Davidson County.

Behavioral Risk Factors

Established lifestyle risks to health generally include smoking, excessive alcohol use, physical inactivity, unhealthy diets, sexual risk behaviors, limited use of available health care or primary prevention services, and behaviors that do not promote safety or prevent injury.[49] While lifestyles might be associated with individuals' choices and preferences, such choices are often determined by the environmental and community contexts in which people live, work, and play. Understanding the extent and distribution of behavioral risk factors within and between population subgroups helps to inform policy and program decision making so that limited public health resources can be deployed in ways that maximize population health outcomes and reduce health inequities.

Alcohol Use and Binge Drinking

The following data are from the Nashville Community Health + Well-being Survey© report on alcohol use among Davidson County residents aged 18 years and older who participated in the survey in 2019.[50] About 63.4% of all adults reported having consumed alcohol in the past 30 days prior to the survey, mostly those aged 30-49 years (72.9%), college graduates (77.3%), employed persons (69.8% vs. 49.2% of the unemployed), persons in households with incomes above $75,000 (about 75% compared to 48.6% in households with incomes below $25,000), and those residing in the South West zone of Davidson County (78.2% compared to 54.9% in the South East) (**Table 4**).

The survey defined binge drinking as the "consumption of four or more drinks by females and five or more drinks by males on a single occasion." Using these criteria, 41.9% of adults in Davidson County who drank in the previous 30 days indicated having had at least one binge drinking episode during the past 30 days. Younger persons were more likely to report recent binge drinking (61.6%) in comparison to older persons. Among those aged 65 and older, 24.4% indicated at least one recent binge drinking episode. Currently employed persons were more likely to report a recent binge drinking episode (46.7%) than were those not employed (29.1%[51]) There were no statistically significant racial/ethnic differences in self-reported binge drinking behavior. However, Hispanic/Latino respondents reported the largest number (4.6 drinks) and African Americans the lowest number (2.9 drinks) of alcohol drinks consumed on one occasion during the past 30 days.

Table 4: Current alcohol use among all respondents, and binge drinking days during past 30 days among past 30-day drinkers in Davidson County by demographic characteristics: Nashville Health + Wellbeing Survey 2019

	Drank alcohol in past 30 days			Any binge drinking days during past 30 days		
	(*n*)	%	(se)	(*n*)	%	(se)
Total Sample	1767	63.4	2	1143	41.9	2.6
Sex						
Female	1159	58.1	2.5	714	34.5	2.9
Male	608	69.2	3.3	429	48.7	4.1
Age						
18-29	280	63.4	5.8	205	61.6	6
30-49	614	72.9	2.8	443	42.9	3.9
50-64	414	59	4.2	256	29.8	4.9
65 and older	400	51.1*	3.9	205	24.4*	4.8
Race/ Ethnicity						
African American	400	62.7	4.1	234	33.3	5.2
Hispanic/ Latino	115	52.3	9.1	65	58.7	9.2
White, non-Hispanic	1108	66.5	2.3	763	43.4	3.2
Mixed/other	97	52.3	8.4	50	45	10.6
Education						
Less than high school	95	44.3	7.6	34	43.1	12.6
High school graduate/GED	226	43.6	5.5	104	54.9	8.6
Some college, no degree	377	70.5	3.5	232	63.1	5.2
College graduate	594	77.3	2.6	435	54.9	3.6
Graduate/ professional degree	424	72.8*	3.4	308	62.9	4
Employment Status						
Employed	1090	69.8	2.5	783	46.7	3.3
Unemployed	602	49.2*	3.3	309	29.1*	4
Annual Household Income						
Less than $25,000	362	48.6	4	170	41.2	6
$25,000 to less than $50,000	420	62.9	4.8	257	43.5	6.9
$50,000 to less than $75,000	320	68.6	4.3	222	43.4	5.5
$75,000 to less than $100,000	184	77.4	4.6	141	48	7.5
$100,000 and greater	347	74.5*	4.3	277	41.9	4.5
Health Insurance Coverage						
Yes	1580	64.5	2.1	1049	39.5	2.7
No	135	59	7.9	75	69.1	7.6

Data Source: Nashville Community Health + Well-being Survey, 2019 (p.59)

*p<.001

Disparities in Health Risk and Promoting Behaviors

According to the Youth Risk Behavior Survey (YRBS), about 5.8% (95% CI: 4.6% - 7.4%) of Davidson County students in 9th through 12th grade reported binge drinking on at least 1 day during the 30 days before the survey in 2019. More female than male students reported binge drinking (7.1% vs. 4.4%) but the estimates were not statistically significantly different. About 8.9% (95% CI: 5.6% - 13.9%) of Non-Hispanic White students compared to 2.6% (95% CI: 1.3% - 5.2%) of Non-Hispanic Black students reported current cigarette smoking in 2019. Hispanic students were as likely as Non-Hispanic White students to report binge drinking in 2019.

Tobacco Use

During the 2019 Nashville Health + Wellbeing Survey, about 6.7% of adults in Davidson County reported smoking at least 100 cigarettes at some time in their life (defined as any lifetime cigarette use), 7.8% reported current (everyday) smoking and 5.4% smoke some days (Table 5). "Current smoking varied by level of education, as 23.6% of persons not completing high school reported everyday cigarette use. The prevalence dropped with increasing education, with only 1.5% of persons with graduate/professional degrees currently smoking."[52] An estimated 1.9% reported everyday use of e-cigarette and other vaping products. "Although use of these products was not strongly associated with any sociodemographic measures, we nonetheless note that young adults aged 18-29 were found to report higher levels (9.5%) of current use, as were those currently without health insurance (17.0%) and persons considered to be sexual minorities (13.8%.)[53]

Table 5: Current tobacco use behaviors in Davidson County by demographic characteristics: Nashville Health + Well-being Survey 2019

	Current (every day) cigarette smoker			Current (some days) cigarette smoker			Current user (every day or some days) of chewing tobacco, snuff or snus		
	(n)	%	(se)	(n)	%	(se)	(n)	%	(se)
Total Sample	1791	7.8	1.1	1790	5.4	1.4	1786	2.3	0.6
Sex									
Female	1177	7.3	1.3	1177	2.5	0.6	1175	0.1	0.1
Male	614	8.3	1.8	613	8.6	2.8	611	4.7*	1.3
Age									
18-29	280	3.1	1.3	280	9.1	5.3	280	0.8	0.7
30-49	615	8.2	2.1	615	4.9	1.4	616	3.8	1.3
50-64	417	13.4	2.7	416	4.5	1.9	415	2.4	1.8
65 and older	414	7.2	2.3	414	3.6	1.4	412	1.5	1
Race/Ethnicity									
African American	405	7.4	2	404	4.4	1.6	403	0.5	0.5
Hispanic/Latino	114	4.3	4.3	114	7.7	6.5	113	3.6	3.5
White, non-Hispanic	1121	8.9	1.6	1121	5.8	2.1	1120	2.9	0.9
Mixed/other	98	4.3	3	98	3.9	2.8	98	1.7	1.7
Education									
Less than high school	98	23.6	7.7	98	9	3.4	96	6.3	4.6
High school graduate/GED	231	11.2	2.7	230	5.4	4	231	2.2	1.6
Some college, no degree	384	8.2	1.9	384	7.9	3.2	382	0.7	0.7
College graduate	594	2.3	0.7	594	3.5	1.1	596	3.4	1.2
Graduate/professional degree	428	1.5*	0.7	428	2.8	1.2	426	1.5	0.8
Employment Status									
Employed	1095	6.8	1.1	1095	6.8	2.1	1094	2.6	0.8
Unemployed	614	9.3	1.9	613	3.3	0.9	612	0.7	0.6
Annual Household Income									
Less than $25,000	368	15.3	3	368	4.9	1.4	366	2.4	1.6
$25,000 to less than $50,000	425	6.2	2	424	8	4.8	423	1.7	0.9
$50,000 to less than $75,000	321	8.5	3.2	321	4.1	2.1	321	2.8	2.1
$75,000 to less than $100,000	187	4.1	1.9	187	6.9	6.4	187	1.5	1
$100,000 and greater	349	1.1*	0.6	349	4.8	2.2	349	2.9	1.2
Health Insurance Coverage									
Yes	1602	6.7	1.1	1601	5.3	1.5	1596	2.5	0.7
No	134	16.4	5.1	134	7.6	4	135	0.4	0.3

Data Source: Nashville Community Health + Well-being Survey Report, 2019 (pp. 49-50)
*p<.001

Disparities in Health Risk and Promoting Behaviors

According to the Youth Risk Behavior Survey (YRBS), about 16.8% (95% CI: 14.4% - 19.61%) of Davidson County students in 9th through 12th grade reported smoking cigarettes or using electronic vapor products on at least 1 day during the 30 days before the survey in 2019. The proportion of current smokers among these students did not differ much by sex or grade level. About 23.5% ((95% CI: 17.7% - 30.6%) of Non-Hispanic White students compared to 12.4% (95% CI: 9.5% - 16.9%) of Non-Hispanic Black students reported current cigarette smoking in 2019. Hispanic students were as likely as Non-Hispanic Black students to report current smoking in 2019.

Sexual Risk Behaviors

Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS)

The Tennessee Department of Health estimated that in 2018 there were 596.0 people living with Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS) per 100,000 persons, and 18.4 new HIV diagnoses per 100,000 persons in Davidson County, compared to the statewide estimate of 269.0 per 100,000 and 11.3 per 100,000 respectively (Table 6). Non-Hispanic Black individuals bear the highest burden of HIV across all sex and age categories in Davison County (similar to the statewide distribution of disease burden). In 2018, non-Hispanic Black individuals in Davidson County were diagnosed with HIV at a rate of 37.1 per 100,000 persons, compared to 21.1 among Hispanic individuals and 8.7 among non-Hispanic White individuals. Cisgender males were diagnosed with HIV at a rate of 29.7 per 100,000 persons, compared to 5.9 among Cisgender female individuals.

Table 6. Persons Diagnosed with HIV, Davidson County, 2018

	New HIV Diagnoses		Concurrent Stage 3 (AIDS)		All persons living with	
	No.	Rate	No.	Rate	No.	Rate
Gender						
Cisgender male	99	29.7	13	3.9	3199	959.6
Cisgender female	21	5.9	2	0.6	865	241.7
Transgender person	7	—	1	—	56	—
Age group (years)						
<15	0	0.0	0	0.0	19	15.2
15–24	28	31.4	2	2.2	131	147.1
25–34	58	41.9	9	6.5	709	512.3
35–44	22	23.3	3	3.2	769	815.0
45–54	11	13.3	2	2.4	1202	1453.0
≥55	8	4.9	0	0.0	1290	796.2
Race/ethnicity						
Non-Hispanic black	70	37.1	12	6.4	2158	1144.1
Non-Hispanic white	34	8.7	2	0.5	1560	401.4
Hispanic	15	21.1	1	1.4	273	384.1
Other	8	18.6	1	2.3	129	300.6
Overall	**127**	**18.4**	**16**	**2.3**	**4120**	**596.0**

Data Source: Tennessee enhanced HIV/AIDS Reporting System (eHARS), accessed August 1, 2019.
New HIV diagnoses: persons diagnosed with HIV during January 1–December 31, 2018 and resided in Tennessee at the time of diagnosis
Concurrent diagnoses: persons who were diagnosed with HIV 12 months or less before being diagnosed as Stage 3 HIV (AIDS) Living with diagnosed HIV: persons diagnosed with HIV on or before December 31 and resided in Tennessee on December 31, 2018. For new diagnoses and concurrent diagnoses, age group refers to the age at the time of HIV diagnosis. For persons living with diagnosed HIV, age group refers to age as of December 31, 2018.
Hispanics can be of any race.
— represents data not available. Rates were calculated using the US Census Bureau 2017 Population Estimates.

Disparities in Health Risk and Promoting Behaviors

During the Nashville Community Health + Well-being Survey (NCHS) 2019 the percent of adults engaged in HIV risk behaviors was assessed from responses the following: "Do any of these situations apply to you?

- You have used intravenous drugs in the past year.
- You have been treated for a sexually transmitted or venereal disease in the past year.
- You have given or received money or drugs in exchange for sex in the past year.
- You had anal sex without a condom in the past year."

According to the NCHS 2019 report "(i)n Davidson County, 5.8% of adults reported having one or more of these risk factors. Persons aged 30-49 were most likely to indicate having one of these risks during the past 12 months (9.1%) while those aged 65 and older were least likely (0.4%). Sexual minority respondents were at greater risk, as 30.1% indicated at least one of these behaviors, compared to 3.5% of heterosexual respondents."[54]
"When asked if they had ever been tested for HIV, not including tests done as part of a blood donation, but including testing mouth fluid, 40.7% of all adults indicated they had ever been tested. Persons aged 30-49 were most likely to have been tested (50.7%), and those 65 and older least likely (19.4%). African Americans were also more likely to have been tested (55.2%), and those of mixed or other race groups least likely (23.4%)."[55]

Table 7: HIV Risks and Testing in Davidson County by Demographic Characteristics: Nashville Health + Wellbeing Survey 2019

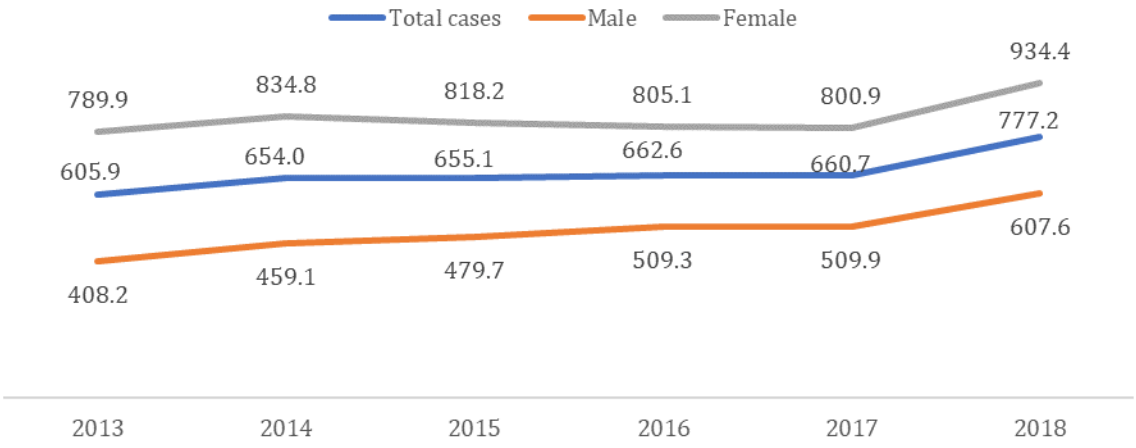
	Ever tested for HIV			Reports any past year HIV risk factors		
	(n)	%	(se)	(n)	%	(se)
Total Sample	1773	40.7	2.1	1774	5.8	1
Sex						
Female	1169	45.5	2.5	1165	5.1	1.2
Male	604	35.3	3.2	609	6.6	1.6
Age						
18-29	280	28.7	5.4	279	6.8	2.2
30-49	615	50.7	3.3	614	9.1	2.1
50-64	413	46.2	4.4	417	4.1	1.7
65 and older	411	19.4*	3.2	413	0.4*	0.2
Race/Ethnicity						
African American	404	55.2	4.4	402	7.4	2
Hispanic/Latino	116	37.3	8.1	113	9.6	4.8
White, non-Hispanic	1113	36.4	2.3	1120	5	1.2
Mixed/other	97	23.4*	6.1	98	0.9	0.9
Education						
Less than high school	99	34	6.5	98	4.8	4.2
High school graduate/GED	227	33.8	5.1	228	5	2
Some college, no degree	381	49.6	4.1	382	7.9	2.4
College graduate	595	38.5	3	596	5.6	1.3
Graduate/professional degree	425	45.1	3.6	428	4.7	1.6
Employment Status						
Employed	1090	44	2.7	1093	6.6	1.3
Unemployed	611	35.5	3.1	612	3.7	1.4
Annual Household Income						
Less than $25,000	366	45.9	4.1	366	9.6	2.8
$25,000 to less than $50,000	422	36.6	4.7	423	5.9	1.9
$50,000 to less than $75,000	320	38.6	4.6	320	5.4	2.2
$75,000 to less than $100,000	187	46.5	6.2	187	2.8	1.4
$100,000 and greater	346	44.5	4.3	348	4.5	1.6
Health Insurance Coverage						
Yes	1589	39.5	2.1	1591	4.9	0.9
No	133	52.2	7.8	130	15.7	6.1

Data Source: Nashville Community Health + Well-being Survey, 2019 (pp. 66-67)

Chlamydia

Chlamydia is one of the most common reportable sexually transmitted infections (STIs) in the United States and locally. Most chlamydia infected persons do not show symptoms, hence the importance of screening for early detection. Although symptoms of chlamydia can be mild, serious complications can occur including ectopic pregnancy or infertility. Untreated chlamydia can also impact a neonate by causing eye infections or pneumonia. Since chlamydia is common and may cause no symptoms, many people do not know they are infected. In Davidson County, chlamydia disproportionately impacts residents that are female (Figure 25), aged 15 to 24 years (Figure 26) and Non-Hispanic Black (Figure 27). This illustrates another health disparity, and an area in need of tailored public health interventions to reduce the burden of disease among this population and countywide.

Figure 25. New cases of chlamydia per 100,000 population, by sex, Davidson County, Tennessee, 2013-2018,

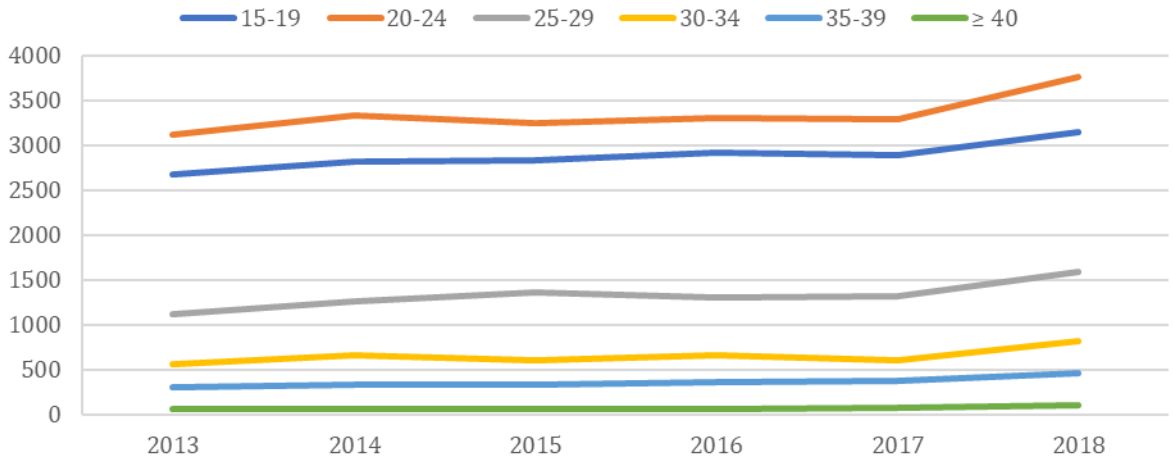


Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been suppressed.

Figure 25 indicates that, compared to males, females in Davidson County had an excess of 381.7 new cases of chlamydia detected per 100,000 population in 2013 and these excess cases declined marginally to 326.8 per 100,000 in 2018. Nationwide, the sex disparity has been attributed to the larger number of women screened for chlamydia compared to men.[56] It also indicates that the sex partners of women with chlamydia might not be receiving a diagnosis of chlamydia or being reported as having chlamydia.

According to **Figure 26b**, the highest burden of chlamydia between 2013 and 2018 was consistently among those aged 20-24 and 15-19 years. These are also the age groups targeted for screening, and particularly women. The lowest incidence of chlamydia was among residents aged 40 or older. Overall, the incidence decreased with age from age 24. This is consistent with literature that indicates that young age is predictive of chlamydia infection among men and women. [57]

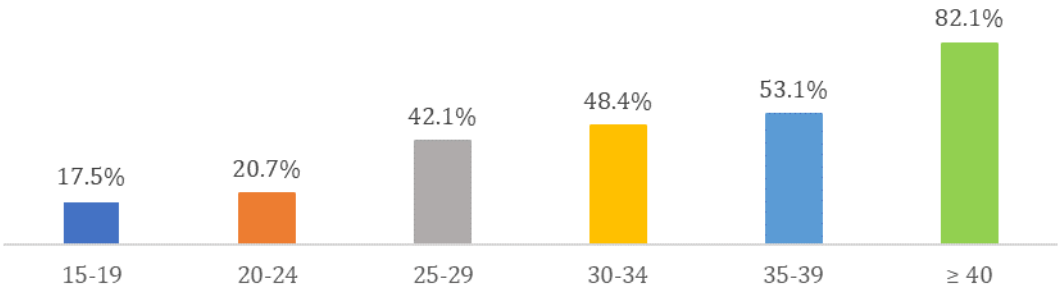
Figure 26b. Chlamydia Incidence per 100,000 Population by Age Group (in Years), Davidson County 2013-2018



Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been suppressed.

Figure 26c demonstrates that, in the 6 years between 2013 and 2018 chlamydia rates increased among all age groups, and the cumulative increase in new reported cases increased with increasing age group, from a low of 17.5% among the 15-19 years age group to a high of 82.1% among the 40 and older age group.

Figure 26c. Percent Change in the Chlamydia Incidence Rate Between 2013 and 2018 by Age Group (years) , Davidson County.

