"Health Opportunities Across the Commonwealth"

Getting to the root cause of health inequity…

Health Begins Where We Live, Learn, Work, and Play

Virginia Health Equity Report 2012

VDH VIRGINIA DEPARTMENT OF HEALTH

Protecting You and Your Environment

COMMONWEALTH of VIRGINIA

Department of Health

KAREN REMLEY, MD, MBA, FAAP
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Dear Reader:

The mission of the Virginia Department of Health (VDH) is to protect and promote the health of all Virginians. The agency's vision is "Healthy People in Healthy Communities." Achieving this vision requires assuring that all Virginians have equitable opportunities to be healthy. However, our public health system continues to be challenged by disparities/inequities in access to quality health care, access to opportunities that promote health and in overall health status by income, education, race, ethnicity, and place of residence. VDH is committed to addressing this sobering reality.

From this perspective, I am pleased to present the 2012 Virginia Health Equity Report, which is an abundant resource of relevant and useful information regarding the health status of disadvantaged populations across the state. This information serves as a baseline from which to develop new plans and strategies with our Commonwealth partners, which include individuals, families, neighborhoods, organizations, businesses, schools, faith communities, cities, counties, and others.

The report also functions as a challenging reminder that much more needs to be done to address this health issue, which is at the heart of the Healthy People in Healthy Communities vision—specifically that individual health responsibility is inextricably linked to society's health responsibility. Ultimately, our success in achieving more equitable opportunities to be healthy and reducing health inequities requires strong, action-oriented partnerships with the Commonwealth's stakeholders.

VDH values its many strong and productive partnerships. I look forward to both working with and learning from you as we strive together to reduce health inequities and make health equity a reality for all Virginians.

Sincerely,

Karen Remley, M.D., M.B.A., F.A.A.P.
State Health Commissioner

COMMONWEALTH of VIRGINIA

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Dear Reader:

As Director of the Office of Minority Health and Health Equity (OMHHE) within the Virginia Department of Health, I am pleased to share with you the 2012 Virginia Health Equity Report. The report is the product of collaborative efforts among OMHHE and other VDH offices and stakeholders.

In support of VDH's mission, my office leads efforts to identify health inequities and their root causes and to promote equitable opportunities to be healthy. Our work is accomplished in part by our data analysis and research in defining the distribution of health, disease, and social determinants of health; and in identifying local high-priority target areas.

By drawing attention to the health inequities of Virginians of varying socioeconomic, racial/ethnic, and urban/rural backgrounds, this report offers direction for accomplishing our mission. The report is intended for two broad target audiences: (1) public health & medical professionals interested in data to guide their grant programs & interventions (2) policy makers, advocates & communities interested in broad strategies & policy solutions to creating communities that provide equitable opportunities to be healthy.

New to the 2012 Health Equity Report are two resources to aid our partners and stakeholders in educating the public and influencing decision-making and policy:

- The *first* addition is the Health Disparity Cost Analysis, which demonstrates the economic burden health inequities bring to the Commonwealth.
- The *second* is the Health Opportunity Index (HOI). The HOI geographically displays the distribution of key social determinants of health, which can be thought of as opportunities to be healthy and their association with life expectancy, low birth weight, and HIV/AIDS in Virginia.

It is notable that health status inequities begin before birth and continue throughout life. Health inequities lead to unnecessary health care, social, and economic costs, as well as reductions to lifespan and quality of life. Because of limited opportunities to be healthy, many children grow up experiencing inequities in health. This impedes their development into productive members of society and denies the Commonwealth the full potential of its citizenry. Thus, health inequity is an issue that truly affects all Virginians and requires all of us to work together. The conclusion of this report identifies strategies and partnerships critical to promoting health equity.

I hope that you will find this report both enlightening and inspiring, and that it will encourage you to engage or continue in the effort to promote fair opportunities for all to be healthy. We look forward to working with you as we strive to advance health equity for all Virginians.

Sincerely,

Michael O. Royster, MD, MPH, FACPM
Director, OMHHE

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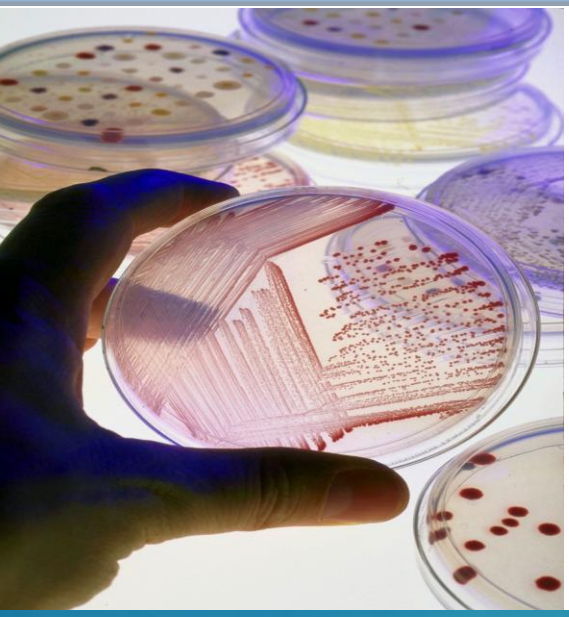
Introduction



"Health equity" is the idea that everyone should have optimal opportunity to have a healthy and long life, regardless of gender, race, ethnicity, social class, or place of residence.

Chapter Overview

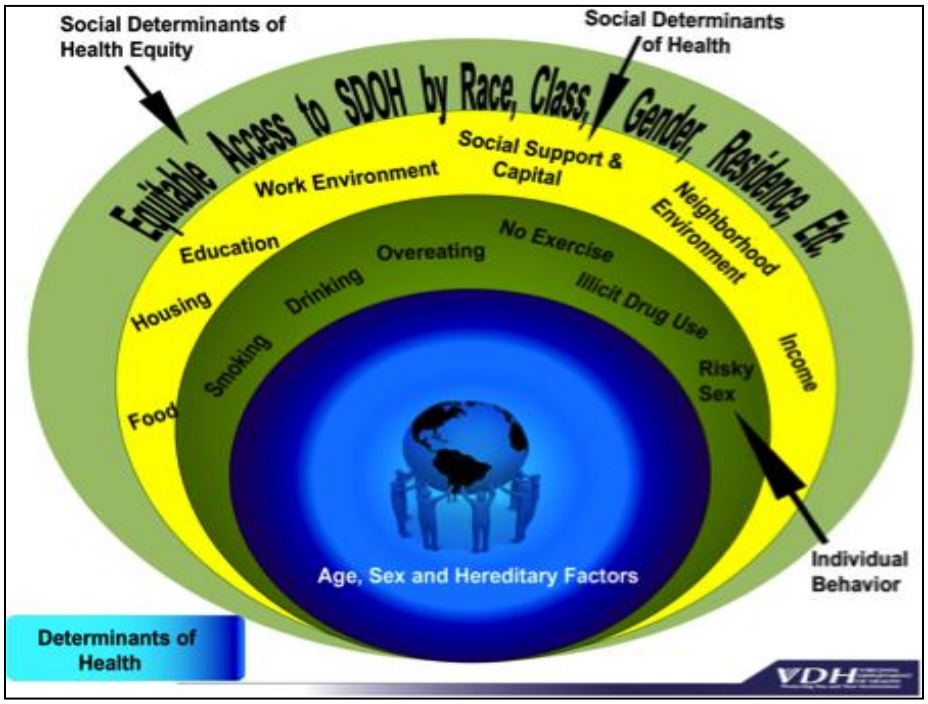
- The 2012 Health Equity Report is a call to action for all residents of the Commonwealth to work across communities to create equitable opportunities for all Virginians to be healthy.
- The report provides comprehensive recommendations for individuals, families, neighborhoods, schools, local and state government, community planners, non-profits, health and medical professionals, the business community and other sectors of our society to collaborate and achieve equitable health status.