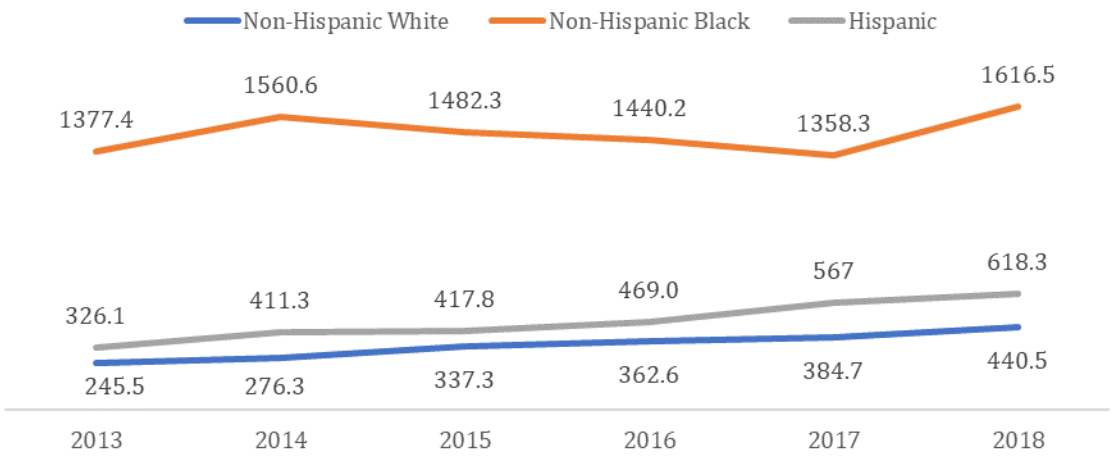


Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been suppressed

Literature indicates that repeat infections are common among Chlamydia patients, with about 32% of patients testing positive within one year of an initial positive test.[58] Hence the emphasis on retesting within 3 to 12 months of an initial test[59] and age-dependent screening strategies.[60] Current CDC Guidelines recommend annual screening of all sexually active women under age 25 years and of older women at increased risk for infection, such as those with new or multiple sex partners.[61]

Figure 27 shows that between 2013 and 2018 the incidence of Chlamydia per 100,000 population was highest among Non-Hispanic Black residents, followed by the rate among Hispanic residents. The lowest rate was among Non-Hispanic White residents. In 2013 the rate among Non-Hispanic Black residents was 5.6 times higher than that among Non-Hispanic White residents and 4.2 times higher than the rate among was Hispanic residents. In 2018 the rate among Non-Hispanic Black residents was 3.7 times higher than that among Non-Hispanic White residents and 2.6 times higher than the rate among Hispanic residents. This means that while the incidence of chlamydia increased across all racial/ethnic groups between 2013 and 2018, the increase was highest among Hispanic residents (89%), followed by Non-Hispanic White residents (79%), and lowest among Non-Hispanic Black residents (17.4%). This racial/ethnic profile for chlamydia incidence mirrors the national profile for 2013-2017.

Figure 27. Chlamydia Incidence per 100,000 Population by Race/Ethnicity, Davidson County 2013-2018



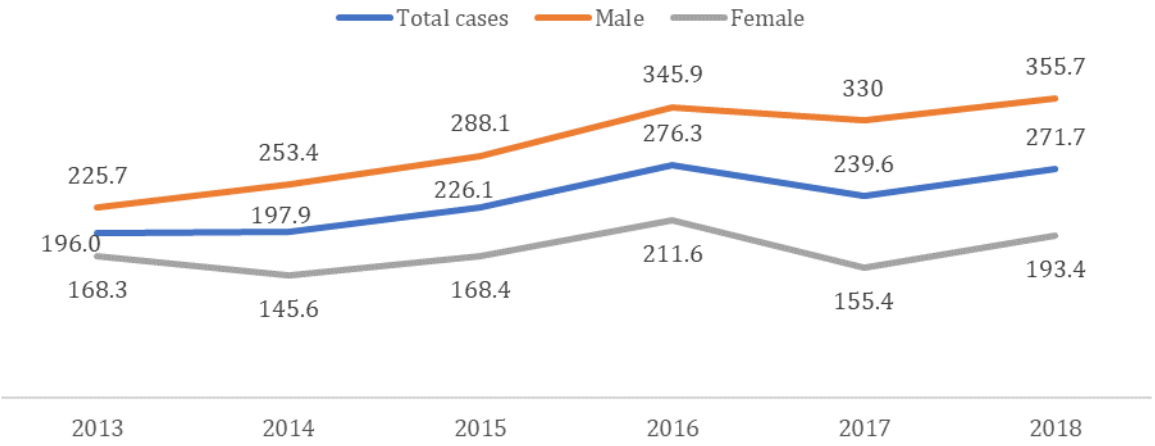
Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Hispanics can be any race reported. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been

The increasing incidence of chlamydia might reflect changes in diagnostic, screening, and reporting practices as well as screening coverage.50 Due to data limitations the incidence of chlamydia among other subgroups, including men who have sex with men and people experiencing incarceration, is not explored. As noted by the CDC, the significance of race and Hispanic ethnicity in Chlamydia detection reflects the role of race/ethnicity and other social determinants of overall health status, such as income/poverty, employment, insurance coverage, and educational attainment.[63] To achieve equity, interventions strategies should distinguish the risk factors that impact different subpopulations, including the role of more upstream socio-economic factors.

Gonorrhea

Gonorrhea is a typically asymptomatic sexually transmitted infection (STI) among men. Among women, if left untreated, gonorrhea can cause serious and permanent health problems, such as pelvic inflammatory disease (PID) and infertility. It can also cause sterility in men. In both sexes and in rare cases, Gonorrhea can cause joint and blood infections. There are currently antibiotic-resistant strains of gonorrhea circulating in populations around the globe, which highlights the need for complete and thorough treatment and good antibiotic stewardship in treating STIs. In 2018 there were a total of 1,882 new cases of gonorrhea reported among Davidson County residents, yielding an incidence rate of 271.7 per 100,000 population (Figure 28). Between 2013 and 2018 the gonorrhea incidence rate for men and women combined increased by 38.6% (196.0 to 271.7 per 100,00 population). In 2018, the incidence of gonorrhea among males was 1.8 times higher than the rate among females, increasing the excess cases among males since 2013 by about 2.8-fold (57.4 to 162.3 cases per 100,000). During 2013–2018, the gonorrhea rate among males increased 57.7% (225.7 to 355.7 cases per 100,000 males) and the rate among females increased 14.9% (168.3 to 193.4 cases per 100,000 females).

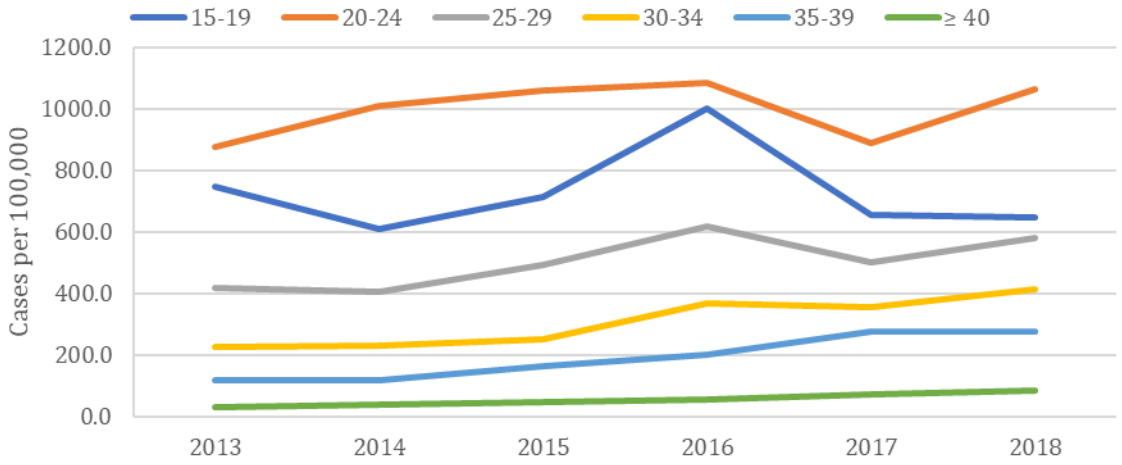
Figure 28. Gonorrhea Incidence per 100,000 Population by Gender, Davidson County 2013-2018



Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been suppressed.

In 2013-2018 the rate of gonorrhea cases continued to be highest among young adults 20-24 years old (1061.3 per 100,000 in 2018), followed by adolescents aged 15-19 years (647 per 100,000 in 2018), although among the latter group the rate fluctuated (Figure 29). Overall, in each year between 2013 and 2018 the incidence decreased with increasing age from age 24.

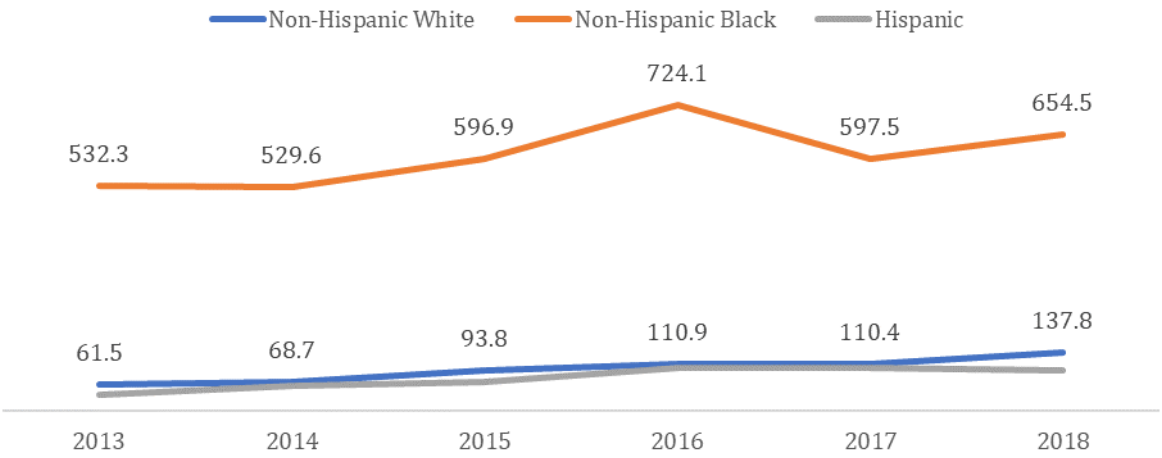
Figure 29. Gonorrhea Incidence per 100,000 Population by Age Group (in years), Davidson County 2013-2018



Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been suppressed.

In 2013-2018 the rate of gonorrhea cases continued to be highest among Non-Hispanic Black residents (654.5 per 100,000 in 2018) and lowest among Hispanic residents (94.3 per 100,000 in 2018) (Figure 30). Rates among Non-Hispanic White residents were comparable to those among Hispanic residents in 2014, 2016 and 2017.

Figure 30. Gonorrhea Incidence per 100,000 Population by Race/Ethnicity, Davidson County 2013-2018



Data Source: Tennessee Department of Health, Patient Reporting Investigation Surveillance Manager (PRISM), 2018. Hispanics can be any race reported. Rates are per 100,000 population. Rates were calculated using the 1-year U.S. Census Bureau Population estimates. Counts < 5 have been

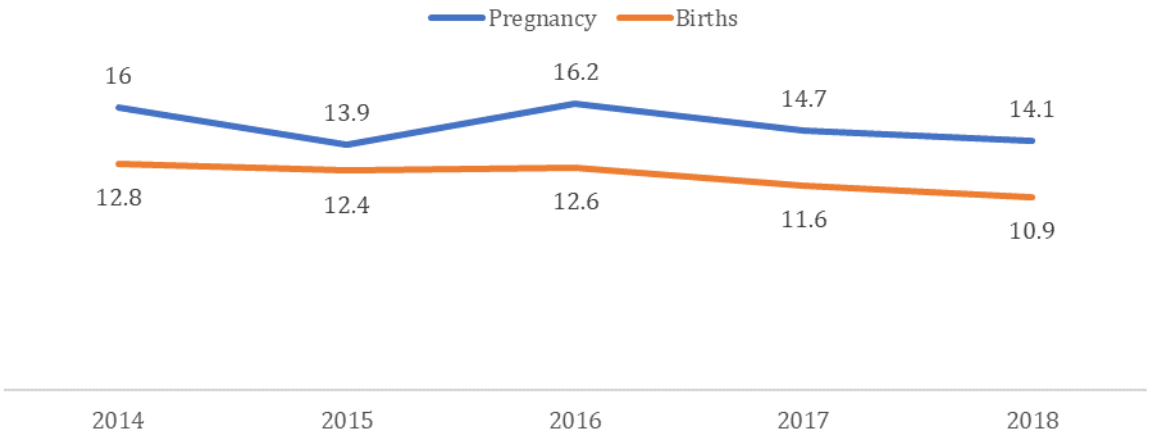
Overall, **Figures 28 to 30** indicate that in Davidson County, gonorrhea disproportionately impacts young (aged 15 to 24 years), Non-Hispanic Black males, but cases are rising fast among Non-Hispanic White and Hispanic residents. As noted in the case of Chlamydia, the increasing incidence of gonorrhea might reflect growing improvements in diagnostic, screening, and reporting practices as well as screening coverage. Due to data limitations the incidence of gonorrhea among other subgroups, including men who have sex with men and people experiencing incarceration, is not explored. As noted by the CDC, the significance of race and Hispanic ethnicity in gonorrhea reporting reflects the role of race/ethnicity and other social determinants of overall health status, such as income/poverty, employment, insurance coverage, and educational attainment.[64] To achieve equity, intervention strategies should distinguish the risk factors that impact different subpopulations, including the role of more upstream socio-economic factors.

Teen Pregnancy and Teen Birth

Teen pregnancy and childbearing bring substantial social and economic costs through immediate and long-term impacts on teen parents and their children. Teen pregnancy and birth are significant contributors to high school dropout rates among girls, and the children of teenage mothers are more likely to have health problems and lower school achievement.[65] Responsible sexual behavior among teens reduces unintended pregnancies and sexually transmitted infections and protects the physical and social health of teens.

Figure 31 below shows the number of pregnancies and live births to 15-17-year-old females during a calendar year per 1,000 females of the same age group in Davidson County. Overall, the teen pregnancy rate decreased from 16 per 1,000 female teens in 2014 to 14.1 per 1,000 in 2018. The teen birth rate decreased consistently between 2014 and 2018 from 12.8 to 10.9 live births per 1,000 female teens.

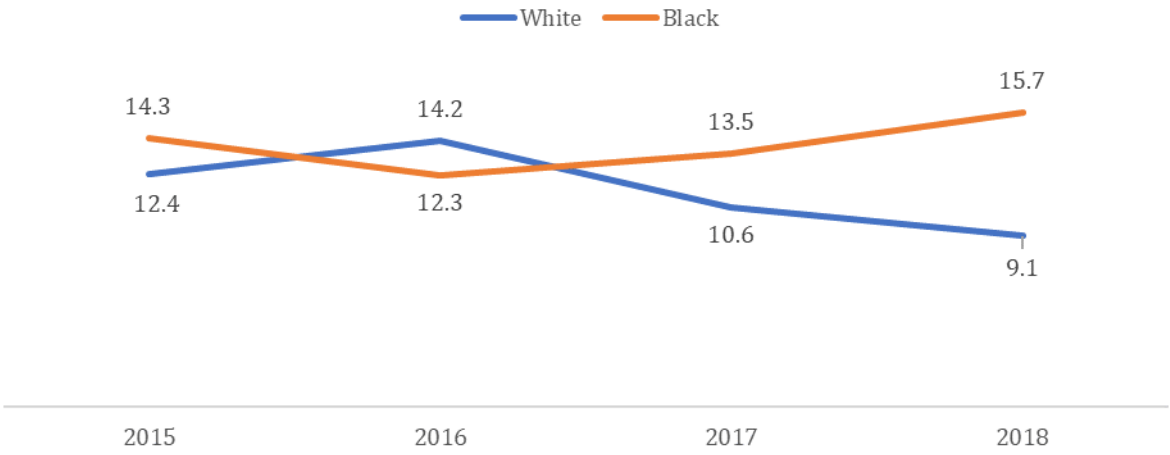
Figure 31. Teen Pregnancy and Birth Rate per 1,000 Females Aged 15-17 Years, Davidson County 2009-2018



Data Source: The Annie E. Casey Foundation, KIDS COUNT Data Center. Retrieved from: https://datacenter.kidscount.org .

Figure 32 shows that when differentiated by race, the birth rate among White teens increased by 14.5% from 12.4 per 1,000 in 2015 to 14.2 per 1,000 while it decreased by about 14% among Black teens (from 14.3 to 12.3 per 1,000 females). Between 2016 and 2018 the teen birth rate decreased by 35.9% among White teens but increased by 27.6% among Black teens. In 2015, the Birth rate among Black teens was 1.2 times higher compared to the rate among White teens. By 2018 the rate among Black teens was 1.7 times higher, indicating that the difference between White and Black teen birth rates increased by about 42% between 2015 and 2018.

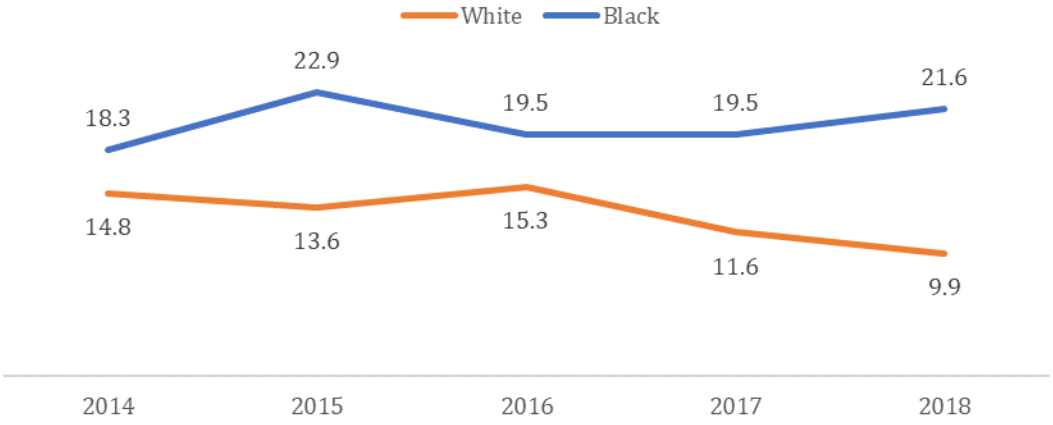
Figure 32. Teen Birth Rate per 1,000 Females Aged 15-17 Years by Race, Davidson County, 2015-2018



Data Source: The Annie E. Casey Foundation, KIDS COUNT Data Center, https://datacenter.kidscount.org/data/tables/3000-teen-pregnancy?loc=44&loct=2#detailed/5/6438/true/37,871,870,573,869,36,868,867,133,38/any/13266

A similar racial disparity is noticeable in the teen pregnancy rate (**Figure 33** below). The difference between White and Black teen pregnancy rates increased by about 30% between 2015 and 2018, with rates being higher among Black than White teens.

Figure 33. Teen Pregnancy Rate per 1,000 Females Aged 15-17 Years by Race, Davidson County, 2014-2018



Data Source: The Annie E. Casey Foundation, KIDS COUNT Data Center. Retrieved from: https://datacenter.kidscount.org .

Cancer Prevention and Control

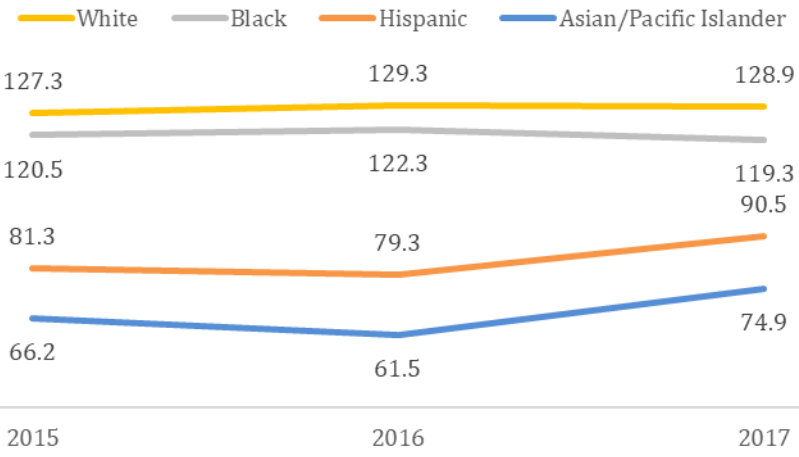
According to the CDC, cancer is the second leading cause of death in the United States. Many kinds of cancer can be prevented or treated early. Leading risk factors for preventable cancers are smoking, getting too much UV radiation from the sun or tanning beds, being overweight or obese, and excessive alcohol drinking. Some kinds of cancer (like breast, cervical, and colorectal) can be caught early through screening. Other kinds can be prevented—for example, cervical cancer through vaccination and colorectal cancer through removal of abnormal growths in the colon and rectum before they turn into cancer.[66] This section examines potential disparities in the incidence of breast, cervical and colon cancers across subgroups in Davidson county. The disparity in the burden of these diseases is then contrasted with the utilization of cancer screening services across the same subgroups. The contrast is by geography and assumes that cancer screening might vary between geographic areas of different socioeconomic status.

Incidence of Breast, Cervical and Colon Cancers

Rate of New Breast Cancer Cases

Among women in the United States, breast cancer is the second most common type of cancer, and the second leading cause of cancer death. Age is the greatest risk factor in developing breast cancer. Figure 34 shows that between 2015 and 2017 the 5-year incidence of breast cancer was highest among Non-Hispanic White residents and lowest among Asian/Pacific Islander residents. Compared to Asian/Pacific Islanders, there were an average of 61.1 more new breast cancer cases per 100,000 among Non-Hispanic White residents in 2015 and 54.0 more cases per 100,000 in 2017. The differences between all other racial/ethnic subgroups were relatively unchanged throughout this period.