Our hope is that the information provided in this report will prove to be a useful tool for public health practitioners, policy makers, health care providers, advocates for health, the business community, the media, grassroots leaders and the general public as we work together to create opportunities for all Virginians to be healthy.

The report utilizes a conceptual framework that demonstrates that while individual behaviors are important factors of health, these factors are shaped by the social determinants of health (SDOH) experienced by individuals and communities *(see model at the bottom of this page*). As an example, physical activity is strongly associated with health. However, the amount of physical activity that individuals achieve is shaped by having sufficient leisure time away from the need to work for basic survival (i.e. income and education), neighborhood safety, the presence or absence of sidewalks and walking paths, social connectedness of neighbors and other factors outside of the individual's control. This framework shows that not only do SDOH shape health through behaviors, they also influence the degree to which individuals are exposed to environmental risks such as air pollution, which directly affects health. Finally, the report findings support a growing body of research that shows that SDOH influence health through the different levels of stress experienced by groups with differing income or education, experiences of discrimination, and privileges [14].

Further the report's finding support; the outcome of studies that have found individual level socioeconomic status (SES) has a greater impact on predicting health status than health behaviors and access to health care **combined** [22, 15, 24, 31]. In addition, neighborhood level SES affects health independently of individual level SES [8]. The association between individual and neighborhood level SES and poor health extends across multiple health outcomes with differing causes and associated risk factors (e.g. heart disease, HIV/AIDS, lead poisoning, asthma). As a result, social determinants of health (SDOH) have been termed "fundamental causes of disease" [25].

Accordingly, the report highlights the importance of multi-level strategies to achieve health equity. Again, the conceptual framework identifies specific areas of focus that are necessary for success—individual behavior change, enhancing health promoting SDOH, and assuring that all Virginians have equitable access to these SDOH regardless of socioeconomic status, race/ethnicity, gender, place of residence, etc.



Virginia Demographics

"In many ways, Americans of all ages and in every race and ethnic groups have better health today than a decade ago yet considerable disparities remain. We should commit our nation to eliminate disparities…for through prevention we can improve the health of all Americans."

– Dr. David Satcher, Former U.S. Surgeon General

Chapter Overview

- The 2012 Virginia Health Equity Report reveals that Virginia's population is becoming increasingly diverse. Specifically, the Hispanic population has increased by 47.8%; American Indian by 45%; Black population by 11.6%; White population by 10%.

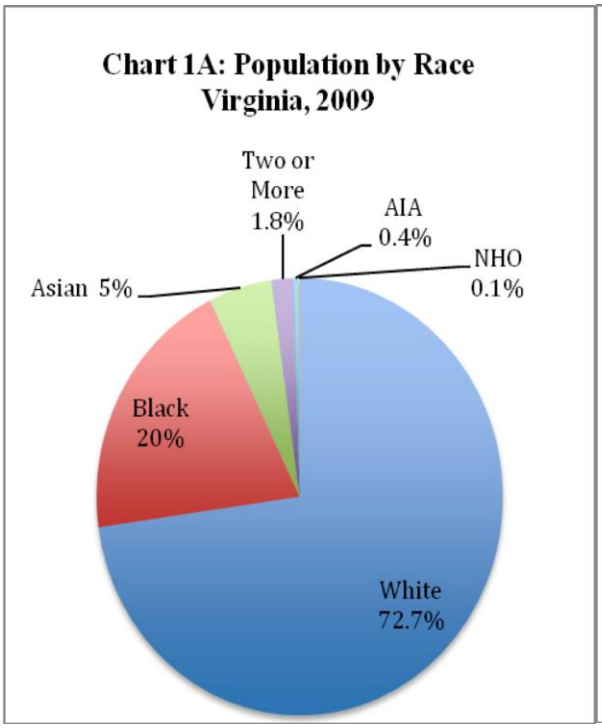
- Although Virginia thrives with diversity, the report shows that not all demographic groups have the same social and economic opportunities. As a result, communities of colors as well as rural and inner city communities experience significant health inequities.

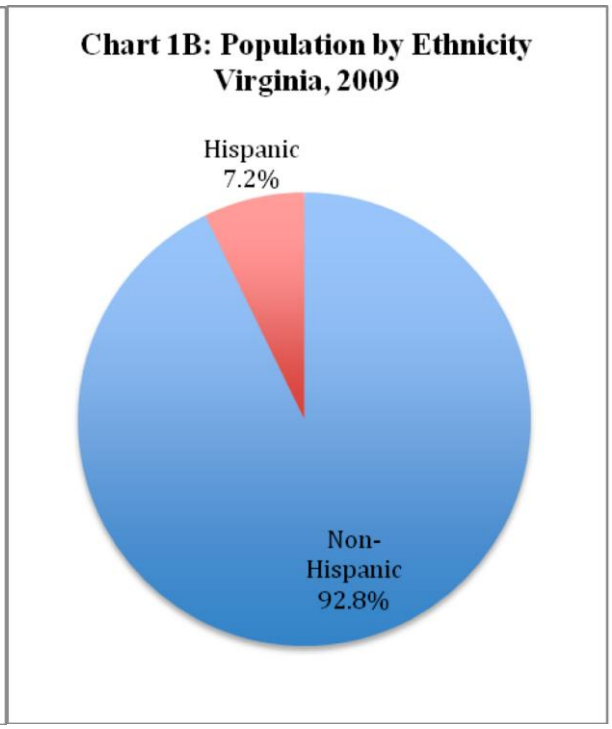
Racial and Ethnic Distribution

The report shows that Virginia has experienced significant changes in its population over the past decade. Virginia's total population in 2009 was 7,882,590, which represents a 1.4 percent increase from 2008. (**Chart 1A and Chart 1B)**

As seen in Chart 1A and 1B:

- **Whites** constituted **72.7%** of the population at 5,735,104
- **Blacks/African Americans** constituted **20%** of the population at 1,573,645
- **Asians** constituted **5%** of the population at 397,476
- **American Indian and Alaskan natives (AIA)** constituted **0.4%** of the population at 29,587
- **Native Hawaiian and Other Pacific Islander (NHO)** constituted **0.1%** of the population at 7,160
- **Hispanics** constituted **7.2%** of the population at 569,921





Source: U.S. Census Bureau, American Community Survey 2009
Chart 1A and Chart 1B

Population Changes and Immigration

Virginia's fastest growing population is Hispanic. When comparing data from the 2000 U.S. Census and the 2009 U.S. Census estimates, we see the following:

- Hispanic population increased by 47.8%.
- AIA population increased by 45%.
- Asian population increased by 40.7%.
- NHO population increased by 28.4%.
- Black population increased by 11.6%
- White population increased by 10%.

In terms of immigration, **Hispanics are also the population with the most immigration from other states**. In 2009 the following percentages of the races and ethnicities listed below moved from another state:

- 4.4% of Hispanics
- 3.4% of Whites
- 3.0% of AIA
- 2.9% of Blacks
- 2.9% of Asians

According to the 2009 American Community Survey, NHO population numbers were too small to produce reliable estimates in this category.

In 2009, of all residents in Virginia, **51% were born in Virginia, 38% were born in other states, and 11% were foreign-born**.

Urban and Rural Composition of Virginia

Charts 1C and **1D** show the racial and ethnic population distribution by rural and urban communities as defined previously.

- White Virginians are the majority in all categories.
- Other racial and ethnic groups are most likely to live in urban areas, followed by mixed urban areas.

Chart 1C, Virginia Urban-Rural Distribution by Race, 2009

Classification	2009 Estimated Population	White Alone	Black Alone	Asian Alone	NHO	AIA
Rural	1388728	80.5	16.5	0.6	0.02	0.29
Mixed Rural	1245293	82.2	13.1	1.6	0.03	0.27
Urban	4192168	61.3	23.8	7.1	0.1	0.37
Mixed Urban	1005738	73.9	15.0	5.5	0.06	0.33

Source: U.S. Census, 2009
Charts 1C

Chart 1D, Virginia Urban-Rural Distribution by Ethnicity, 2009

Classification	2009 Estimated Population	Hispanic	Not Hispanic
Rural	1388728	2.3	97.7
Mixed Rural	1245293	3.6	96.4
Urban	4192168	9.4	90.6
Mixed Urban	1005738	6.9	93.1

Source: U.S. Census, 2009
Charts 1D

Socioeconomic Status

Socioeconomic status (SES) is commonly measured by educational attainment, income, wealth, or job status.

Information on **educational attainment** reveals that about 13% of the population age 25 and older has not earned a high school diploma or equivalent. A **high percentage of Hispanics, Blacks, and American Indians have not earned a high school diploma/equivalent or less** (**Chart 1E**).

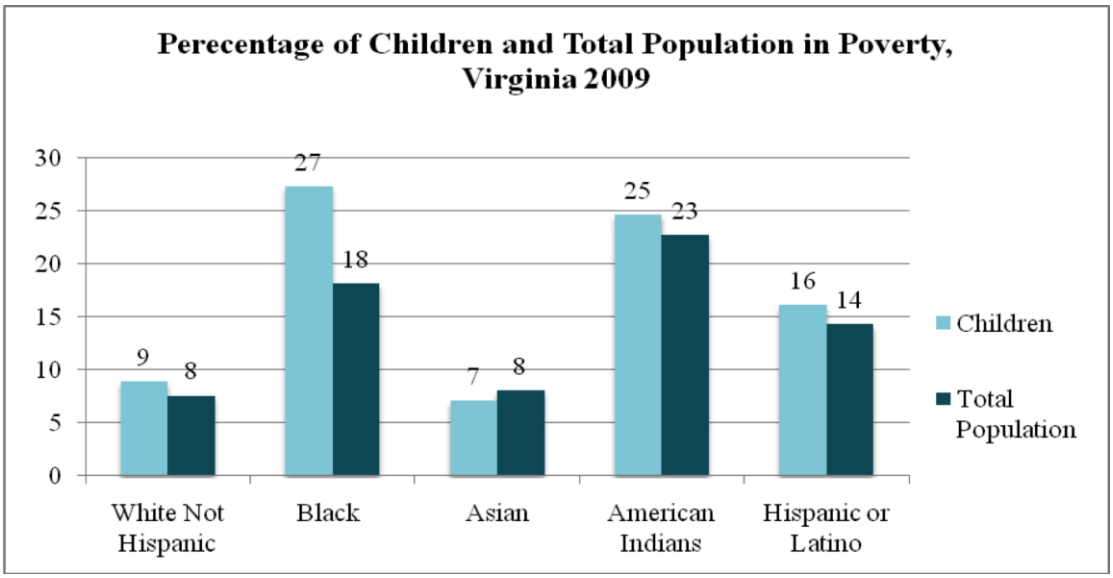
Educational Attainment in Virginia 25 Years Old and Over, 2009

	Total Population	White not Hispanic	Black	Asian	American Indian	Hispanic
	%	%	%	%	%	%
Less than High School	13.4	10.5	19.9	10.8	17.2	31
High Diploma	25.4	25.1	30.6	14.6	29.2	24.2
Some college, no degree	20.6	20.1	24.8	12.4	25.4	17.9
Associate's degree	6.6	6.8	6.5	5.4	6.5	5.1
Bachelor's degree	19.9	21.8	11.5	30.6	13.7	13.6
Graduate degree	14.1	15.6	6.7	26.1	8.1	8.2

Source: U.S. Census Bureau, American Community Survey 2009
Chart 1E

The distribution of poverty in Virginia follows a similar pattern as that of educational attainment (**Figure. 1F**). In 2009:

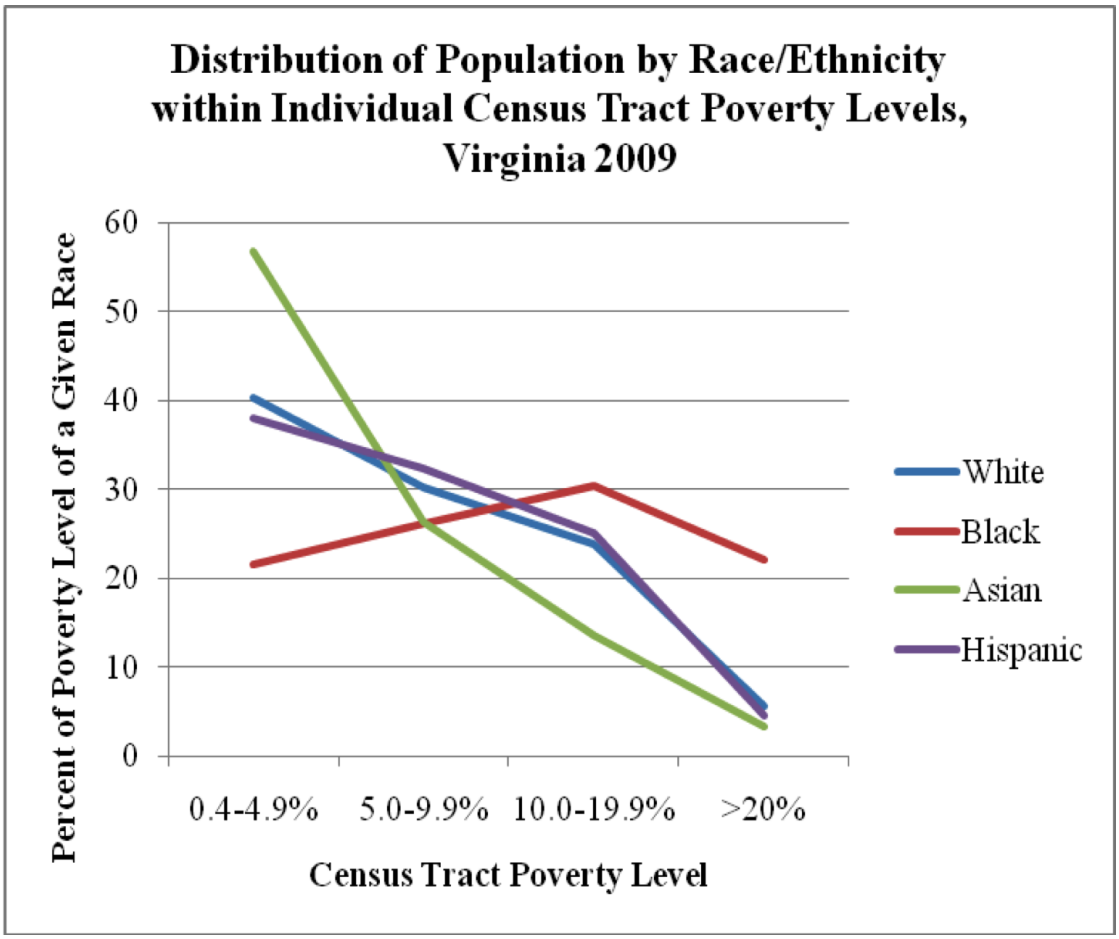
- Overall, **10.7%** of the population fell below the Federal Poverty Level (FPL) placing them at a high risk for multiple health problems.
- 15.2% of children (a total of 268,597 individuals) among all racial and ethnic groups lived in poverty.
- **African Americans** were 2.4 times more likely to live in poverty than their White counterparts.
- **African American children** were 3.1 times more likely to live in poverty than White children.
- **African Americans** accounted for 40.5% of all children living in poverty.
- **Native Americans** were 3 times more likely to live in poverty than White counterparts.
- **Native American children** were 2.8 times more likely to live in poverty than their White counterparts.
- **Hispanics** were 1.9 times more likely to live in poverty than their White counterparts.
- **Hispanic children** were 1.8 times more likely to live in poverty than White children.
- **Asians and Whites** had very similar poverty rates.