Figure 34. Five-year Incidence of Breast Cancer by Race/Ethnicity*, Davidson County 2015 to 2017



Data Source: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2019 submission data (1999-2017): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, released in June 2020.

https://www.cdc.gov/cancer/uscs/dataviz/download_data.htm, downloaded February 08, 2021.

Nationwide data indicate that Black and White women get breast cancer at about the same rate. For example, in 2017 rates of new breast cancer cases nationwide were 125.8 per 100,000 among White women and 121.3 per 100,000 among Black women,[67] though there are Black-White differences in incidence based on age.[68] For example, CDC reported that between 1999 and 2013 "(c)ompared with white women, breast cancer incidence rates were higher among black women who are younger than 60 years old, but lower among black women who are 60 years old or older. Black women die from breast cancer at a higher rate than white women."[69] In Davidson County, the overall the racial/ethnic distribution of breast cancer incidence rates mirrors nationwide patterns.

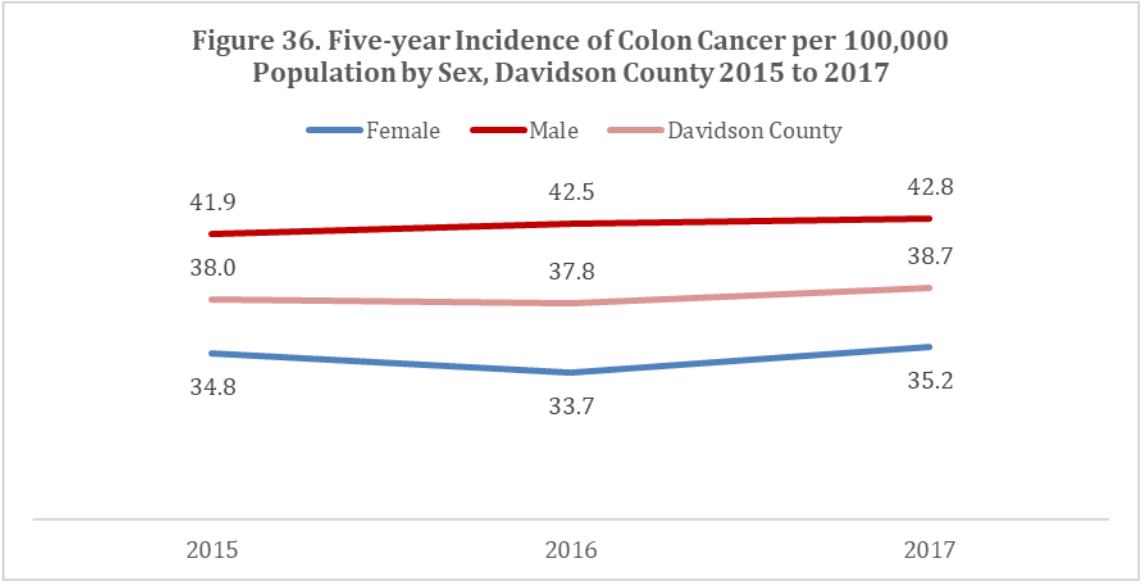
Rate of New Cervical Cancer Cases

Cervical cancer had previously been the leading cause of cancer death for women in the United States. However, during the past 40 years, both the number of new cases and deaths have decreased substantially. This decline largely is the result of women getting regular Pap tests, which can detect cervical precancer before it develops to cancer.[70] Racial differences in cervical cancer incidence trends persist, with the most burden being on Black women nationally and countywide.

Rate of New Colon Cancer Cases

Figure 36 shows the 5-year incidence of colon cancer for 2015 through 2017 for males and females. Overall, the incidence of colon cancer increased slightly between 2015 and 2017, from 38.0 to 38.7 per 100,000 population. Rates among males were consistently higher compared to females by about 20.4% in 2015 and about 21.6% in 2017.

Figure 36. Five-year Incidence of Colon Cancer per 100,000 Population by Sex, Davidson County 2015 to 2017

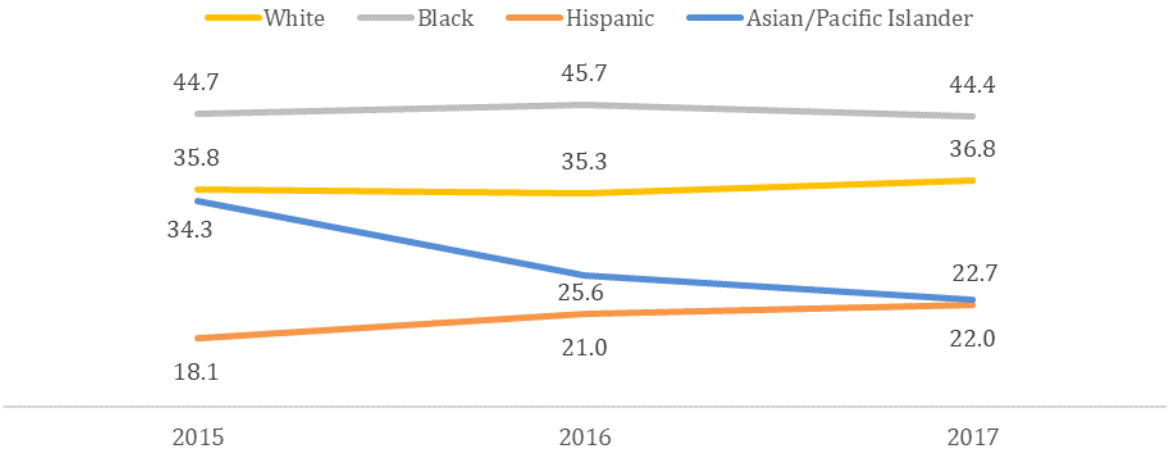


Data source: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2019 submission data (1999-2017): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, released in June 2020.

https://www.cdc.gov/cancer/uscs/dataviz/download_data.htm, downloaded February 08, 2021.

Rates among black residents were consistently the highest, followed by rates among White residents (Figure 37 below). The difference in the colon cancer incidence rate between Black and White residents was relatively unchanged throughout this period. Hispanic residents had the lowest incidence rates of colon cancer, but the rate increased by about 22% between 2015 and 2017. Among Asians/Pacific Islander residents, the colon cancer incidence rate decreased sharply between 2015 and 2017 (by about 34%), narrowing the difference with rates among Hispanic residents from 16 new cases per 100,000 population in 2015 to less than 1 new case per 100,000 population in 2017.

Figure 37. Five-years Incidence of Colon Cancer by Race/Ethnicity per 100,00 Population by Race/Ethnicity, Davidson County 2013 to 2016



Data Source: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2019 submission data (1999-2017): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, released in June 2020.

https://www.cdc.gov/cancer/uscs/dataviz/download_data.htm, downloaded February 08, 2021.

Overall, there are declining trends in the burden of cervical and colon cancers among Davidson county residents, and this is consistent with national trends. The Black-White disparity in the burden of cervical cancers might reflect the sensitivity of the cervical cancer rate to early screening and detection technologies. Therefore, monitoring fluctuations in cervical cancer screening rates might be key to racial equity in the magnitude and consistency of reductions in the incidence of cervical cancer. Non-Hispanic Black males account for a disproportionately high burden of colon cancer despite the overall drop in the burden across all subpopulations. Non-Hispanic White females account for a disproportionately high burden of breast cancer. Overall, variance in screening rates within and between these subpopulations might explain some of the observed disparities and can inform prevention policy and program decision making.

Cancer Screening

Advancements in detection and treatment have led to progressively declining rates of cancer deaths since 1990, particularly breast, cervical and colorectal cancers. Regular screening ensures early detection of most cancers, and can prevent colorectal and cervical cancers in particular, through vaccination (cervical cancer) and removal of abnormal growths (colorectal cancer). According to the CDC, "screening rates for these cancers remain below national targets set by Healthy People 2020, the nation's agenda for improving the health of all Americans."[71] For example, the Healthy People 2020 target is that by 2020:

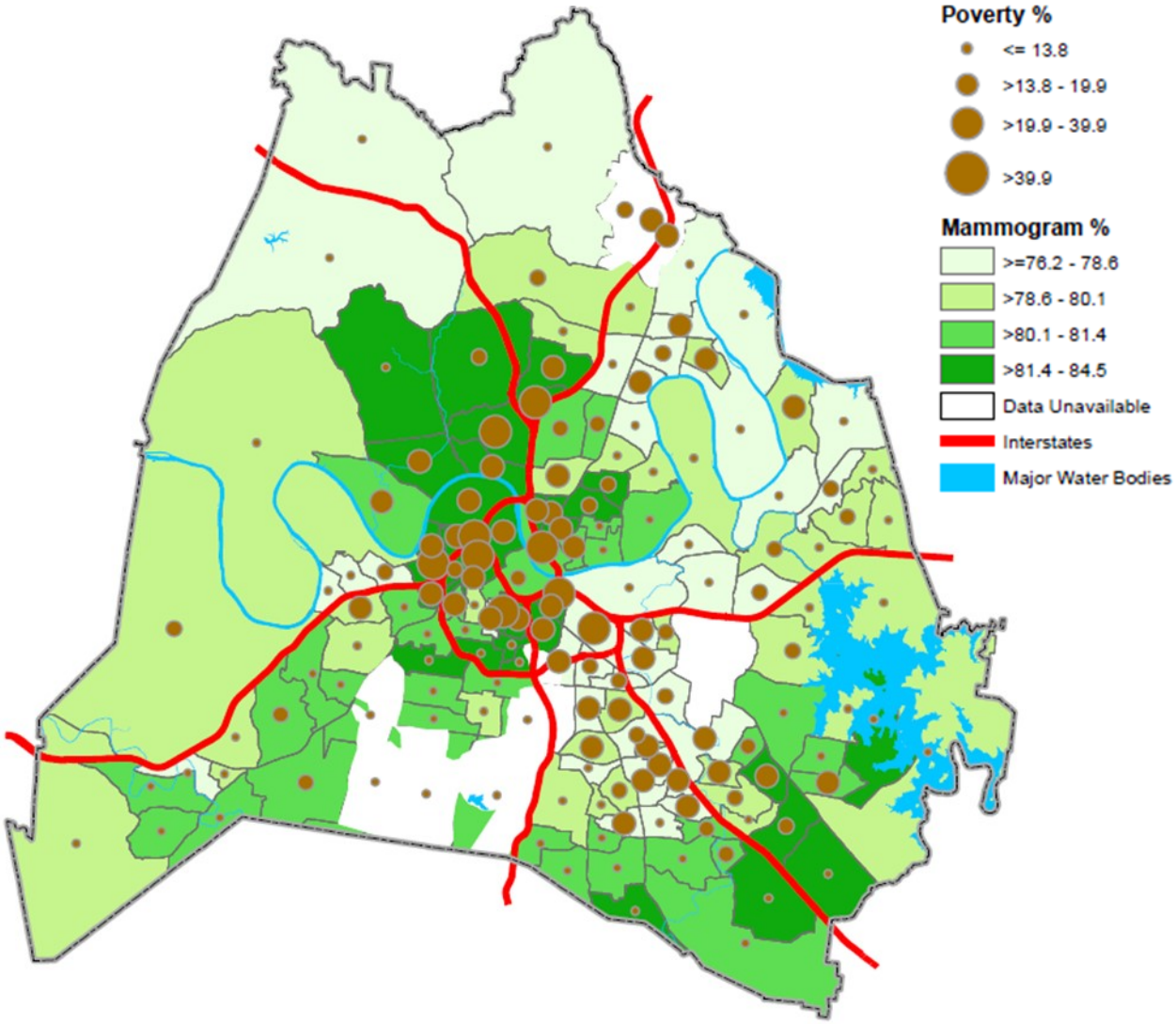
- 81.1% of females aged 50 to 74 receive a breast cancer screening based on the most recent guidelines;
- 93% of females aged 21 to 65 receive a cervical cancer screening based on the most recent guidelines; and
- 70.5% of all persons aged 50 to 75 years receive a colorectal screening based on the most recent guidelines.[72]

Three maps below show screening rates for breast cancer (percent receiving a mammogram), cervical cancer (percent receiving a pap smear test) and colorectal cancers (percent receiving a colonoscopy or sigmoidoscopy or a virtual colonoscopy) in 2016 per census tract in Davidson County. The 2016 estimates are the latest publicly available for subcounty populations. Cancer screening data are from CDC's 500 Cities Project which provides estimates for subcounty units including census tracts. Unfortunately, these data are not available by socio-demographic categories. Given residential segregation by socio-demographics, cancer screening might vary between geographic areas of different socioeconomic status. To demonstrate the correlation, the annual average percentage of the total population living below 100% of the federal poverty threshold in each census tract for the period 2014 to 2018 is shown on the same maps as the cancer screening rates. In each map larger dots indicate higher percentages of the population in poverty, and darker shades indicate higher percentages of the population receiving cancer screening.

Breast Cancer (Mammogram) Screening

Figure 38 below displays the percentage of the female population aged 50 to 74 in each census tract that received a breast cancer screening (Mammogram) in the past 12 months in 2016. Also displayed is the annual average percent of the total population living below 100% of the federal poverty line between 2014 and 2018. The maximum value on the scale for the mammogram map (Figure 38) is 84.5%, indicating that in 2016 the census tract with the highest breast cancer screening rate in Davidson County was 3.4% points above the Healthy People 2020 target of 81.1% by 2020. The lowest breast cancer screening rate per census tract was 8.4% points below the national benchmark. More up-to-date data are needed to better evaluate Davidson County's current screening rates against national benchmarks. Nonetheless, there was an absolute difference of 11.8% points between the census tracts with the highest and lowest breast cancer screening rate in 2016. The lowest screening rates are mapped in Figure 38. It is noted that, with a few exceptions in North Nashville, census tracts with lower breast cancer screening rates also tend to have higher poverty rates.

Figure 38. Percent of women aged 50–74 years who received a mammogram in 2016 and Percent of the Population Living in Poverty in 2014-2018 per Census Tract, Davidson County



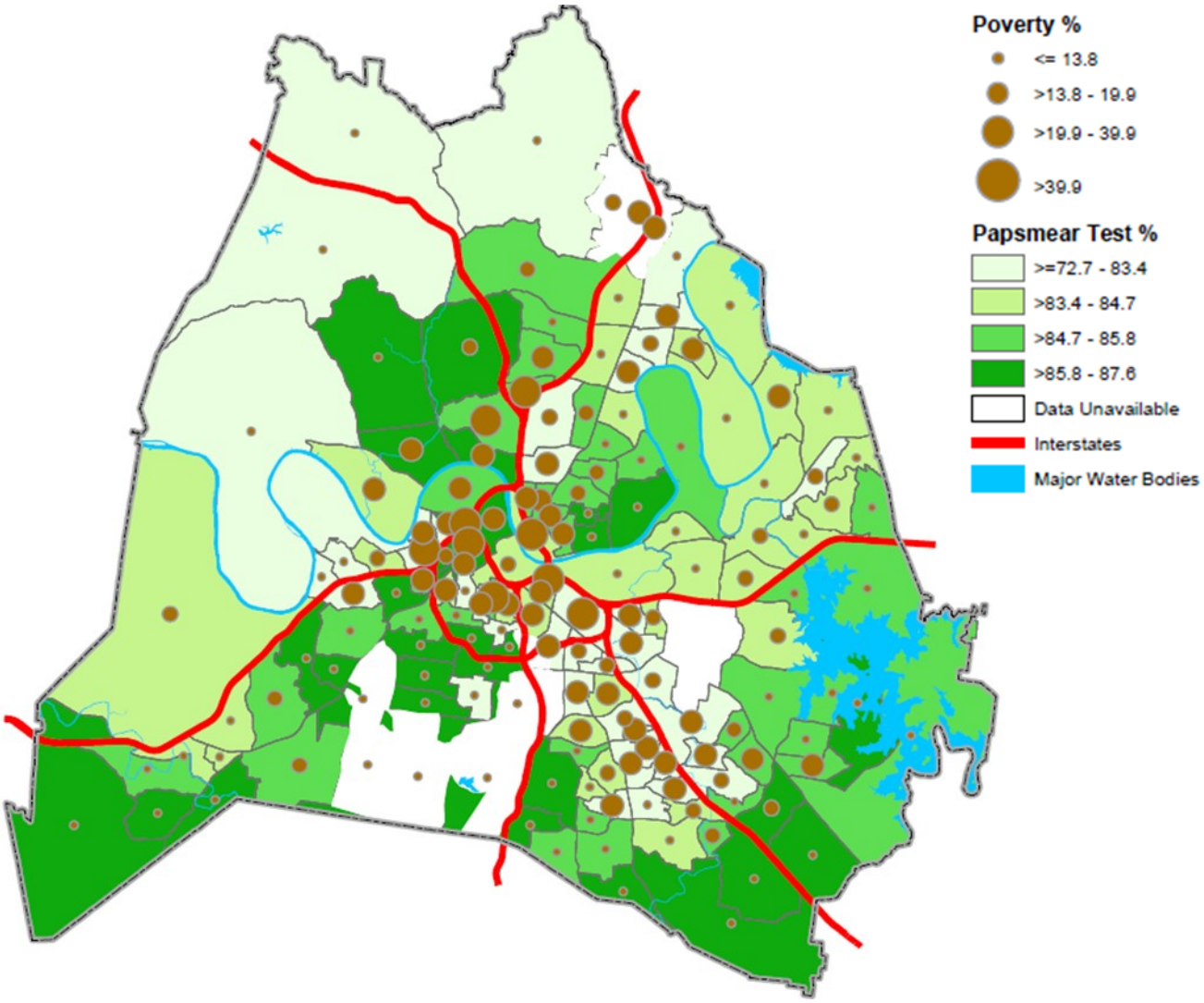
Created by the Division of Epidemiology, MPHD December 2019, Updated September, 2020	Metro Planning Department - GIS Layers CDC - 500 Cities 2018

A comparison of self-reported past year mammography use by women aged 40-70 who participated in the 2016 National Health Interview Survey (NHIS) and the 2016 Behavioral Risk Factor Surveillance System (BRFSS) indicated that mammography use was higher among black than white women.[73] This finding reflected a change from past trends. Consistent with the patterns observed in Davidson County, mammography use was positively associated with older age, higher income and having health insurance. National trends may not necessarily reflect local trends, so local data on screening trends by demographic characteristics are needed. However, addressing disparities in poverty/income and health insurance coverage through policy changes can significantly help narrow the inequities shown in this geospatial analysis. rate per census tract was 20.3% points below the national benchmark.

Cervical Cancer Screening

Figure 39 below displays the percentage of the female population aged 21 to 65 in each census tract that received a cervical cancer (Papanicolaou smear) screening in the past 12 months in 2016. The maximum value on the scale for the pap smear map (Figure 39) is 87.6%, indicating that in 2016 the census tract with the best cervical cancer screening rate in Davidson County was 5.4% points below the Healthy People 2020 target of 93% by 2020. The lowest cervical cancer screening rate per census tract was 20.3% points below the national benchmark.

Figure 39: Percent of women aged 21–65 years who received a Papanicolaou smear in 2016 and Percent of the Population Living in Poverty in 2014-2018 per Census Tract, Davidson County



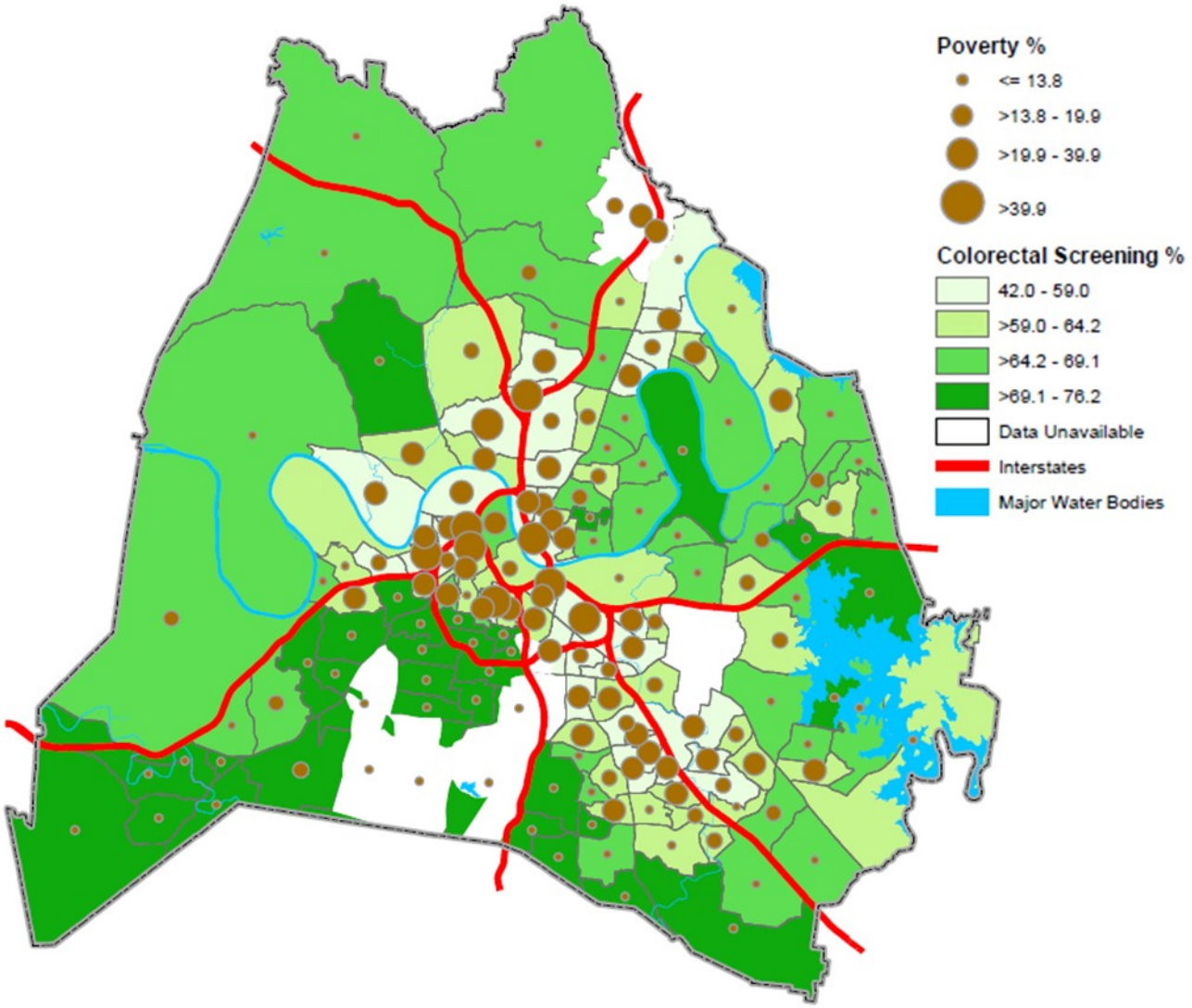
Created by the Division of Epidemiology, MPHD December 2019, Updated September, 2020	Metro Planning Department - GIS Layers CDC - 500 Cities 2018

More up-to-date data are needed to better evaluate how well Davidson County's current screening rates approximate national benchmarks. Nonetheless, there was an absolute difference of 14.9% points between the census tracts with the lowest and highest cervical cancer screening rate in 2016. (See Figure 39.) Screening rates increase the further south and west from Downtown Nashville a census tract is located, as well as immediately north and east of Downtown. With a few exceptions in the North Nashville and West Nashville neighborhoods, census tracts with lower cervical cancer screening rates also tend to have higher poverty rates.

Colorectal Cancer Screening

The geographic pattern of colorectal cancer screening uptake among adults aged 50 to 75 across the 161 Davidson County census tracts is shown in Figure 40. The maximum value on the map scale is 76.2%, indicating that in 2016 the census tract with the best colon cancer screening rate in Davidson County was 5.7% points above the Healthy People 2020 target of 70.5% by 2020.

Figure 40. Percent of adults aged 50–75 years who received a fecal occult blood test, sigmoidoscopy, or colonoscopy in 2016 and Percent of the Population Living in Poverty in 2014-2018 per Census Tract, Davidson County



Created by the Division of Epidemiology, MPHD December 2019, Updated September, 2020	Metro Planning Department - GIS Layers CDC - 500 Cities 2018

The lowest colorectal cancer screening rate per census tract was 28.5% points below the national benchmark. There was an absolute difference of 34.2% points between the census tract with the lowest and highest colon cancer screening rate in 2016. Census tracts with lower colon cancer screening rates tended to have higher poverty rates. Nationwide more and more adults are staying up to date on colon cancer screening. However about 1 in 3 adults do not receive screening as recommended. CDC identifies key barriers as lack of health insurance, not having a regular doctor, screening not offered by a doctor or lack of awareness about current screening guidelines.[74]

Screening rates for the three cancers are not available by demographic categories. However, given the socio-demographic patterns of poverty rates, it likely that screening rates also differ by race/ethnicity. Poverty could be a barrier to primary/preventive care. According the Healthy People 2020, disparities in cancer screening by race/ethnicity have been linked to barriers in primary care, including linguistic isolation or speaking a language other than English at home, lack of health insurance, limited provider office hours or availability, and travel distance or inconvenient and unreliable transportation.[75] Policy changes that address disparities in poverty/income and health insurance coverage, mitigate linguistic isolation and transportation barriers, and increase awareness (among providers and residents) about current screening guidelines are likely to significantly help narrow the inequities shown here and saves lives.

In the following section focused on health outcomes disparities in the mortality rates for breast and colon cancers are contrasted with disparities in the incidence rates. As will be further described, when mortality is high in the groups with low incidence but low in the groups with high incidence then the likely disparities in access to screening and treatment need to be addressed to progress toward equity.

Disparities in Health Outcomes

2021 Health Equity in Nashville
Metro Public Health Department

Overview

This section describes disparities in the burden of potentially preventable illness, injury and death across various subgroups of the population in Davidson County. These are largely the long-term consequences of the social determinants explored in the earlier sections of the report.

Morbidity

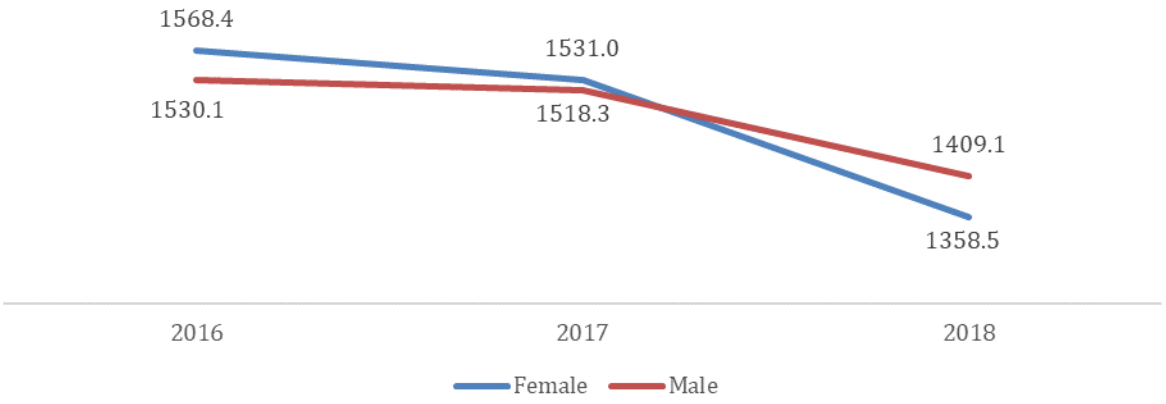
Physical wellbeing, which has been defined as feeling very healthy and full of vitality, is critical to overall community wellbeing.[76] As the death rate drops and people live longer (the case in developed countries like the United States), the time spent in unhealthy states (such as illness and disability) are important measures of the burden of disease and injury in the community,[77] and serve as reminders of the need for continued investment and focus on equity in upstream determinants of health, such as equitable investments in safe, affordable and adequate housing, accessible health promoting natural and built environments, access to healthy foods, and reductions in institutional racism and discrimination.

Potentially Preventable Hospitalizations

Potentially preventable hospitalizations in a community indicate the availability, quality and accessibility of primary health care services. If the quality of care in the outpatient setting is poor, then people may be more likely to overuse the hospital as a main source of care and be hospitalized unnecessarily. If available, primary health care should be sufficient for ambulatory care-sensitive conditions. According to the Agency for Healthcare Research and Quality (AHRQ) "Medical conditions such as asthma, urinary tract infections, and complications of diabetes are considered ambulatory care sensitive conditions, meaning that when those conditions are present, primary or preventive health care can reduce the need for emergency department (ED) visits and inpatient hospitalization."[78] An area with a higher density of primary care providers usually has lower rates of hospitalization for ambulatory care-sensitive conditions. If access to high quality primary care is increased, a community may be able to reduce its preventable hospitalizations.

Figure 41 below shows the age-adjusted rate of potentially preventable hospitalizations among adults in Davidson County by the sex of the hospitalized patient. The estimate is based on the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicator 90 (PQI 90) which is composed of hospital admissions for one of the following conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputation, chronic obstructive pulmonary disease (COPD), asthma, hypertension, heart failure, bacterial pneumonia, or urinary tract infection.

Figure 41. Age-adjusted Potentially Preventable Hospitalizations per 100,000 Population Among Adults (≥18 Years) by Sex, Davidson County 2016-2018

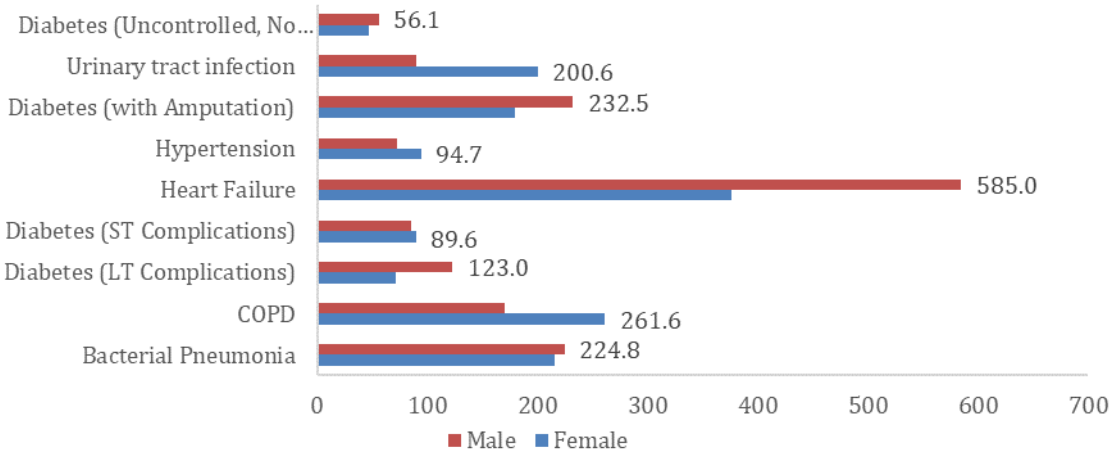


Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).[79]

To be included in the estimate, the condition must be the principal (or first-listed) diagnosis in the Hospital Discharge Data System (HDDS).[80] The focus on the first-listed diagnosis excludes records that are associated with maternal/neonatal hospital stays.[81] The denominator for the rate is the 1-year population estimate from the Census Bureau's American Community Survey for each sex and age group. Age-adjustment is based on the direct method using the US 2000 Standard Population weights.[82] Age-adjustment makes rate estimates comparable across groups with different age structures. Overall, potentially preventable hospitalizations among adults in Davidson County decreased between 2016 and 2018 by 13.4% among women and 9.2% among men. Rates were higher among women compared to men in 2016 and 2017, and in 2018 rates among women dropped to below rates for men. However, all the differences were not statistically significant.

In 2018, the highest rates of avoidable hospitalizations were for heart failures followed, respectively, by community-acquired bacterial pneumonia, chronic obstructive pulmonary disease (COPD) and diabetes with lower-extremity amputations (**Figure 42** below.)

Figure 42. Age-adjusted Potentially Preventable Hospitalizations per 100,000 Population Among Adults (≥18 Years) by Sex and Primary Diagnosis, Davidson County, 2018

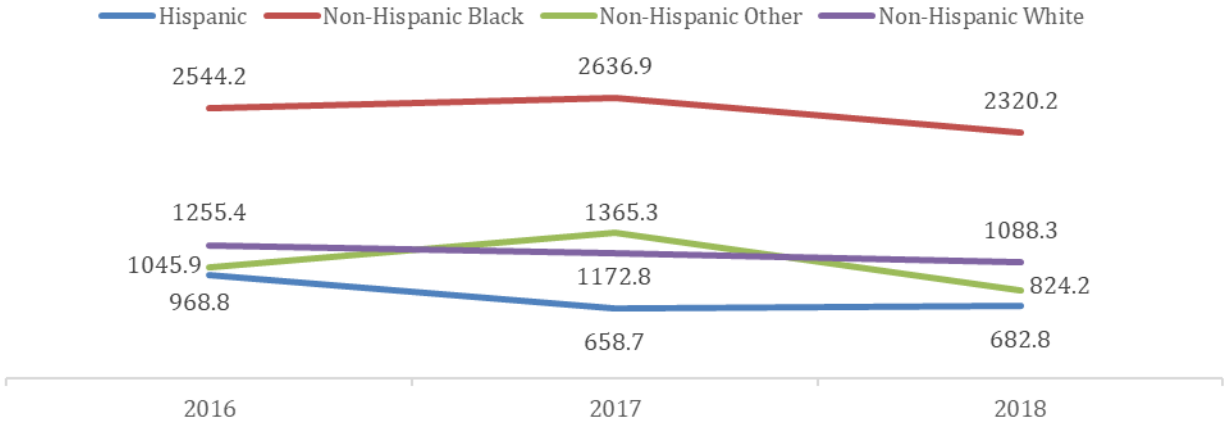


Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator). ST = Short-term; LT=Long-term; COPD = Chronic Obstructive Pulmonary Disease. Bacterial pneumonia refers only to community-acquired pneumonia.

Disparities in Health Outcomes

Figure 43 below shows the age-adjusted rate of potentially preventable hospitalizations among adults in Davidson County by the race/ethnicity of the hospitalized patients. Between 2016 and 2018 the rate of potentially preventable hospitalizations in Davidson County differed by patients' race/ethnicity. Non-Hispanic Black residents had the highest rates of avoidable hospitalizations in 2016 through 2018. The lowest rates were consistently among Hispanic residents. However, these rates were not statistically significantly different from those among Non-Hispanic White residents and other racial/ethnic groups. Rates among Non-Hispanic Black residents were 2.6 to 3.4 times higher than rates among Hispanic residents (**Figure 43**).

Figure 43. Age-adjusted Potentially Preventable Hospitalizations per 100,000 Population by Race/Ethnicity Among Adults (≥18 years), Davidson County, 2016 -2018

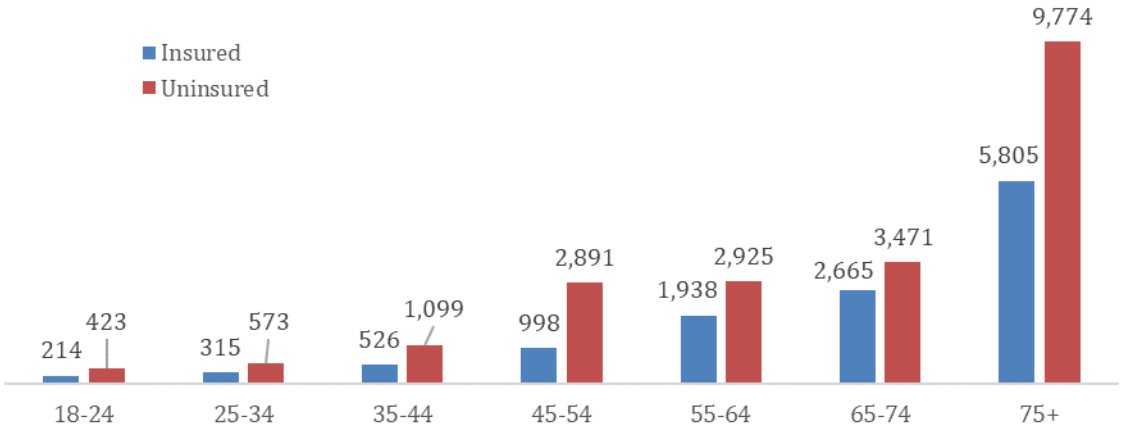


Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Overall, avoidable hospitalizations decreased over the 3 years by 29.5% among Hispanic residents, 13.3% among non-Hispanic Whites residents and by 8.8% among non-Hispanic Black residents. Avoidable hospitalizations decreased by 21.2% among all other non-Hispanic residents. According to the Agency for Healthcare Research and Quality (AHRQ) the decrease in potentially preventable hospitalizations could indicate improvements in the availability, accessibility and utilization of quality primary care and preventive services. Complications and severity of diseases such as diabetes, asthma/COPD, heart failure or urinary tract infections can be prevented through early interventions. The racial/ethnic differences reflected in the Davidson County data may indicate inequities in the opportunity and capacity to benefit from improvements in primary care or preventive services. Recent incentives to penalize hospitals with high readmissions rates,[83] may also have the effect of decreasing preventable hospitalizations. As shown earlier, Hispanic residents have the lowest health insurance coverage rates in Davidson County. Lack of insurance coverage could limit their access to healthcare in general or to in-hospital stays and, they might instead be overrepresented among patients treated and released from hospital emergency departments.

Figure 44 below indicates that in 2018 rates of preventable hospitalizations were higher among older than younger adults in Davidson County. For each age group ≥18 years, rates were higher among the uninsured compared to the insured. A closely similar pattern of differences by age and insurance status was observed in 2016 and 2017 (Data not shown.)

Figure 44. Age-adjusted Potentially Preventable Hospitalizations per 100,000 Population Among Adults (≥18 Years) by Health Insurance Status, Davidson County, 2018



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

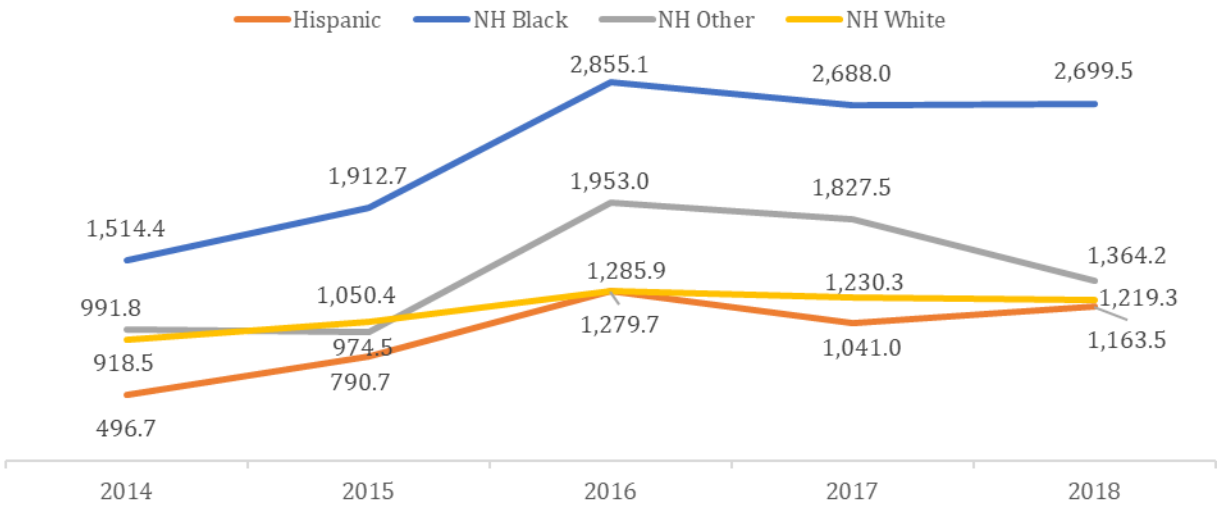
Data presented in this section suggest that lack of health insurance generally restricts access to quality primary and preventive care services, and might force the uninsured to postpone early interventions, resulting in hospitalizations for complications of otherwise ambulatory sensitive conditions.

Emergency Department (ED) Visits for High Impact Chronic Diseases: Cardiovascular Disease, Diabetes, Cancer, Mental Health

Healthcare use such as visits to the emergency department may not reflect the burden of disease, particularly within deprived subgroups of a given population. Generally, emergency, trauma or urgent care facilities are accessed for crisis or critical care needs. However, where barriers to primary care or elective medical care exist, such as lack of (inadequate) health insurance coverage or transportation, emergency departments may be the main source of health care --- either as a rational choice or due to medical emergencies ensuing from postponed primary care /preventive health services.

Figure 45 below indicates that Non-Hispanic Black adults had the highest heart disease ED visit rate in 2014 through 2018, and Hispanic adults consistently had the lowest visit rates. In 2014 the highest ED visit rate (observed among NH Black adults) was 3 times higher compared to the lowest visit rate (observed among Hispanic adults) and in 2018 the rate difference between these two groups was 2.3-fold. There was an underlying trend across all race/ethnic groups of visit rates rising sharply between 2014 and 2016 and then decreasing modestly (<10%) through 2018, except for rates among those adults in the other race/ethnic group, which experienced a 30% decrease in the rate of ED visits between 2016 and 2018.