Source: U.S. Census Bureau, American Community Survey 2009
Figure 1F

In Virginia, as the concentration of poverty within a census tract increases, the proportion of Asians, Hispanics, and Whites living in those census tracts decreases. However, African Americans are more likely to live in census tracts with higher concentrations of poverty than in census tracts with lower concentrations of poverty.

- **8.7% of the population lives in the high poverty census tracts** (defined by >20% of the census tract population living below the federal poverty level (**Fig. 1G**).
- **22% percent of African Americans live in a high poverty census tract**, compared to 5.6% or less of all racial and ethnic groups.



Source: U.S. Census Bureau, American Community Survey 2009

Figure 1G

Figure 1H shows the geographic distribution of poverty throughout the Commonwealth of Virginia by level of rurality and urbanicity. Rural areas in the southern and southwestern parts of Virginia, some urban areas and mixed urban areas in central Virginia, and urban inner city areas have the largest concentrations of poverty (in red and orange).

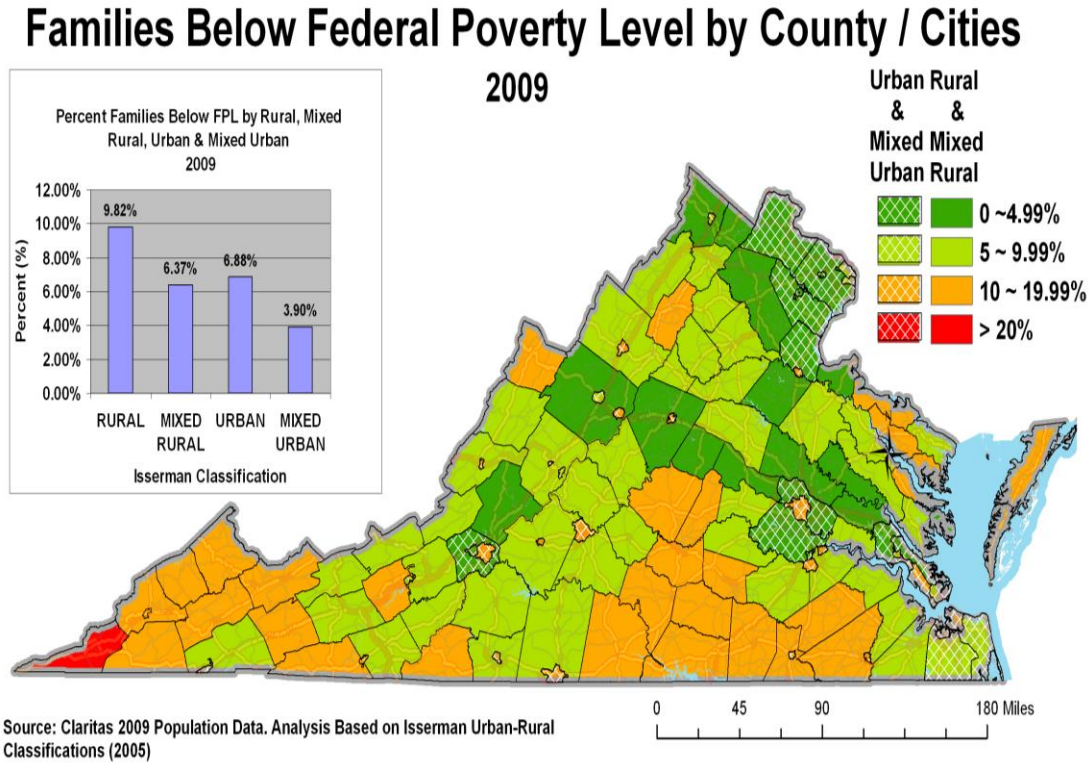
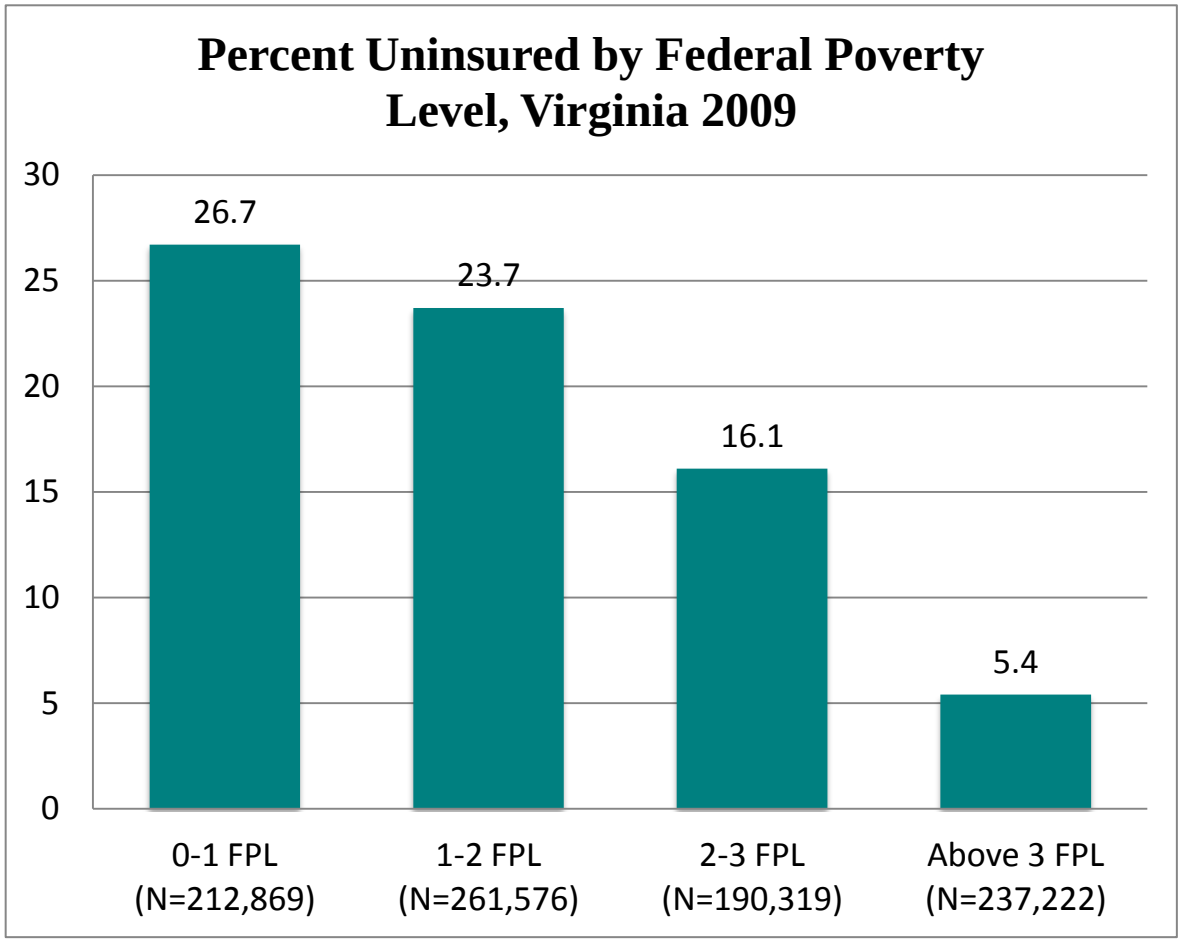


Figure 1H

Insurance Status

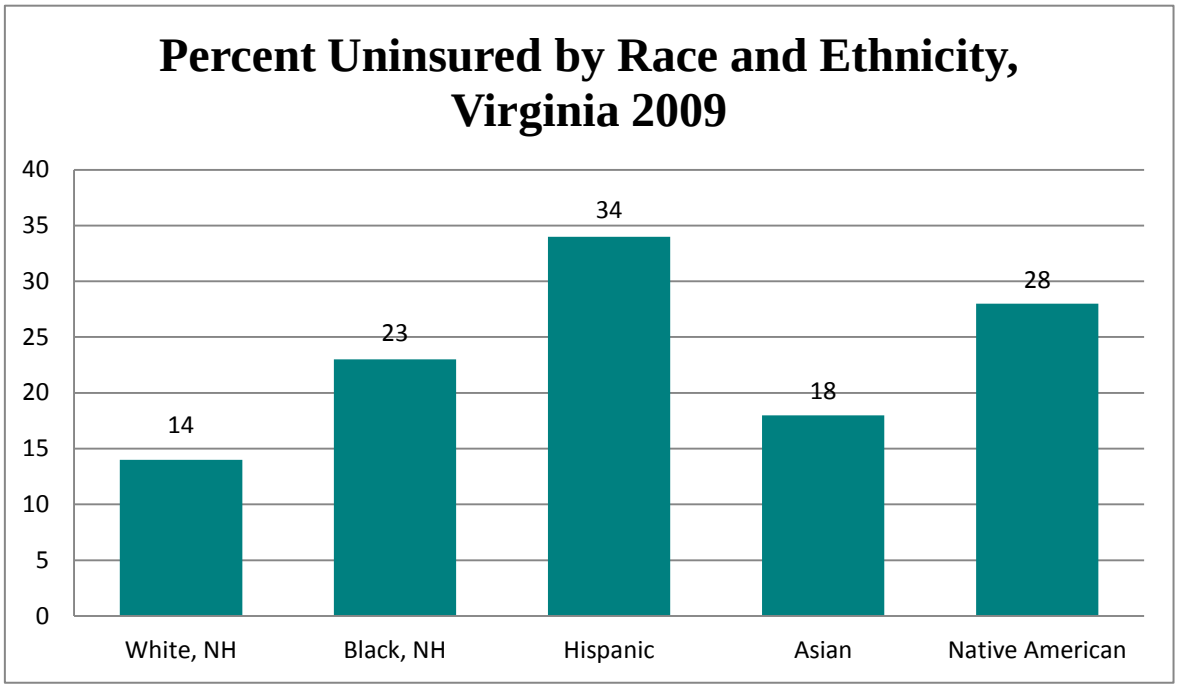
Figure 1I shows uninsured by Federal Poverty Levels (FPL) in Virginia in 2009 by the American Community Survey. A clear stepwise decrease in uninsured rate is seen as income increases. Of note, the largest number of uninsured is in the income range between 1-2 FPL. Such individuals are often referred to as the "**working poor**."



Source: American Community Survey, 2009
Figure 1I

Figure 1J shows uninsured by race and ethnicity in Virginia in 2009 by the American Community Survey.

- Hispanics are the group that is most likely to be uninsured and are 2.4 times more likely to be uninsured than Whites.
- All other racial groups are more likely to be uninsured than Whites as well.



Source: American Community Survey, 2009
Figure 1J

While health insurance coverage is an important determinant of health, research suggests that lack of access to or poor quality of health care accounts for only about 10% of premature mortality overall [33].

Countries that have tracked the health impact of introducing universal access to health care have found that marked health inequities still exist [15].

It is evident that health is shaped by income, education and other factors that individuals experience long before they seek health care [46].

Health Disparities/Inequities

"Our lives begin to end the day we become silent about things that matter."

-Martin Luther King Jr.

Chapter Overview

- The 2012 Health Equity Report highlights the fact that "Health begins where we live, learn, work, and play". The findings reveal that Virginians who experience unequal access to opportunities to be healthy throughout a lifetime live shorter and less healthy lives.

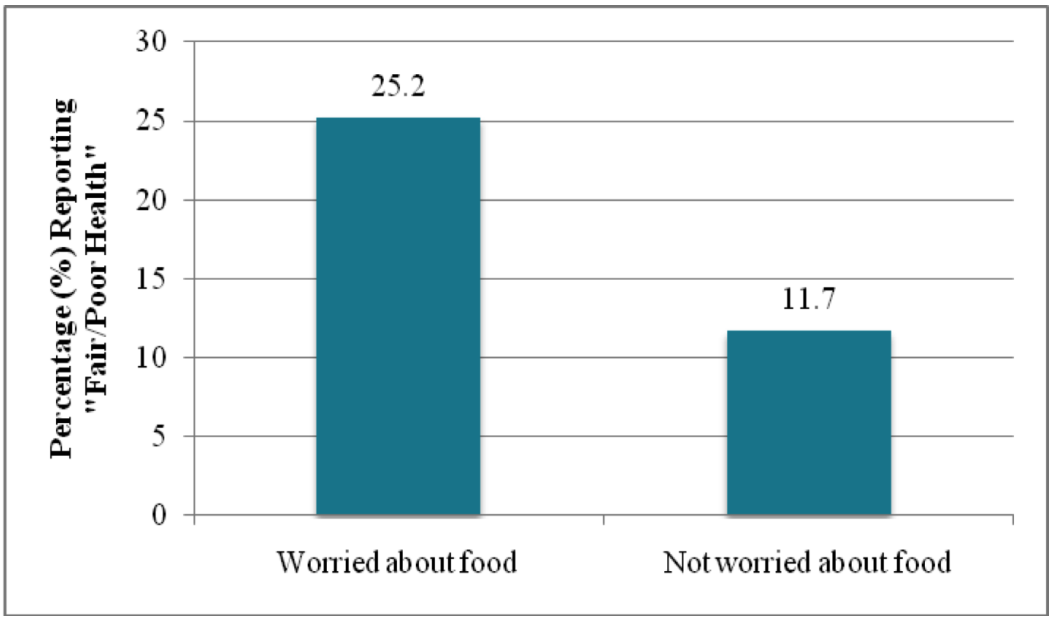
- Factors such as food security, perceived neighborhood security, and racism are statistically associated with poorer self-reported health among Virginians. African Americans in Virginia, on average, live 3-5 fewer years than Whites. Virginians with the least educational attainment experience mortality rates 2.7 times higher than those with the most education.