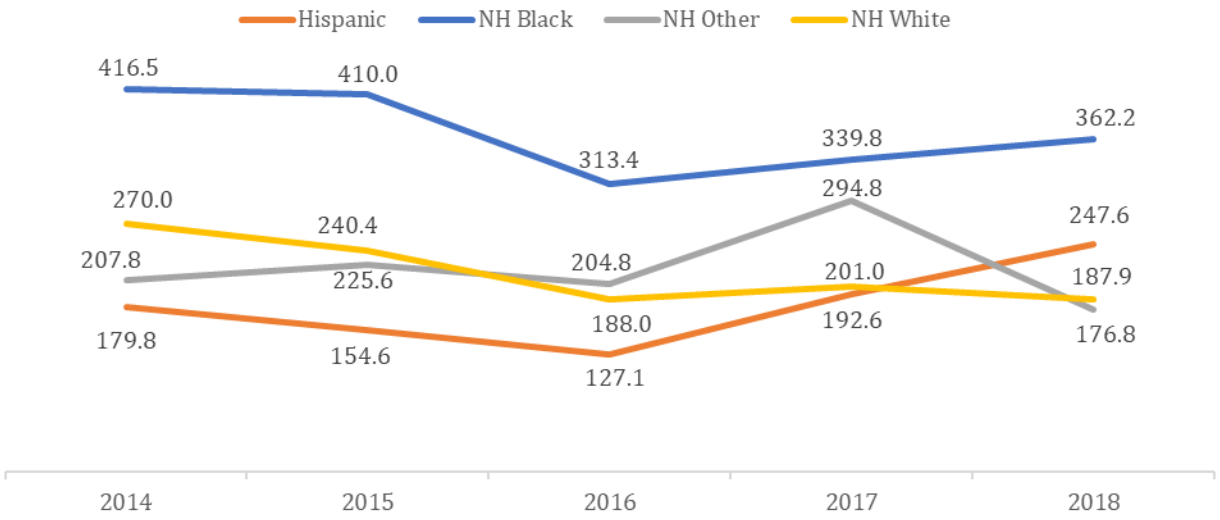
Figure 45. Age-adjusted ED Discharges with Heart Disease Diagnosis per 100,000 Population Aged 18 Years and Older by Race/Ethnicity, Davidson County 2008-2018



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

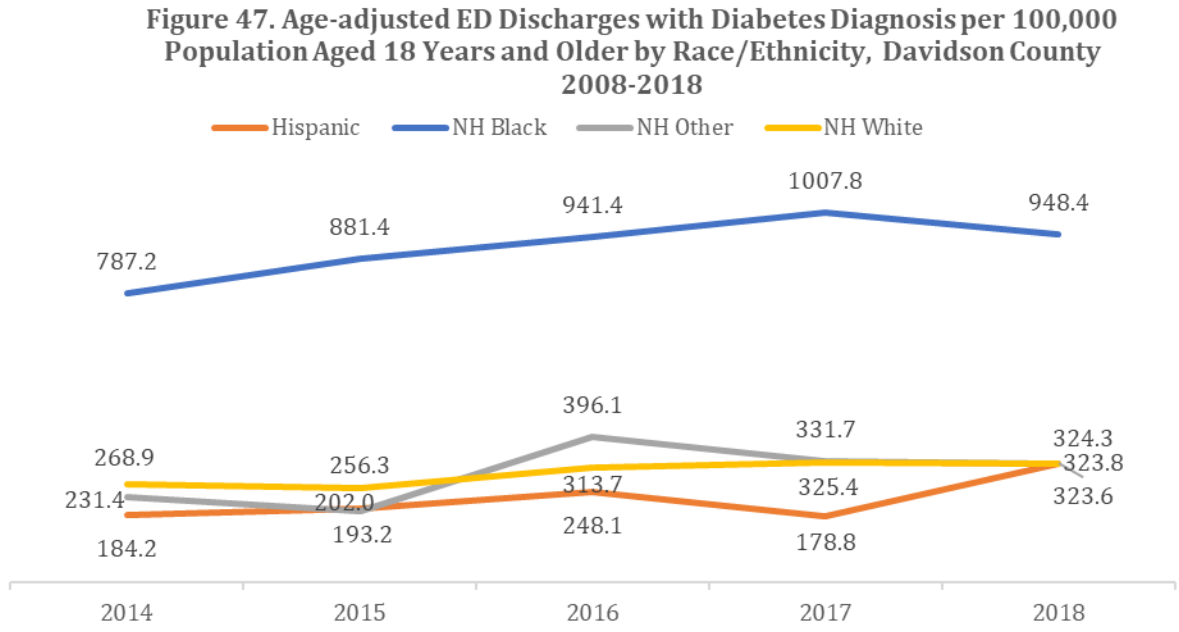
The racial/ethnic disparities in ED visits for stroke (Figure 46 below) are comparable to those for heart diseases. However, the trends for stroke ED visits contrast the trends for heart disease-related ED visits. Between 2014 and 2016 stroke ED visit rates decreased sharply among Non-Hispanic White (30.4%), Hispanic (29.3%) and Non-Hispanic Black (24.8%) adults but were relatively unchanged among all the other racial/ethnic groups combined. Between 2016 and 2018 ED visits for stroke increased by 94% among Hispanic and 15.6% among Non-Hispanic Black adults but were relatively unchanged among Non-Hispanic White adults. Rates fluctuated among all the other racial/ethnic groups.

Figure 46. Age-adjusted ED Discharges with Stroke Diagnosis per 100,000 Population Aged 18 Years and Older by Race/Ethnicity, Davidson County 2008-2018



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Figure 47 below indicates that Non-Hispanic Black adults had the highest diabetes ED visit rate in 2014 through 2018, and Hispanic adults consistently had the lowest visit rates.



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Table 8 shows the age-adjusted rates of ED visits for chronic diseases and mental health by health insurance status. Uninsured is defined by the Agency for Healthcare Research and Quality (AHRQ) as a health care visit with primary payer listed as self-pay or free/charity/ no fee charged.[84] All other records are classified as insured. These include private and public insurance plans. Records for whom the payer is unknown or unspecified are not included. The denominator for the rate was the Census Bureau's annual estimate of the number of uninsured Davidson County residents by age group.

Table 8. Age-adjusted Rate of Emergency Department (ED) Visits with a Primary Diagnosis* of Chronic Disease per 100,000 Population by Insurance Status**, Davidson County, 2015-2018

Year	Insurance Status	Heart Disease	Cancer	COPD	Diabetes	Mental Health	Stroke
2015	Insured	1027.9	125.2	421.2	355.4	1154.5	221.8
	Uninsured	2213.5	154.3	797.1	782.8	3546.0	--
2016	Insured	1258.0	112.4	442.6	358.2	1124.9	159.3
	Uninsured	2781.3	210.1	793.1	960.7	3950.8	317.1
2017	Insured	1170.2	109.2	458.4	369.0	1096.5	172.0
	Uninsured	6292.8	--	--	1830.1	4857.4	--
2018	Insured	1158.5	106.0	364.5	354.1	1068.5	164.5
	Uninsured	3045.6	255.1	710.3	921.8	4682.0	399.1

Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).
***Visits in which the disease type is the first listed (primary) diagnosis in the principal diagnosis field.**

**** Two categories of insurance status are applied. The uninsured include discharges for whom the health care payer (primary, secondary or tertiary) is self-pay or free/charity/ no fee charged. All other records are classified as not uninsured.**

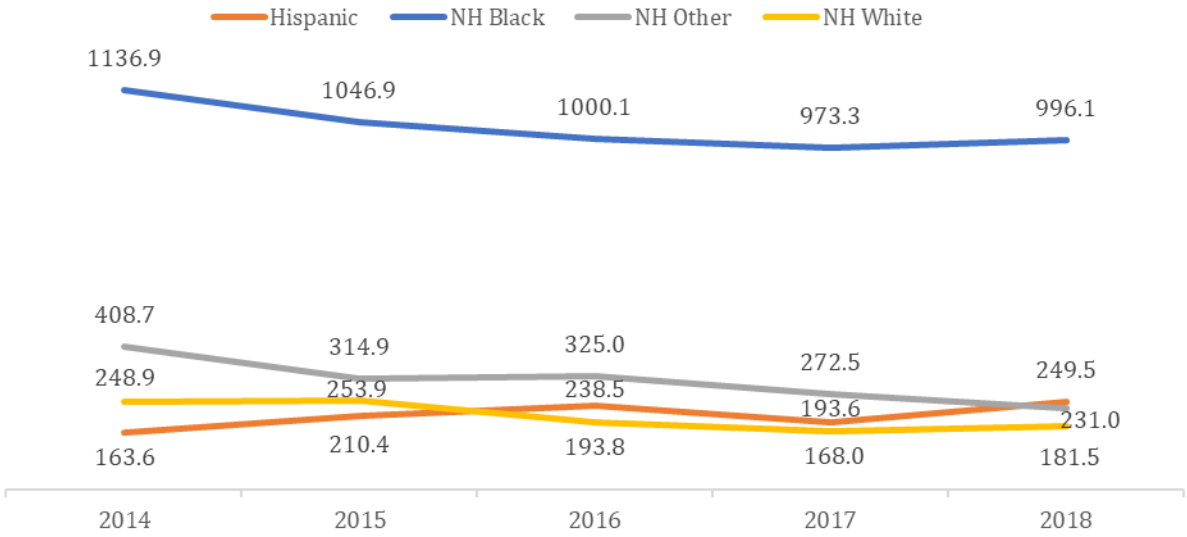
¥ COPD = Chronic Obstructive Pulmonary Disease.
-- represents data not available or estimate unreliable (i.e., Relative Standard Error ≥25).

Table 8 demonstrates that regardless of the condition, the uninsured visited the ED during 2015-2018 at almost double the rate of residents with health insurance. For mental health, ED visits among the uninsured were 3.1 times higher than among the insured in 2015 and increased to 4.4 times higher in 2018. This increasing gap in ED visits between the uninsured and insured was also evident for heart diseases, cancers and diabetes.

ED Visits for Asthma

According to the CDC hospitalizations due to asthma could be reduced if asthma is managed according to established guidelines. Effective management includes control of exposure to factors that trigger exacerbations, adequate pharmacological management, continual monitoring of the disease, and patient education in asthma care.[85] **Figure 48** below shows the age-adjusted rate of visits to emergency departments for asthma among adults aged 18 years and older by race/ethnicity in Davidson County.

Figure 48. Age-adjusted ED Discharges with Asthma Diagnosis per 100,000 Population Aged 18 Years and Older by Race/Ethnicity, Davidson County 2014-2018

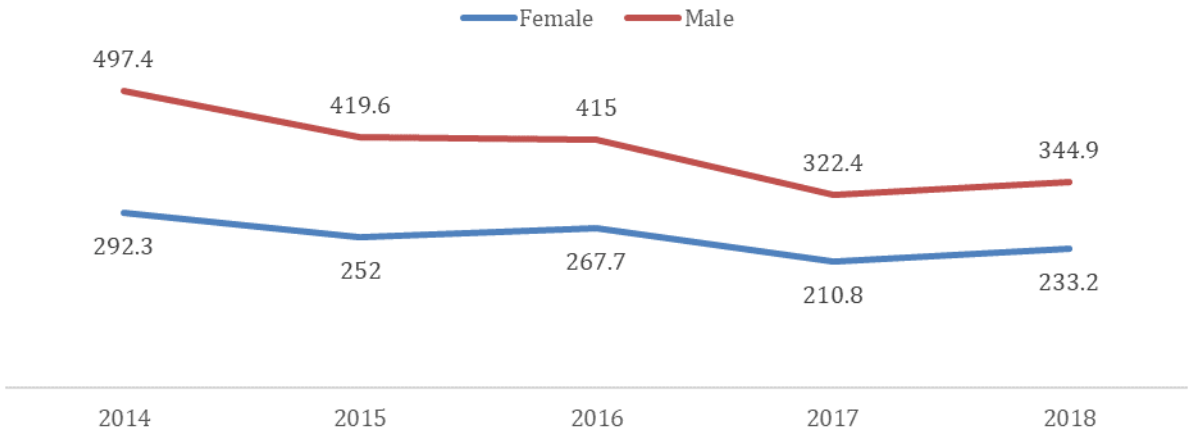


Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Non-Hispanic Black adults had substantially higher rates of asthma-related ED visits during 2014-2018. Hispanic adults had the lowest rates in 2014 (163.6 per 100, 000) and 2015 (210.4 per 100,000). Rates among Non-Hispanic Black adults decreased from 1136.9 per 100,000 population in 2014 to 996.1 per 100,000 in 2018, yet the difference with the group with the next highest ED visit rate widened to 4-fold.

Figure 49 below shows asthma ED visit rates among children aged 17 years and younger by sex. Overall, rates for all sexes decreased between 2014 and 2018 from 497.4 to 344.9 per 100,000 among males, and from 292.3 to 233.2 per 100,000 among females aged 0-17 years. Rates decreased more strongly among males compared to females, narrowing the disparity from 1.7-fold in 2014 to 1.5-fold in 2018.

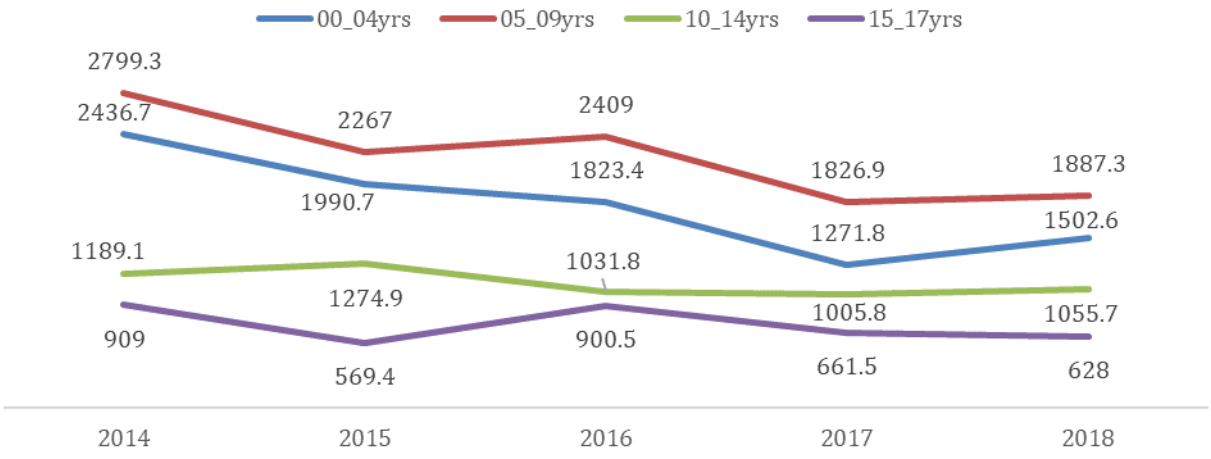
Figure 49. Age-adjusted ED Dicharges with Primary Asthma Diagnosis per 100,000 Population aged 0-17 years by Sex, Davidson County 2014-2018



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Asthma rates among children tend to vary by age. An estimated 8.3% of U.S. children under the age of 18 years lived with asthma in 2016, 3.8% among the 0-4 years old, 9.6% among the 5-14 years old and 9.9% among the 15-17 years age group.[86] When surveyed, about half of the children who live with asthma report having one or more asthma attacks in the previous 12 months (53.7% in 2016). These attacks may lead to visits to emergency departments (ED). In Davidson County the highest rates of ED visits with primary asthma diagnosis between 2014 and 2018 were among children aged 5 to 9 years, followed by the 0-4 years old, and the lowest rates were among the 15 to 17 years old, as demonstrated for male children in **Figure 50**. Data for female children followed a similar pattern. In 2014 and 2018 rates of ED visits for primary asthma diagnosis among male children aged 5 to 9 years old were about 3 times higher than rates among the 5-17 years old.

Figure 50. Rates of ED visits with Primary Asthma Diagnosis per 100,000 Males Aged 0-17 years by Age Group, Davidson County, 2014-2018



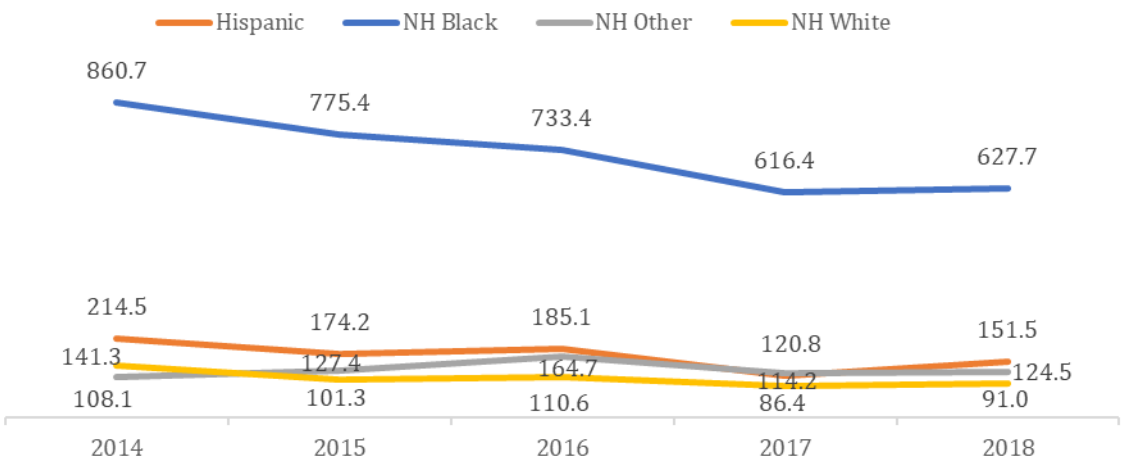
Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

Disparities in Health Outcomes

As noted in the adult population, the highest asthma ED visits rates were among Non-Hispanic Black children. During the 5 years 2014-2018, this rate dropped from 860.7 visits per 100,000 population to627.7 visits per 100,000 (**Figure 51**). In the same period, Hispanic children had the next highest rates and their rates decreased by 29.7%. The difference between asthma ED visits rates among Non-Hispanic Black and Hispanic children was 4-fold in 2014 and remained the same in 2018. Non-Hispanic White children had the lowest asthma ED visit rates in 2015 through 2018. Cumulatively, their visit rate decreased by 35.6% between 2014 and 2018 (from 141.3 to 91 per 100,000 population. The difference between asthma ED visits rates among Non-Hispanic Black and Non-Hispanic White children was 6.1-fold in 2014 and 6.9-fold in 2018. Asian children experienced increasing rates of ED visits for asthma from 108.1 visits per 100,000 in 2014 to 124.5 visits per 100,000 population in 2018 (a cumulative increase of 15.2%).

Figure 51 below shows rates of emergency department visits for asthma among children under 18 years of age by race/ethnicity.

Figure 51. Age-adjusted ED Discharges with Asthma Diagnosis per 100,000 Children 0-17 Years Old by Race/Ethnicity, Davidson County, 2014-2018



Data Source: Tennessee Department of Health, Hospital Discharge Data System (numerator). Population estimates from the U.S. Census Bureau (denominator).

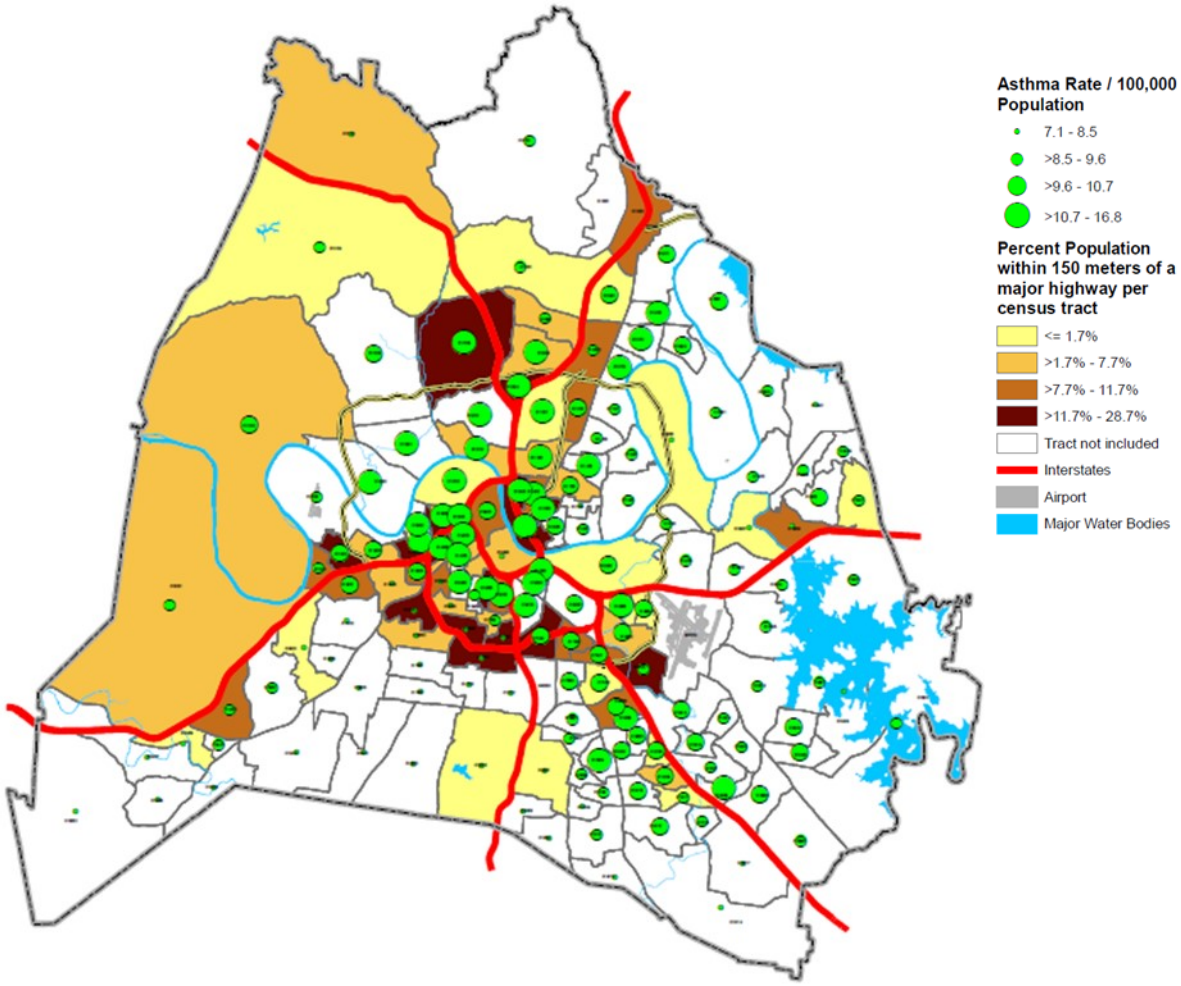
Reducing emergency department (ED) visits is among the primary goals of the National Asthma Control Program, which funds state and local health departments to ensure children with asthma (and all people with asthma) access "guidelines-based management and pharmacotherapy." *These data about racial/ethnic differences in emergency department (ED) visits for asthma suggest the need for more refined targeting of interventions that are aimed at tackling the root causes of disparities in asthma disease management and control. This could be done the training of health professionals, public education about asthma control and Interventions that reduce secondhand smoking in homes and cars.*[87]

As indicated earlier (page 35), traffic pollution is the primary source of local variability in air pollution levels and living close to major highways has been associated with increased risk of developing asthma and compromised lung function.[88] **Figure 52** below shows the number of adults aged 18 years or older living with asthma per 100,000 population in each census tract and the percent of the population in that census tract that lives within 150 meters of a major highway. Asthma rates were obtained from the 500 Cities project, which estimates the number of adults who answered "yes" to two questions in the 2016 Behavioral Risk Factor Surveillance System (BRFSS) survey: "Have you ever been told by a doctor, nurse, or other health professional that you have asthma?" and the question "Do you still have asthma?" See page 32 for the description of the major highways in Davidson County.