Health is Shaped by the Built Environment

Individuals and families that experience poverty, along with racial and ethnic minorities (regardless of income), are more likely to live in neighborhoods that lack various resources and opportunities to be healthy such as full-service grocery stores and safe and affordable places to be physically active, health care providers, and pharmacies. In addition, those same communities are more likely to be characterized by the presence of liquor stores, fast food restaurants, crime, and access to illegal drugs [8, 49].

The 2008 Virginia Behavioral Risk Factor Surveillance System (BRFSS) survey documents the impact of such environments on health in Virginia. BRFSS asked over 5,000 adults in Virginia about the characteristics of the built environment where they lived and found that adults who reported worrying about access to healthy and affordable food for themselves or their family (food insecurity) were twice as likely to report being unhealthy than adults who were not worried (25.2% vs. 11.7%; RR=2.15, p<.0001).

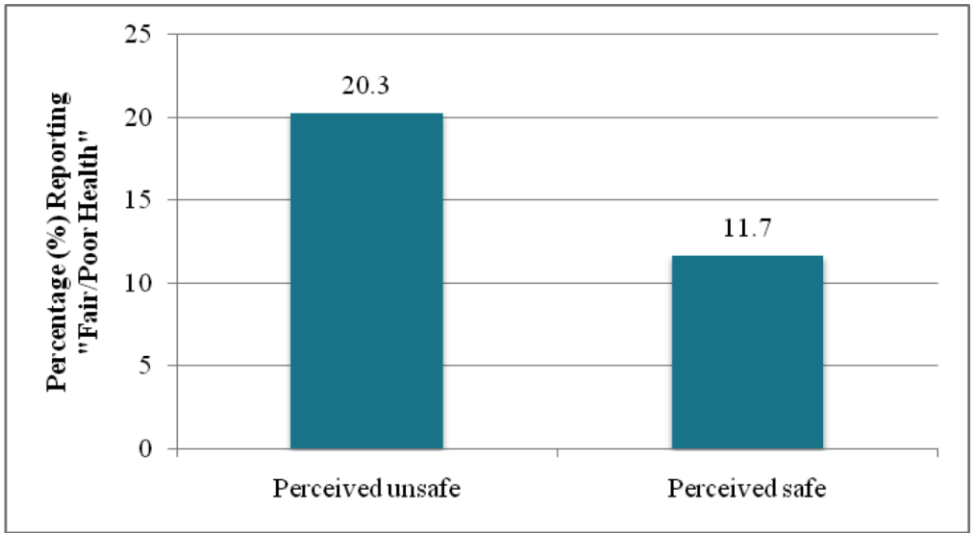
Figure 2A, General Health Status "Unhealthy": Adults with Food Insecurity vs. No Insecurity, Virginia, 2008



Source: Virginia Behavioral Risk Factor Surveillance System, 2008
Figure 2A

A third of respondents (30.7%) felt that their neighborhood was extremely safe, and an additional 58.9% considered their neighborhood to be quite safe. However, African Americans and Hispanics were significantly more likely to say that their neighborhood was not safe. Almost twice as many respondents who reported their neighborhood to be unsafe stated that their health status was fair or poor (20.3% vs. 11.7%).

Chart 2B General Health Status "Unhealthy": Adults Living in Unsafe Neighborhood vs. Safe Neighborhood, Virginia, 2009



Source: Virginia Behavioral Risk Factor Surveillance System, 2008

Chart 2B

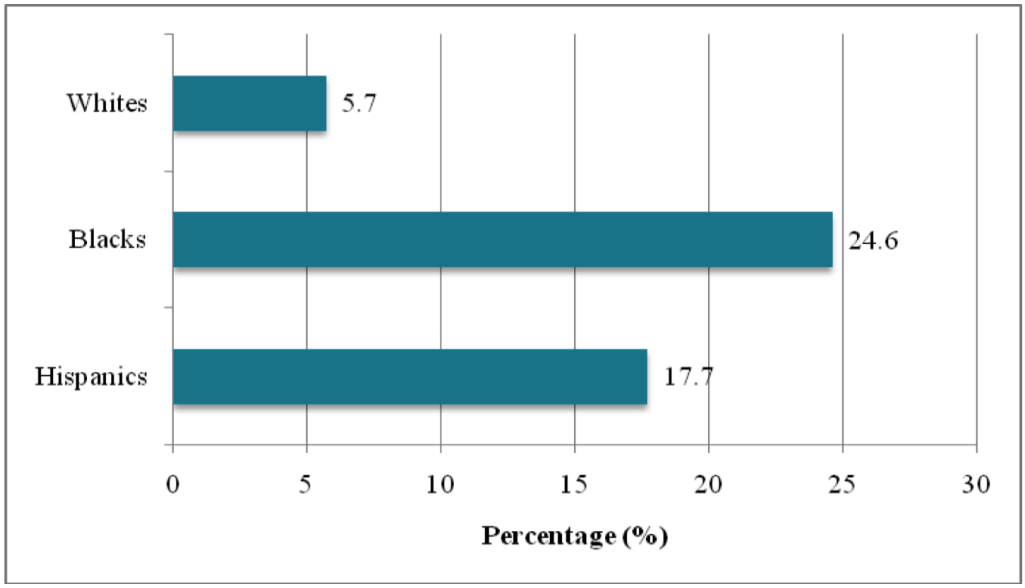
This result is consistent with research demonstrating that perceived unsafe neighborhood conditions are associated with poorer physical health (e.g. violence and obesity), mental health (e.g. stress and depression), and reduced social connections among neighbors [7, 21, 40].

Health is Shaped by Discrimination

In addition to the health impact of individual and neighborhood poverty and lower educational attainment, findings from the 2008 Virginia BRFSS suggest that there is an added health burden among racial/ethnic minorities related to experiences of racial discrimination. The Virginia BRFSS asked questions about perceived racial discrimination to determine if responses were associated with self-reported health status.

As seen in **Figure 2C,** Blacks and Hispanics were more likely to report experiences of perceived racial discrimination than Whites.

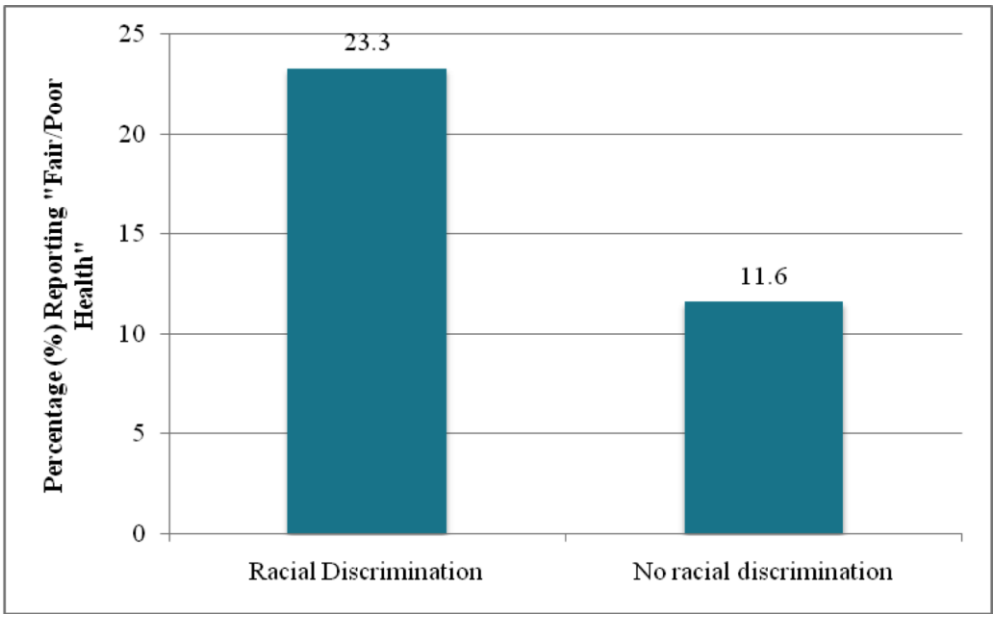
Figure 2C Perceived Racial Discrimination by Race and Ethnicity, Virginia, 2008



Source: Virginia Behavioral Risk Factor Surveillance System, 2008
Figure 2C

Respondents who reported experiences of racial discrimination were more than twice as likely to report fair or poor health (Fig. 2D).

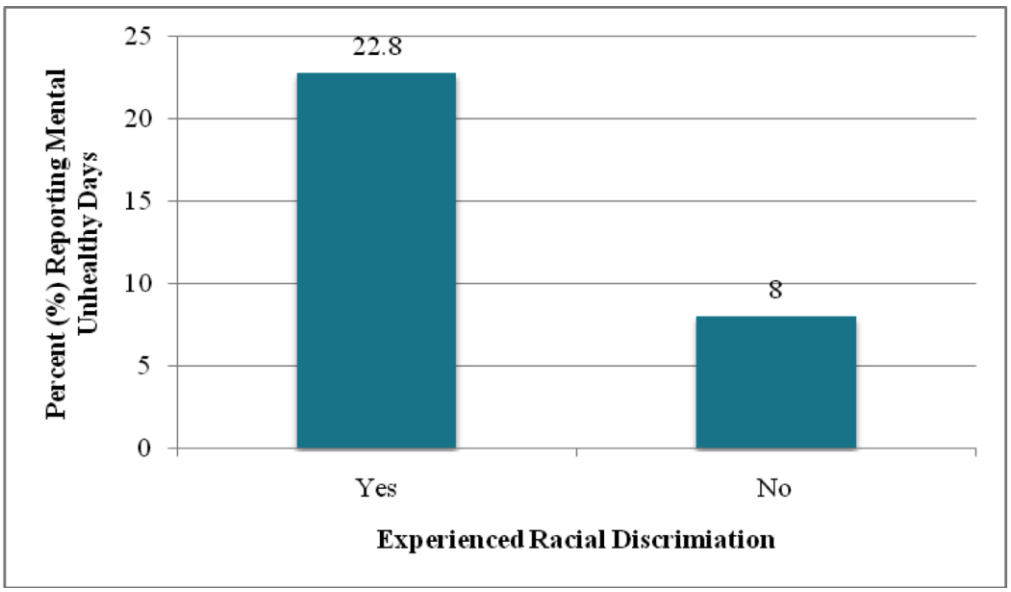
Figure 2D General Health Status "Unhealthy" by Experience of Racial Virginia, 2008



Source: Virginia Behavioral Risk Factor Surveillance System, 2008
Figure 2D

Individuals who reported experiencing racial discrimination also reported higher rates of mental unhealthy days compared to those who did not, as seen in Figure 2E below.

Figure 2E Self-reported Frequent Mental Unhealthy Days by Experience of Racial Discrimination, Virginia, 2008



Source: Virginia Behavioral Risk Factor Surveillance System, 2008
Figure 2E

BRFSS Data Conclusion

The findings of the 2008 BRFSS support national research suggesting that reported experiences of racial discrimination are associated with poorer self-rated health, higher blood pressure, usage of tobacco and alcohol, psychological distress, and depression [48]. It is notable that a study of state BRFSS programs across the country found that Hispanics who are socially identified as White by others report better average health status than Hispanics who are identified as Hispanic [19]. The authors suggest this is related to a reduced likelihood of experiencing discrimination and the positive self-image that results from being associated with whiteness in a color - conscious society. Because of the small numbers of Hispanics in Virginia, such a comparison could not be made.

In addition to evidence for poorer health among socioeconomically disadvantaged and racial and ethnic minority populations in Virginia, there is strong evidence for higher death rates and shorter life expectancy.

Health is Shaped by Educational Attainment

There is a consistent gradient showing increasing mortality rates as educational attainment decreases. Age-adjusted mortality rates for age 25 and over by education attainment per 100,000 population for the 14 leading causes of death are shown in **Chart 3A**.

- For all of the 14 leading causes of death, Virginians with the least education have higher rates than Virginians with the most education.

- For 10 of the 14 leading causes of death, there is a clear step-wise pattern in which the **rates are highest for Virginians with less than a 9th grade education, followed by those with a 9th to 11th grade education, followed by those with a 12th grade education, and the lowest death rates are among those with more than 12 years of education.** Although unintentional injury, Alzheimer's disease, influenza, nephritis, and suicide did not consistently follow this pattern, the **rate for the least educated was higher than that for the most educated.**

- The mortality rates across all 14 causes of death for Virginians with the lowest level of educational attainment (under 9th grade education) range from **1.4 times higher (suicide) to 4.5 times higher (chronic lower respiratory disease, CLRD)** than Virginians with the highest level of educational attainment (more than 12 years of education).

Resident Age-Adjusted Death Rates Per 100,000 Population for Ages 25 and Over By Education Virginia, 2009

Cause of Death	Education Attainment			
	Under 9th Grade	9th to 11th Grade	12th grade	>12 Years
Total Deaths	1,873.0	1,552.7	1,413.5	689.5
Heart Disease	474.0	371.2	320.4	153.8
Cancer	378.6	365.0	352.1	183.2
Cerebrovascular	105.2	88.5	77.6	40.3
CLRD	126.0	96.7	74.4	28.0
Unintentional Injury	64.6	80.8	67.4	25.2
Diabetes	62.6	44.8	39.4	15.2
Alzheimer's	51.2	39.4	42.9	23.8
Influenza	49.6	28.8	29.3	14.8
Nephritis	53.1	45.3	34.4	18.2
Septicemia	45.4	38.4	33.1	15.8
Suicide	16.2	20.0	25.9	11.4
Pneumonitis	19.9	10.3	10.8	5.9
Chronic Liver Disease	25.8	22.9	16.7	6.8
Primary Hypertension	18.3	13.6	14.0	6.4