In **Figure 52** there appears to be some correlation between areas with a high percentage of people living within 150 meters of a major highway and a high rate of adults who self-report living with asthma. The correlation might be better captured with more up-to-date asthma data, since the location of highways has not changed but housing density and quality in and around areas next to highways might have changed between 2016 and 2020.

To achieve equity or environmental justice, asthma prevention efforts should also include strategies that assist poor and socially disadvantaged communities at risk of exposure to traffic pollutants to afford improved ventilation systems in homes and buildings, in addition to public investments in roadside barriers and other clean air measures.

Figure 52. Percent Population within 150 Meters of a Major Highway per Census Tract in 2020 and Current Asthma Rate per 100,000 Adults aged ≥18 years in 2016, Davidson County



Data Sources: Metro Planning Department GIS Layers. Asthma Prevalence Rates were obtained from the 2016 Behavioral Risk Factor Surveillance System, 500 Cities Project.

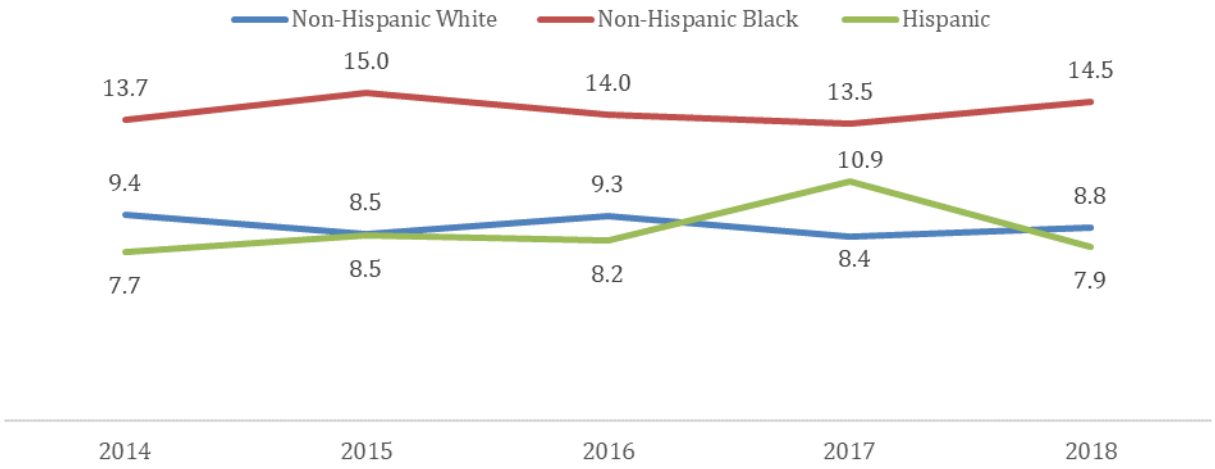
Birth Outcomes

Preterm Births

Preterm birth (i.e., birth at <37 weeks gestation) is a leading cause of infant mortality and an important cause of serious morbidity among children under 5 years of age. It is associated with adverse lifelong health consequences such as breathing problems, developmental delay, cerebral palsy, and vision or hearing problems.[89]

Between 2014 and 2018 the highest percentage of babies born preterm was consistently observed among Non-Hispanic Black mothers (**Figure 53** below).

Figure 53. Percent of Preterm Births by Maternal Race/Ethnicity, 2014-2018

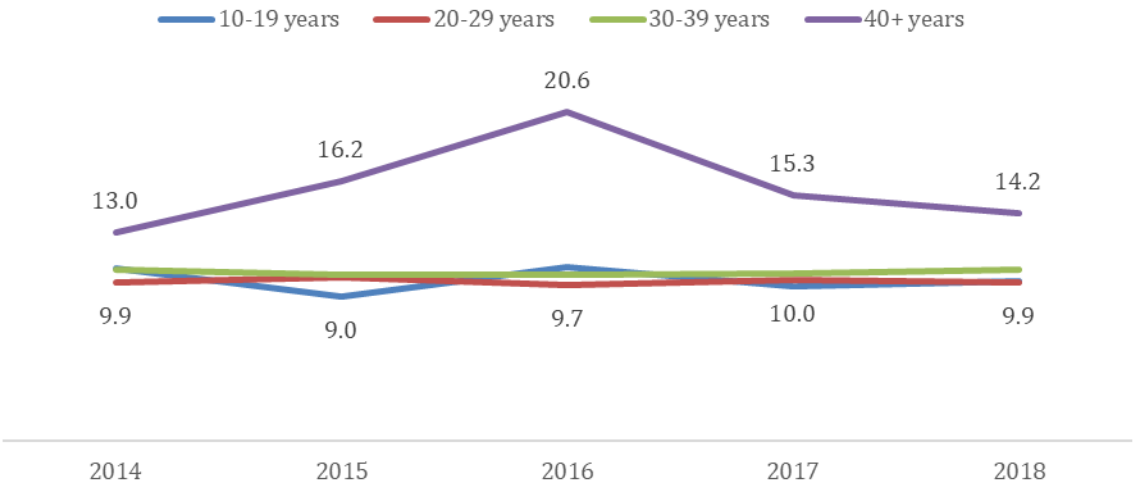


Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those the public-use data on CDC WONDER Online Database. TDH provides data by race only, might differ from rates based on race and ethnicity.

Preterm births among Non-Hispanic White and Hispanic mothers were similar (**Figure 53**.) In 2014 preterm births among Non-Hispanic Black mothers were about one and a half times higher than among Non-Hispanic White mothers, and this rate difference was relatively stable through 2018.

In **Figure 54** mothers ages 40 years and older shouldered the most burden of preterm birth in Davidson County between 2014 and 2018. This is consistent with well-known trends in increasing maternal age and consequent risks of adverse birth outcomes with increasing maternal age.

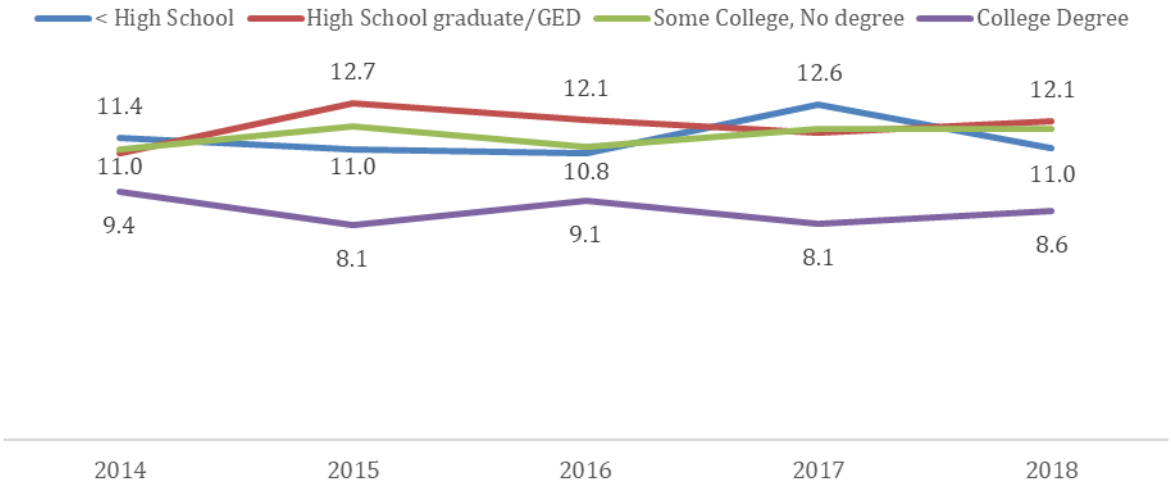
Figure 54. Percent of Preterm Births by Maternal Age, 2014-2018



Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those in the public-use data on CDC WONDER Online Database.

Figure 55 also indicates a known profile of risk and protective factors. Mothers with a college degree consistently had the lowest preterm birth rates from 2014 through 2018. There was no significant difference in preterm birth at all other lower levels of educational achievement.

Figure 55. Percent of Preterm Births by Maternal Education, 2014-2018



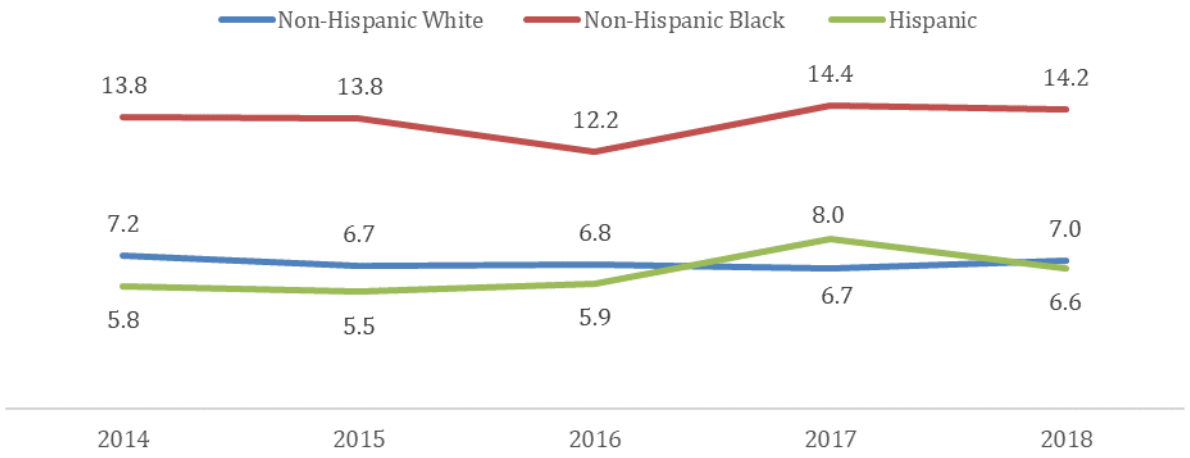
Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those in the public-use data on CDC WONDER Online Database.

Preterm delivery can be prevented through improving nutrition and wellbeing of all women of childbearing age, spacing pregnancies, improved pregnancy care including the optimum treatment of chronic diseases and counseling about risk factors such as alcohol and tobacco, and interventions such as antenatal steroids when appropriate.[90] *The long-term stability of differences in preterm births indicate the need to investigate barriers that tend to exclude Non-Hispanic Black women and communities from accessing and maximizing the benefits of existing pre-term birth prevention opportunities and resources.*

Low Birth Weight

Babies born with a low birth weight are more likely than babies of normal weight to have health problems and require specialized medical care in neonatal intensive care. In 2014 the percent of babies born with low birth weight among Non-Hispanic Black mothers in Davidson County was two times higher than that among Non-Hispanic White mothers (**Figure 56.**) This rate difference was stable through 2018. Rates were comparable among Hispanic and Non-Hispanic White mothers.

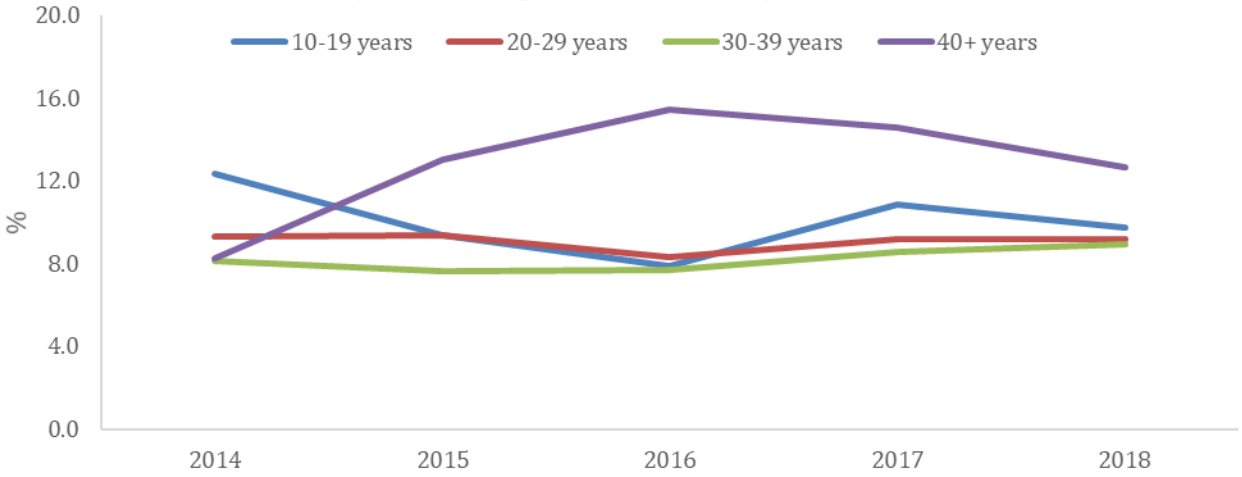
Figure 56. Percent of Live Births Born Weighing <2,500 grams (5.5 pounds) by Maternal Race/Ethnicity, Davidson County 2014-2018



Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those the public-use data on CDC WONDER Online Database. TDH provides data by race only, might differ from rates based on race and ethnicity.

As with pre-term birth, the percent of live births with low birth weight was highest among mothers aged 40 years or older, particularly between 2015 and 2017 (**Figure 57.**) Among mothers aged 10 to 19 years, the proportion dropped significantly between 2014 and 2016, to the level comparable with that among the 20 to 29 and 30 to 39 years-old age groups.

Figure 57. Percent of Live Births Born Weighing <2,500 grams (5.5 pounds) by Maternal Age, Davidson County 2014-2018

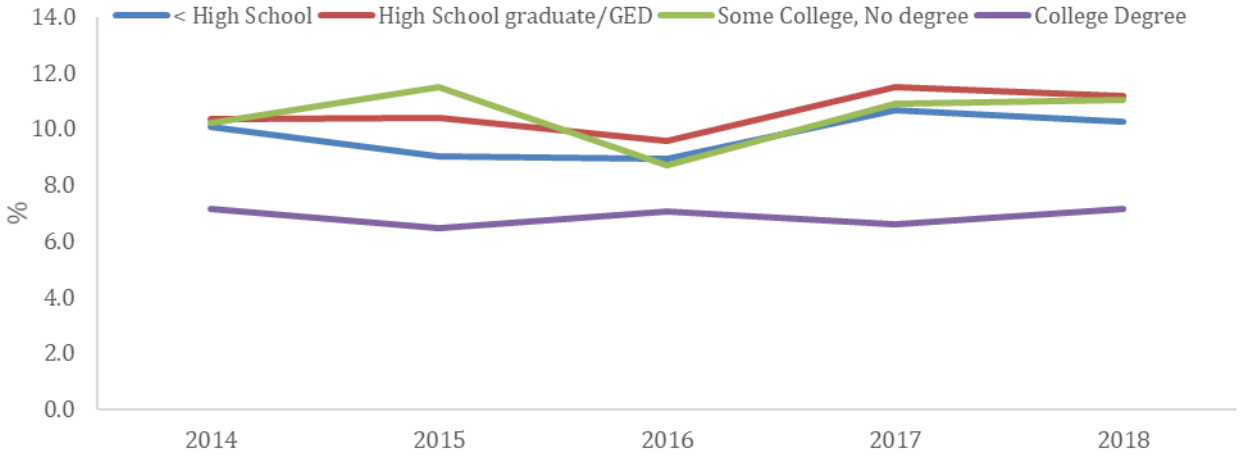


Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those the public-use data on CDC WONDER Online Database.

Disparities in Health Outcomes

Figure 58 indicates a known profile of risk and protective factors. Mothers with a college degree consistently had the lowest percent of low birth weight babies from 2014 through 2018. There was no significant difference in low birth weight rates at all other levels of educational achievement.

Figure 58. Percent of Live Births Born Weighing <2,500 grams (5.5 pounds) by Maternal Education, Davidson County 2014-2018



Data Source: Birth Files 2004-2018, Tennessee Department of Health (TDH). Estimates might differ from those the public-use data on CDC WONDER Online Database.

Overall, rates of infant mortality, low birthweight, and preterm births are higher for Black or African American than for White mothers in Davidson County, TN. Low birth weight is typically caused by premature birth and fetal growth restriction, both of which are influenced by a mother's health and genetics. Upstream socio-economic factors such as wage-income, job type, engagement with the criminal justice system or living in a food desert, have been associated with increased risk for low birth weight and infant mortality.[91] Maternal actions to aid in preventing low birth weight, such as seeking prenatal care, taking prenatal vitamins, and avoiding smoking, drinking, and using drugs, are also viewed as important. Komro and colleagues reported that a $1 increase in the minimum wage across all US states would have resulted in 2,790 fewer low birth weight births and 518 fewer infant deaths in 2014.[92] It has been noted that "(i)ncreasing wages can improve psychological well-being and job satisfaction, increase the opportunity cost of engaging in unhealthy habits, and expand the ability to delay gratification."[93]

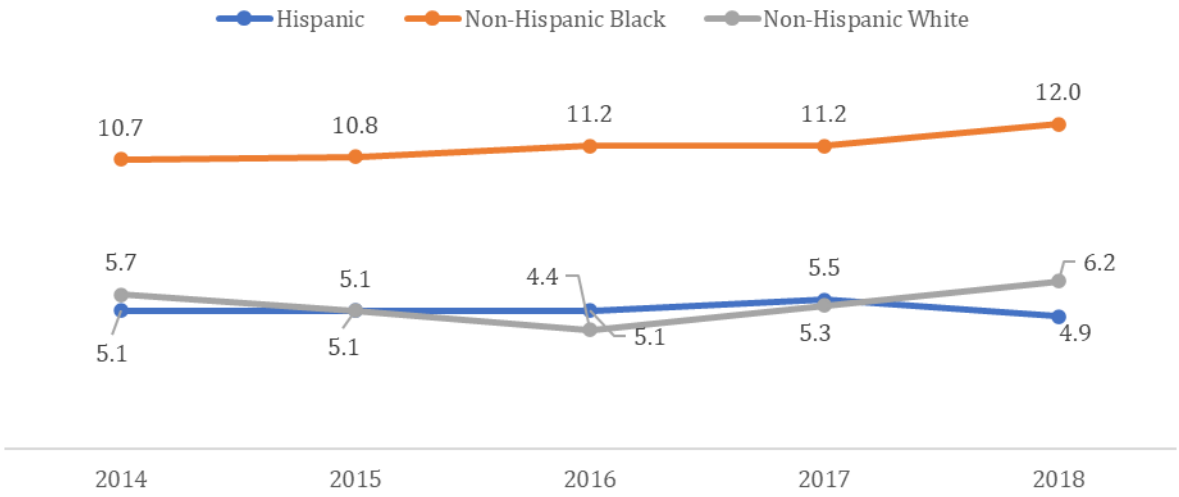
Disparities in Mortality

Infant Mortality

The infant mortality rate continues to be a widely used indicator of overall community health status. The leading causes of death among infants are birth defects, preterm delivery, low birth weight, and maternal complications during pregnancy. In 2017 the national 3-year infant mortality rate was 5.8 per 1,000 live births,[94] and varied by maternal race/ethnicity: "infants of non-Hispanic black women had the highest mortality rate (11.0 infant deaths per 1,000 births), followed by infants of non-Hispanic AIAN (9.2), non-Hispanic NHOPI (7.6), Hispanic (5.1), non-Hispanic white (4.7), and non-Hispanic Asian (3.8) women."[95] In 2014, the infant mortality rate among non-Hispanic Black women was 2.8 times higher than the rate among non-Hispanic White women, with little variation through 2018. Nationwide, infant mortality has been decreasing from 7.6 per 1,000 live births in 1995 to 5.8 per 1,000 live births in 2017.[96]

Figure 59 below shows the three-year rolling average mortality rate per 1,000 live births for infants in Davidson County. As shown, the highest 3-year infant mortality rate throughout the period was among non-Hispanic blacks. The lowest rates of infant mortality in the county occurred among Hispanic and non-Hispanic whites.

Figure 59. Three-year Rate of Infant Deaths per 1,000 Live Births by Race/Ethnicity, Davidson County, 2014 to 2018



Data Source: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Division of Vital Statistics, Linked Birth / Infant Death Records Natality 2007-2018, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program, on CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/lbd-current.html on Mar 22, 2021 10:55:09 AM. Three-year rates were used to stabilize the effect of small numbers on the estimates.

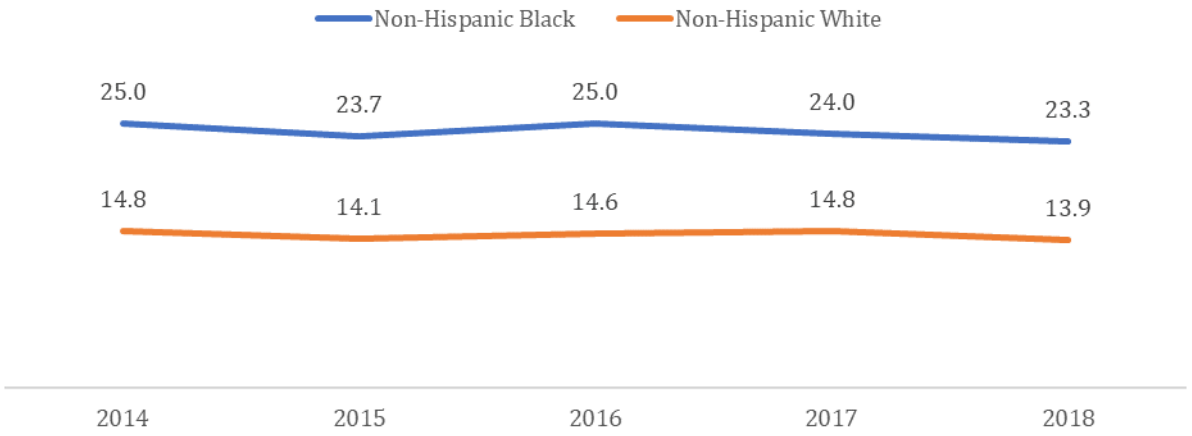
The infant mortality rate in Davidson County increased between 2014 and 2018, by 12.1% among non-Hispanic Blacks (from 10.7 to 12.0 per 1,000 live births). Between 2016 and 2018, the rate for Hispanics increased 40.9% (from 4.4 to 6.2 per 1,000 live births). However, among non-Hispanic whites between 2014 and 2018, the infant mortality rate was relatively stable. On average, infant mortality among non-Hispanic blacks was 2.2 times higher than among non-Hispanic Whites. Though rising fastest among all racial/ethnic groups, infant mortality among Hispanics in 2018 was about half that of non-Hispanic blacks.

Colon and Breast Cancer Deaths

Colon Cancer Deaths

Colon (and rectum) cancer deaths in the U.S. decreased from 20.9 per 100,000 population in 1999 to 13.5 per 100,000 population in 2017.[97] **Figure 61** shows the 5-year average death rate for colorectal cancer per 100,000 population in Davidson County. The rate is adjusted for any differences in the ages between the two groups. Data to calculate rates for other racial/ethnic groups were not available.

Figure 61. Five-year Age-adjusted Death Rate for Colorectal Cancer per 100,000 Population by Race/Ethnicity, Davidson County 2014-2018



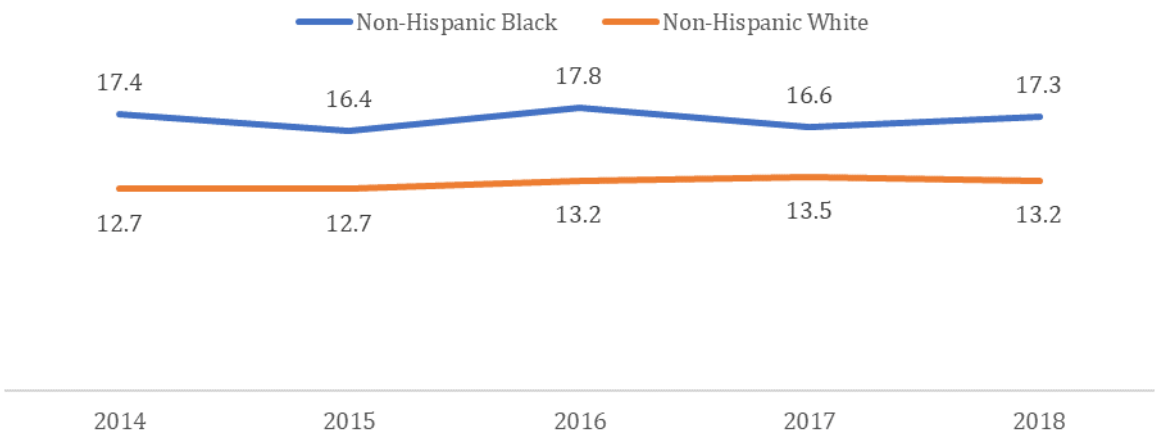
Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in November 2020. Due to small yearly numbers of deaths, five years of data were combined on a rolling basis to

Figure 61 demonstrates that in Davidson County death rates for Non-Hispanic Black residents were consistently higher than for Non-Hispanic White residents between 2014 and 2018. Compared to white residents, black residents experienced an excess mortality of 10.2 per 100,000 population in 2010-2014 and 9.4 per 100,000 in 2018. During these periods the death rate among black residents decreased from 25.0 and 23.3 per 100,000 population (6.8% decrease). Among white residents the colorectal cancer rate decreased between 2014 and 2018 from 14.8 to 13.9 per 100,000 population (6.1% decrease). Generally, the death rate for men tends to be higher than for women. For example, in 2017 there were 18.9 colorectal cancer deaths per 100,000 men in Davidson County (16.9 per 100,000 white men and 28.8 per 100,000 black men).[98] Among women there were 13.1 deaths per 100,000 (112 per 100,000 white women and 20.6 per 100,000 black women).

Breast Cancer Deaths

Breast cancer is the second most common cancer among women in the United States (U.S.). Breast cancer deaths in the U.S. increased from 19.7 per 100,000 population in 1999 to 26.6 per 100,000 population in 2018.[99] **Figure 62** shows the 5-year average death rate for breast cancer per 100,000 population among black and white women in Davidson County. The rate is adjusted for any differences in the ages between the two groups of women. Due to data limitation, rates for other racial/ethnic groups were not available.

Figure 62. Age-adjusted Death Rate for Breast Cancer per 100,000 Population by Race/Ethnicity, Davidson County 2014-2018



Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in November 2020. Due to small yearly numbers of deaths, five years of data were combined on a rolling basis to stabilize rates.

Figure 62 shows that death rates for Non-Hispanic Black women were consistently higher than for Non-Hispanic White women between 2014 and 2018. Compared to white women, black women experienced an excess mortality of 4.7 per 100,000 population in 2014 and 4.1 per 100,000 in 2018. Between these periods the death rate among black women fluctuated between 16.4 and 17.8 per 100,000 population, although there was no cumulative increase overall. Among white women the rate increased slightly between 2014 and 2018 from 12.7 to 13.2 per 100,000 population. As noted earlier, black and white women in the U.S. get breast cancer at about the same rate, but the death rate for black women tends to be higher than for white women.[100]

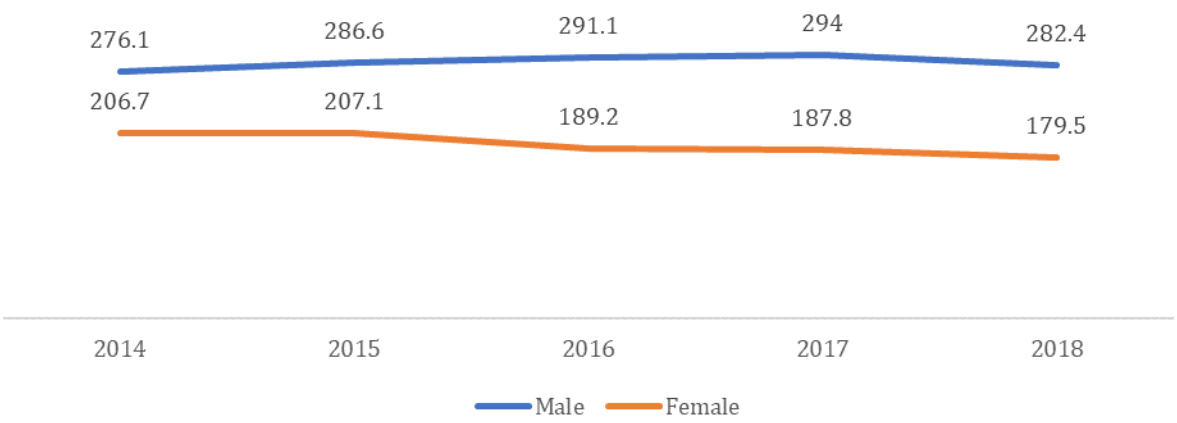
Increasing screening rates for colorectal cancer and for female breast and cervical cancers can reduce deaths substantially. One simulation study indicated that increasing the 2016 screening rates across these three cancers to 100% of all eligible men and women nationwide would prevent an additional 2,821 deaths from breast cancer, 6,834 deaths from cervical cancer, and 35,530 deaths from colorectal over a lifetime of each respective single-year group of men and women.[101] *Therefore, addressing social determinants of screening rates in general (and those specific to low-income racial/ethnic minorities) can reduce death in general and inequities in the burden of death across subpopulations in Davidson County.*

Heart Disease and Stroke Deaths

Cardiovascular diseases, including heart disease and stroke, account for more than one-third of all U.S. deaths and are a leading cause of disability. Heart disease is a term that encompasses a variety of different diseases affecting the heart. The most common type in the United States is coronary artery disease, which can cause heart attacks, angina, heart failure, and arrhythmias. In Davidson County the age-adjusted death rate from heart diseases declined from 192.7 per 100,000 population in 2014 to 180.7 per 100,000 population in 2018.

Figure 63 below shows the 5-year trend in the death rate due to heart disease by sex in Davidson County. Among males the age-adjusted rate increased by 2.3% from 276.1 per 100,000 population in 2014 to 282.4 per 100,000 in 2018. Among females the rate decreased during the same period by about 13.2% from 206.7 to 179.5 per 100,000. Relative to female rates, rates among males increased from being 1.3 times higher in 2014 to being 1.6 times higher in 2018.

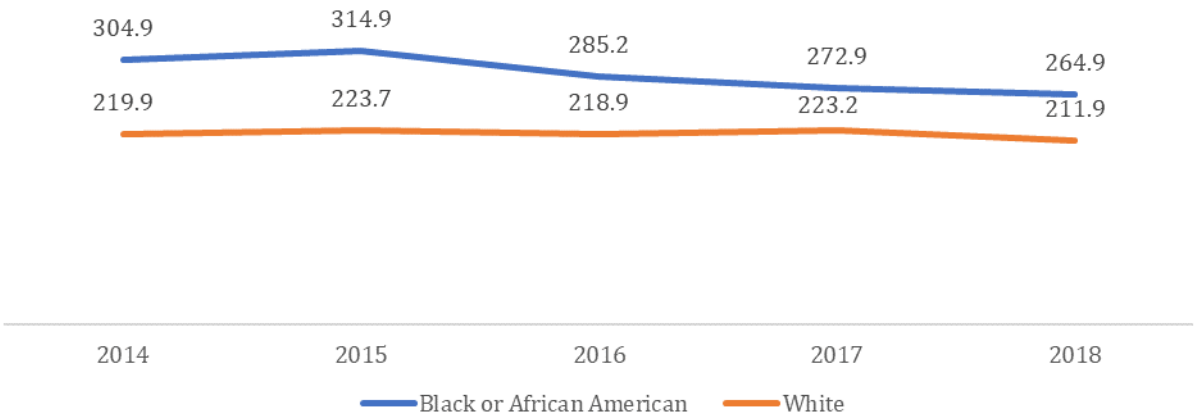
Fugure 63. Age-adjusted Death Rate per 100,000 Population due to Heart Disease by Sex, Davidson County 2014-2018



Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in August 2020.

Heart disease death rates also differed between White and Black residents (**Figure 64** below). Between 2014 and 2018 rates among Black or African American residents were consistently higher compared to rates among White residents. Overall, deaths due to heart diseases among Black or African American residents decreased by 13.1% from 304.9 per 100,000 in 2014 to 264.9 per 100,000 in 2018. This narrowed the rate difference between Black and White residents from 85 deaths per 100,000 in 2014 to 53 deaths per 100,000 in 2018, even as deaths among Whites dropped slightly.

Figure 64. Age-adjusted Death Rate per 100,000 Population due to Heart Disease by Race/Ethnicity, Davidson County 2014-2018



Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in August 2020.

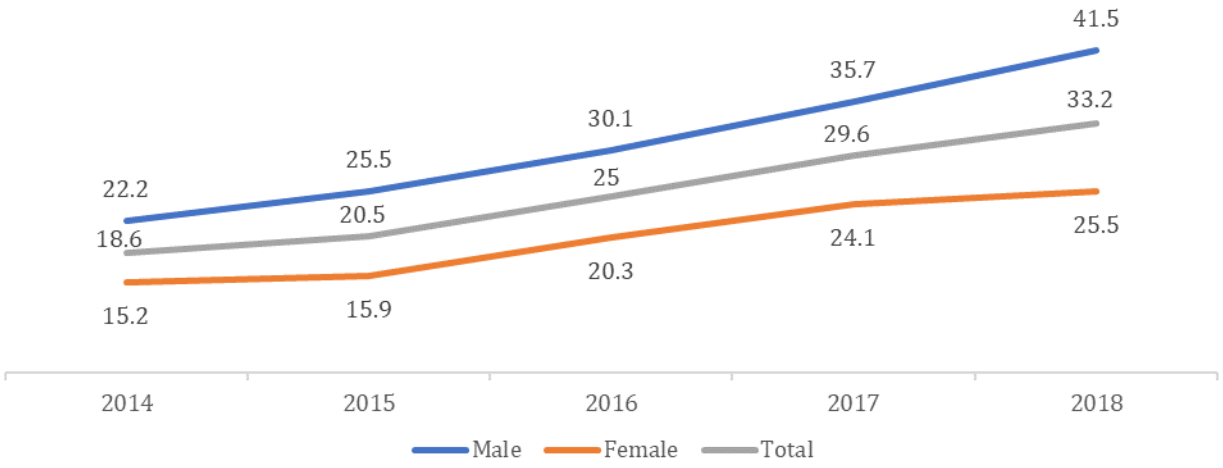
There are many modifiable risk factors for heart disease and stroke, including tobacco smoking, obesity, a sedentary lifestyle, and poor diet. Controlling high blood pressure and cholesterol are also important prevention strategies. According to the Centers for Disease Control and Prevention (CDC), a 12-13-point reduction in systolic blood pressure can reduce heart disease risk by 21%, stroke risk by 37%, and risk of death from heart disease or stroke by 25%.[102]

Drug-Induced Deaths

According to the Centers for Disease Control and Prevention, unintentional poisonings are overwhelmingly due to drug overdoses, which commonly involve prescription pain medications. Drug overdoses are a rising public health threat, with drug overdose death rates in the United States tripling since 1990.[103] Men and people aged 45-49 are at the highest risk of suffering death due to unintentional poisoning.

As shown in **Figure 65** below, there were 22.2 drug-induced deaths per 100,000 population among men in 2014 compared to 15.2 per 100,000 among women. Rates for men and women increased through 2018: by 86.9% to 41.5 per 100,000 among men, and by 67.8% to 25.5 per 100,000 among women.

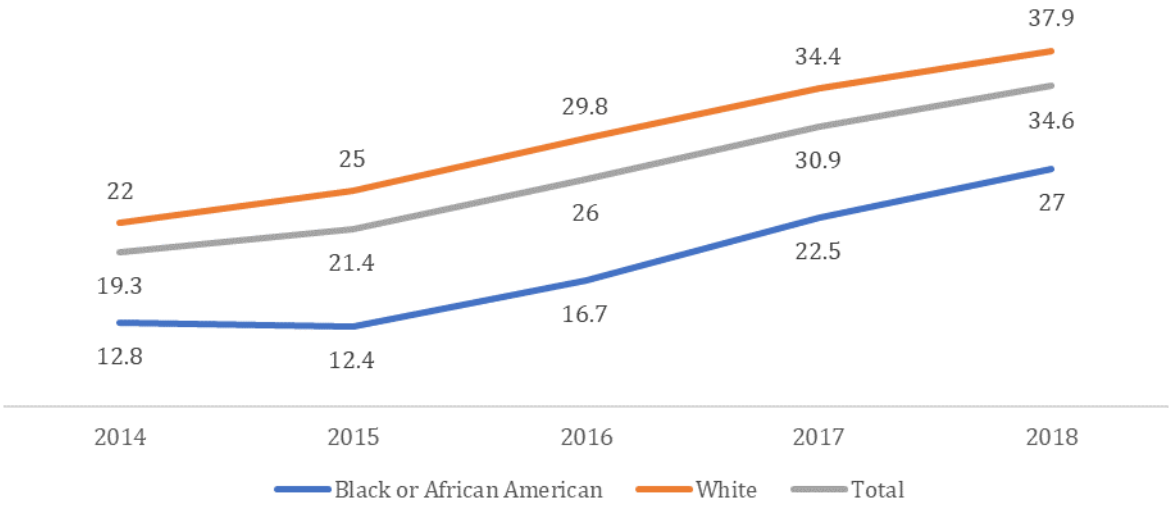
Figure 65. Five-year Age-adjusted Deaths due to Drug-induced Causes per 100,000 Population by Gender, Davidson County, 2014 to 2018



Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in August 2020. Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates.

The rise in deaths due to drug-induced causes between 2014 and 1018 also occurred among both White and Black/ African American residents, regardless of age, as shown in **Figure 66** below. In 2014, there were 22 deaths per 100,000 population among White residents and 12.8 deaths per 10,000 among Black/African American residents (a 1.7- fold difference). The White-Black difference doubled between 2014 and 2015, and then declined to about 1.4-fold through 2018.

Figure 66. Five-year Age-adjusted Deaths due to Drug-induced Causes per 100,000 Population by Race/Ethnicity, Davidson County, 2014 to 2018

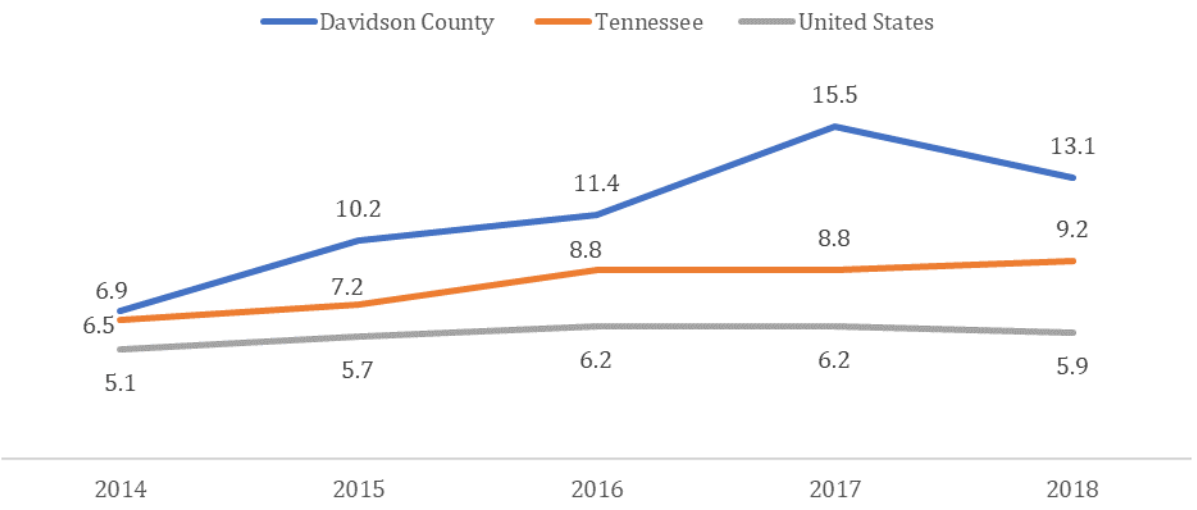


Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death" 1999-2018 on CDC WONDER Online Database. Accessed in August 2020. Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates.

Homicides

Homicide has been in the top 15 leading causes of death in the U.S. since 1965. Violence, and the threat of violence, negatively impact the safety and well-being of communities and contribute to an overall environment that can negatively impact health outcomes. Between 2014 and 2017 the rate of homicide deaths per 100,000 population in Davidson County more than doubled, from 6.9 to 15.5 per 100,000. In 2018 the rate decreased to 13.1 per 100,000 population (**Figure 67**). The increase in homicide rates in Davidson County was higher compared to the average increase for the State of Tennessee and nation.

Figure 67. Age-Adjusted Death Rate per 100,000 Population Due to Homicide, 2014-2018

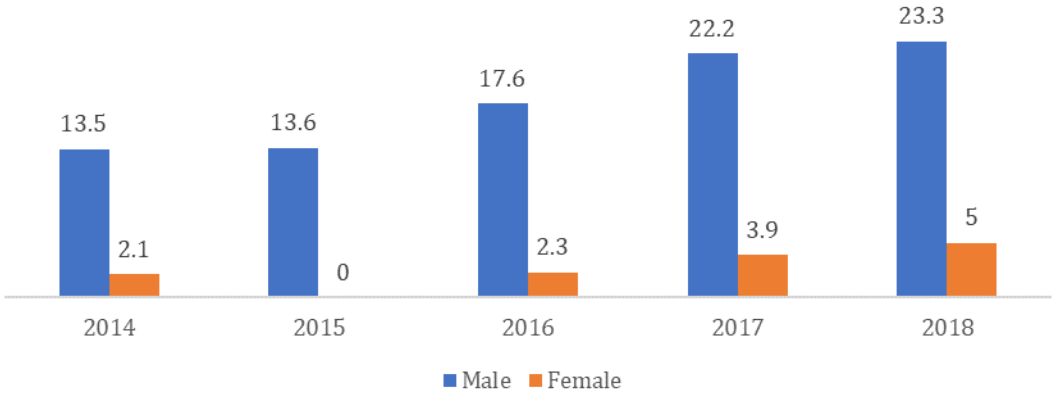


Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76

Disparities in Health Outcomes

Figure 68 below indicates that in the 3-year average homicide death rate in 2014 was 13.5 homicide deaths per 100,000 male residents in Davidson County compared to 2.1 deaths per 100,000 among female residents. From 2014 to 2018, the male homicide death rate increased by 72.6% to 23.3 per 100,000, while the female suicide death rate increased by 138% to 5 per 100,000 population.

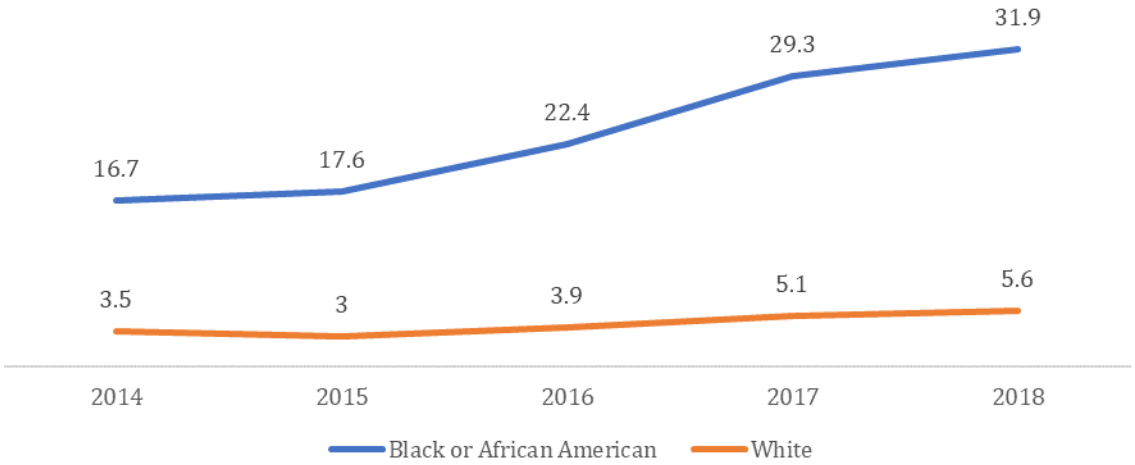
Figure 68. Three-year Age-adjusted Homicide Deaths per 100,000 Populaion by Sex, Davidson County, 2014 to 2018



Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76 . Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates.

Figure 69 below shows that, in 2012-2014 period there were 16.7 homicide deaths per 100,000 Black or African American residents in Davidson County compared to 3.5 deaths per 100,000 White residents. From 2012-2014 to 2016-2018, the homicide death rate among Black/African Americans residents increased by 91% to 31.9 per 100,000, while the homicide death rate among White residents increased by 60% to 5.6 per 100,000 population.

Figure 69. Three-Year Age-Adjusted Homicide Deaths per 100,000 Population by Race/Ethnicity, Davidson County, 2014-2018

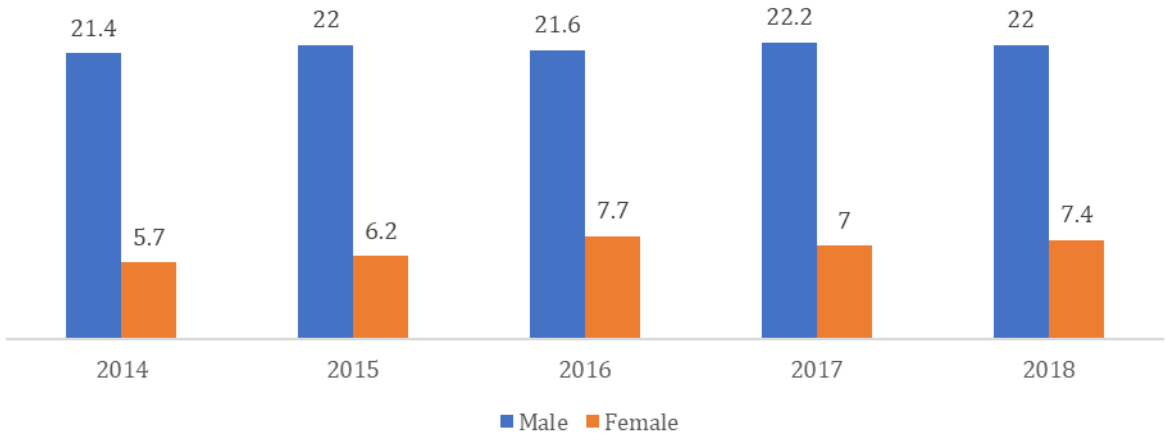


Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76 . Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates. However, rates for Hispanic, Asian and other racial/ethnic groups could not be sufficiently stabilized to be reliable. Hence, they are not presented.

Suicides

Suicide is death resulting from self-harm with the intent to die.[104] In the 3 years from 2012 to 2014 there were 21.4 suicide deaths per 100,000 male residents in Davidson County compared to 5.7 deaths per 100,000 among female residents (**Figure 70**). From 2012-2014 to 2016-2018, the male suicide death rate increased by 2.8% to 22 per 100,000, while the female suicide death

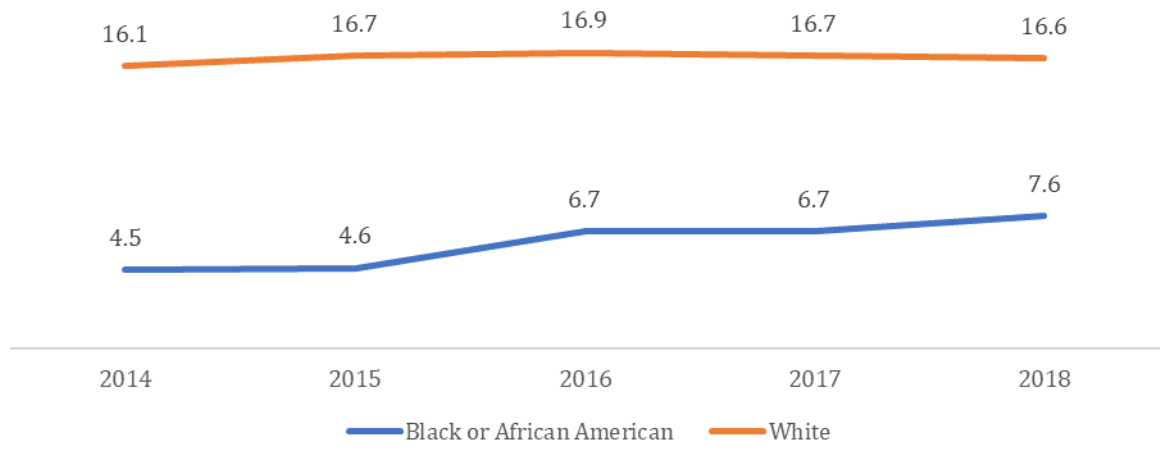
Figure 70. Three-Year Age-Adjusted Suicide Deaths per 100,000 Population by Gender, Davidson County, 2014-2018



Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76 . Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates.

Figure 71 below shows that, in 2012-2014 period there were 16.1 suicide deaths per 100,000 White residents in Davidson County compared to 4.5 deaths per 100,000 Black or African American residents. Regardless of age, Whites were 3.6 times more likely than Black or African Americans to die from suicide during the 3 years between 2012 and 2014, though the race-related difference narrowed from then through 2018.

Figure 71. Three-Year Age-Adjusted Suicide Deaths per 100,000 Population by Race/Ethnicity, Davidson County, 2014-2018



Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76 . Due to small yearly numbers of deaths, three years of data were combined on a rolling basis to stabilize rates. However, rates for Hispanic, Asian and other racial/ethnic groups could not be sufficiently stabilized to be reliable. Hence, they are not presented.

Disparities in Health Outcomes

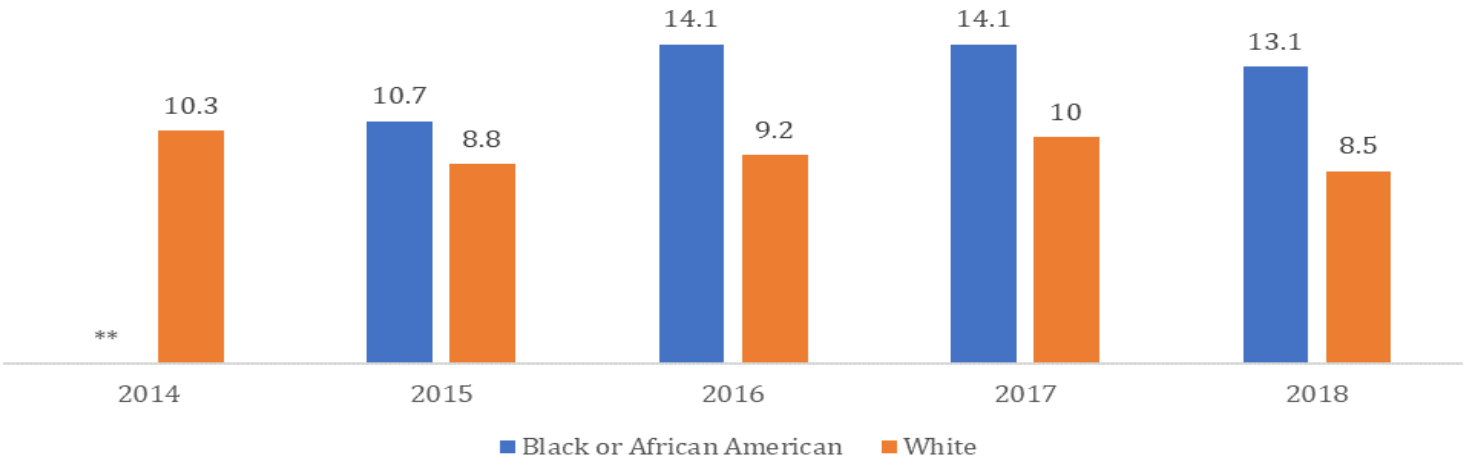
According to the Centers for Disease Control and Prevention (CDC) the causes of suicide are complex. For example, the experience of violence (including child abuse, sexual violence and bullying) increases the risk of suicide. Nationwide, suicide risk persists from age 10 to 64 years, particularly among veterans and active military, Non-Hispanic American Indian/Alaska Native and non-Hispanic White populations, and sexual minority youth, as well as people in certain occupations, including construction and the arts, design, entertainment, sports, and media fields.[105] Due to data limitations the reports only highlight the difference between Black and White suicide rates. More in-depth local analysis is needed to understand the factors driving the increasing trends shown in the data presented, and how they might mask the suicide risks among other subgroups of residents.

Suicide is a preventable public health problem. The CDC recommends that suicide prevention be addressed at multiple levels of influence: individual, community, and societal. Effective suicide prevention strategies promote awareness, decrease exposure to risk factors, and promote resilience. It is, therefore, critical to reduce any disparities in access to clinical care for mental and substance use disorders, and access to strength-based supports including family and community connectedness, individual problem-solving skills development, and cultural and faith-based and inspired prevention strategies.

Motor-Vehicle Related Deaths

The CDC estimates that over 32,000 people die[106] and 3 million are injured every year from motor vehicle accidents.[107] In 2013, one third of deaths from motor vehicle accidents involved drunk driving and another third from speeding. According to the CDC "Over 18,000 lives could be saved each year if US crash deaths equaled the average rate of 19 other high-income countries."[108] Nationally, youth and older adults (75 years and older) are at greater risk of motor crash related death. Regardless of age, motor crash deaths rates among males tend to be higher compared to females.[109] In 2017, about 25% of all work-related deaths involved workers driving or riding a motor vehicle on a public road, making motor crashes the leading cause of work-related deaths in the US.[110] **Figure 72** shows the overall annual crude rate of motor vehicle related deaths per 100,000 population in Davidson County between 2014 and 2018 by race/ethnicity. The crude death rate for motor vehicle crashes was higher among Black compared to White residents (1.2 times higher in 2015 and 1.5 times higher in 2018 respectively).

Figure 72. Crude Rate of Motor Vehicle Related Deaths per 100,000 Population by Race/Ethnicity*, Davidson County 2014-2018



Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released April 2020. Retrieved from: https://wonder.cdc.gov/controller/datarequest/D76 . * Due to the small number of deaths among Hispanic and other races/ethnic subgroups, only the rate among Non-Hispanic Black and White residents are stable and reliable.

It has been noted that, while the pattern and severity of crash injuries depends on a complex interaction of biomechanical factors, human body characteristics such as height and weight may play an important role.[111] For example a review of several research studies by Homaie and colleagues indicated an increase in the severity of motor crash related injury and mortality with increasing BMI (Body Mass Index).[112] According to the CDC, prevention can be achieved through seat belt use, properly buckling children in the back seat in age and size appropriate seats and belts, not
driving under the influence of alcohol or drugs, and obeying speed limits and guidance to avoid distractions while driving (such as using a cell phone or texting). Older adults experiencing reduced mobility can be supported by health

COVID-19 Pandemic

During the COVID-19 pandemic, the Metro Public Health Department has collected data regarding disease morbidity and mortality, along with demographic information that can help describe how our community has been affected by COVID-19. We have seen that some races and ethnicities were affected disproportionately.

As of May 2021, the White and Black populations, including both Hispanic and Non-Hispanic ethnicities, had experienced 10,296 and 10,277 cases per 100,000 residents, respectively. Among these same populations, however, the rates of death were not equivalent.

Approximately 1.51% of Black residents identified as cases died as a result of COVID-19, while 1.14% of White case-patients died. There were 155 deaths per 100,000 Black population and 117 deaths per 100,000 White population during the course of the pandemic.

When examining the population by Hispanic ethnicity, there have been 16,339 cases per 100,000 Hispanic population and 8,827 cases per 100,000 Non-Hispanic population, which is a glaring disparity. However, cases among Hispanic residents resulted in death only 0.62% percent of the time, compared to 1.50% among non-Hispanic residents. There were 101 deaths per 100,000 Hispanic population, and 132 deaths per 100,000 Non-Hispanic population, as of May 12, 2021.

Figure 73. COVID-19 cases by race, Davidson County, as of May 12, 2021

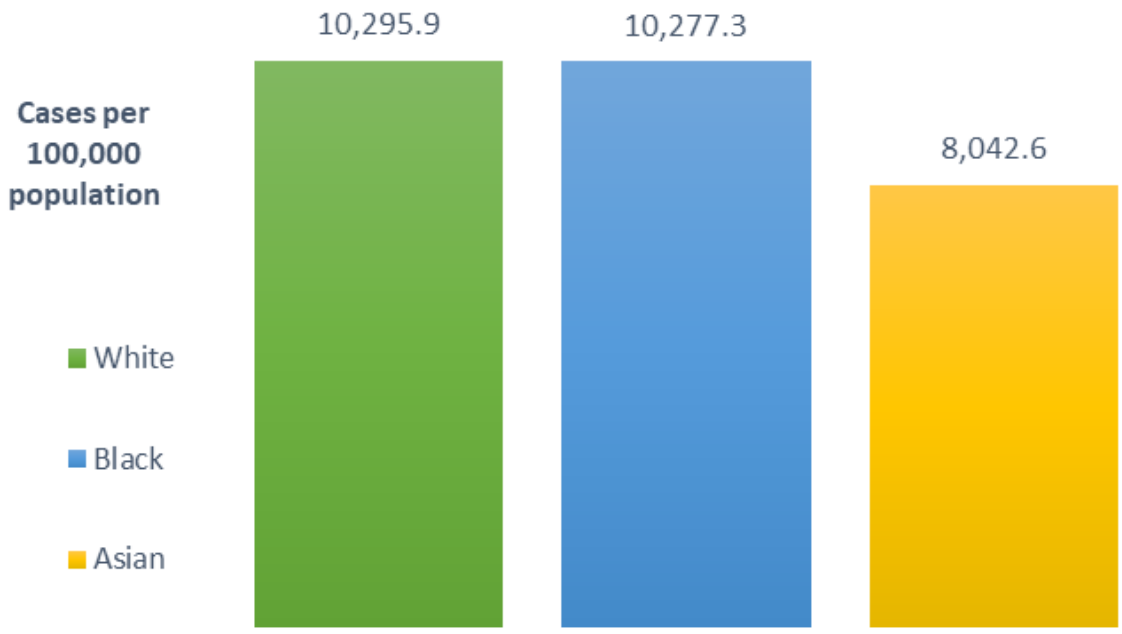
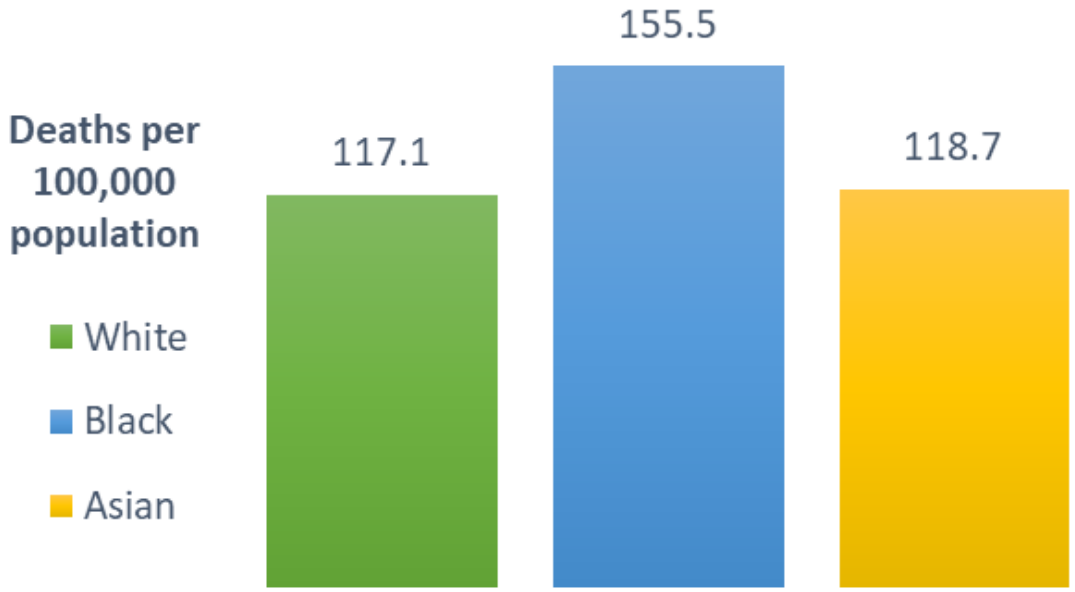


Figure 74. COVID-19 deaths by race, Davidson County, as of May 12, 2021



Data sources: Davidson County COVID-19 Dashboard, accessed May 14, 2021, https://nashville.maps.arcgis.com/apps/MapSeries/index.html?appid=30dd8aa876164e05ad6c0a1726fc77a4

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Conclusion

The Department of Health and Human Services' Healthy People 2020 initiative highlighted Health in All Policies (HiAP) and Health Impact Assessments as emerging strategies for addressing social determinants of health nationwide.[113] As indicated in this report, the Metro Public Health Department (MPHD) has adopted and continues to implement these and other related strategies. Assessing the long-term impacts of HiAP, Community Health Assessment actions and processes, and Community Health Improvement Plans can assist in tracking progress towards health equity in Davidson County.

The 2020 Health Equity Report has highlighted and summarized disparities in Davidson County's health profile based on indicators applied in the Community Health Profile 2020 and the Community Health Improvement Plan (CHIP) 2015-2020. The analysis described in this report relied heavily on publicly available data, most of which are available up to 2018 and a few up to 2019. Updated data can be important to continue evaluating trends in health equity. Nevertheless, the report highlighted trends in health inequities, many of which have remained consistent over the long term, and some that reflected a worsening of health inequities. The few, but important social determinants of health whose correlation with specific health outcomes have been described, point to specific set of root causes that need to be addressed if these trends are to be altered and health equity realized and sustained in Davidson County. The health equity profile described in this report mirrors profiles in comparable counties across the United States and, therefore, reflects local dynamics of broader structural and institutional determinants of health equity.

Since the 2015 health equity report, MPHD has made significant progress towards developing the much-needed framework for health equity, internally as well as externally, in partnership with community and institutional stakeholders. For example, the MPHD governing body passed a Health Equity Resolution in March 2019, requiring the incorporation of health equity in all MPHD policies, practices and programs, and an annual report to the board on this work. MPHD facilitated community assessment, planning and partnership processes that led to the compilation of the Community Health Improvement Plan (CHIP) 2015-2020, which prioritizes the advancement of health equity. MPHD is currently facilitating the next iteration of these processes. The equity metrics applied in this report might not be specific enough to assess the policy, programmatic and practice level changes facilitated by MPHD. Operationalizing equity in all policies, programs and practices requires the development of measurable equity goals and objectives, and dynamic equity metrics that are tailored to specific policy, program and practice areas.

Throughout this report, race and Hispanic ethnicity are overwhelmingly the key demographic bases of health disparities in Davidson County. This is largely consistent with the national profile of health disparities (both static profiles and health trends). The report shows that geography matters in the distribution of health risks (including socio-economic and environmental determinants) and health outcomes in Davidson County. For example, the correlation between the percent of the population living within 150 meters of a major highway and the percent living with asthma per census tract. The combined significance of geography and race/ethnicity across all indicators (at the static and time series level) suggests the probable impacts of institutional racism, the long-term effects of housing segregation policies, the instability of social safety nets, institutional and structural inequalities in health promoting opportunities, the persistence of barriers to health and healthcare, and inequity in the capacity to recover from natural and economic disasters. Addressing the "unequal structuring of life conditions," which creates health inequities,

Conclusion

requires sustained investment in culturally competent, collective-impact focused, cross-sector efforts to affect the causes of inequities.

One limitation of distinguishing social groups or population subgroups univariately based only on demographic characteristics is the inability to account for variability within each subgroup – e.g., the risk of Gonorrhea infection is not evenly distributed within Non-Hispanic Black residents. Further segmentation is necessary to more accurately assess the risk factors. Our analysis is limited to a univariate level. Through mapping, the potential association between some select social determinants and health outcomes was highlighted, but these need to be further explored using more advanced analytic methods. Hence, the MPHD should work with academic and community partners to identify or develop additional metrics and methods for measuring health equity by which to evaluate the impacts of specific policy, program and practice interventions.

A follow-up report will highlight the key policies initiatives, programs and practices that are being implemented in Davidson County in partnership with MPHD to address some of the root causes and consequences of the health disparities detailed in this report.

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