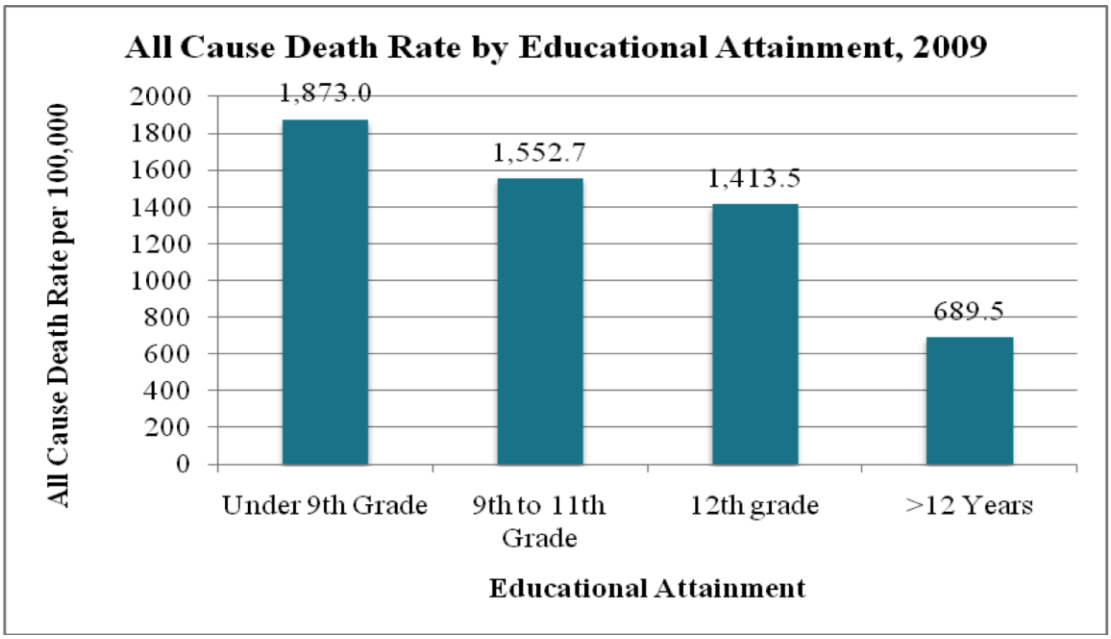
Source: Division of Health Statistics, Virginia Department of Health

Chart 3A *[Cerebrovascular = Stroke] [CLRD = Chronic Lower Respiratory Disease (e.g. emphysema, chronic bronchitis]*

When the rates for all causes of death are combined, there is a clear step-wise decrease in mortality as educational attainment increases**.** Virginians with the least educational attainment have an overall death rate that is:

- **2.7 times higher** than Virginians with more than 12 years of education;
- **1.3 times higher** than Virginians with 12 years of education; and
- **1.2 times higher** than Virginians with 9-11 years of education.

The death rate in the group with 12 years of education (second highest educational attainment) is **2 times higher** than that of the most educated group (greater than 12 years). **(Figure 3B)**.



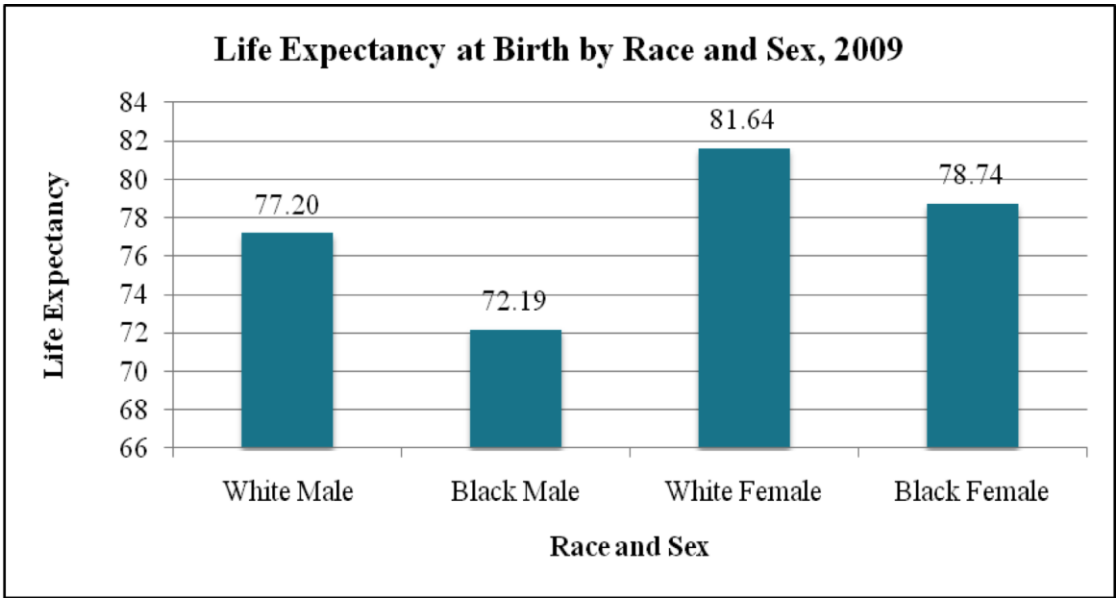
Source: Division of Health Statistics, Virginia Department of Health
Figure 3B

Mortality and Life Expectancy by Race and Ethnicity

Life expectancy: Life expectancy is the number of years a person born today would be expected to live, based on current age-specific mortality rates within that demographic group. Only Blacks and Whites are shown because small numbers for other groups provide unreliable estimates.

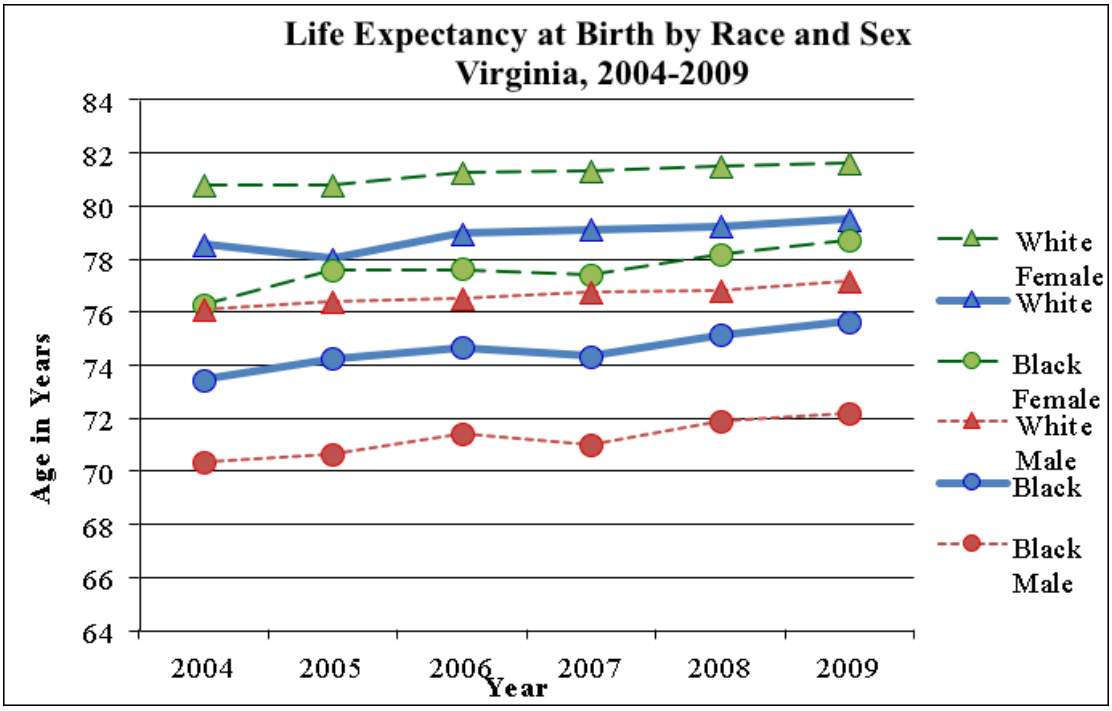
As seen in **Figure 3C**, **in 2009**

- **Black males were expected to live approximately 72 years compared to 77 years for White males, and**
- **Black females were expected to live approximately 79 years compared to 82 years for White females.**



Source: Division of Health Statistics, Virginia Department of Health
Figure 3C

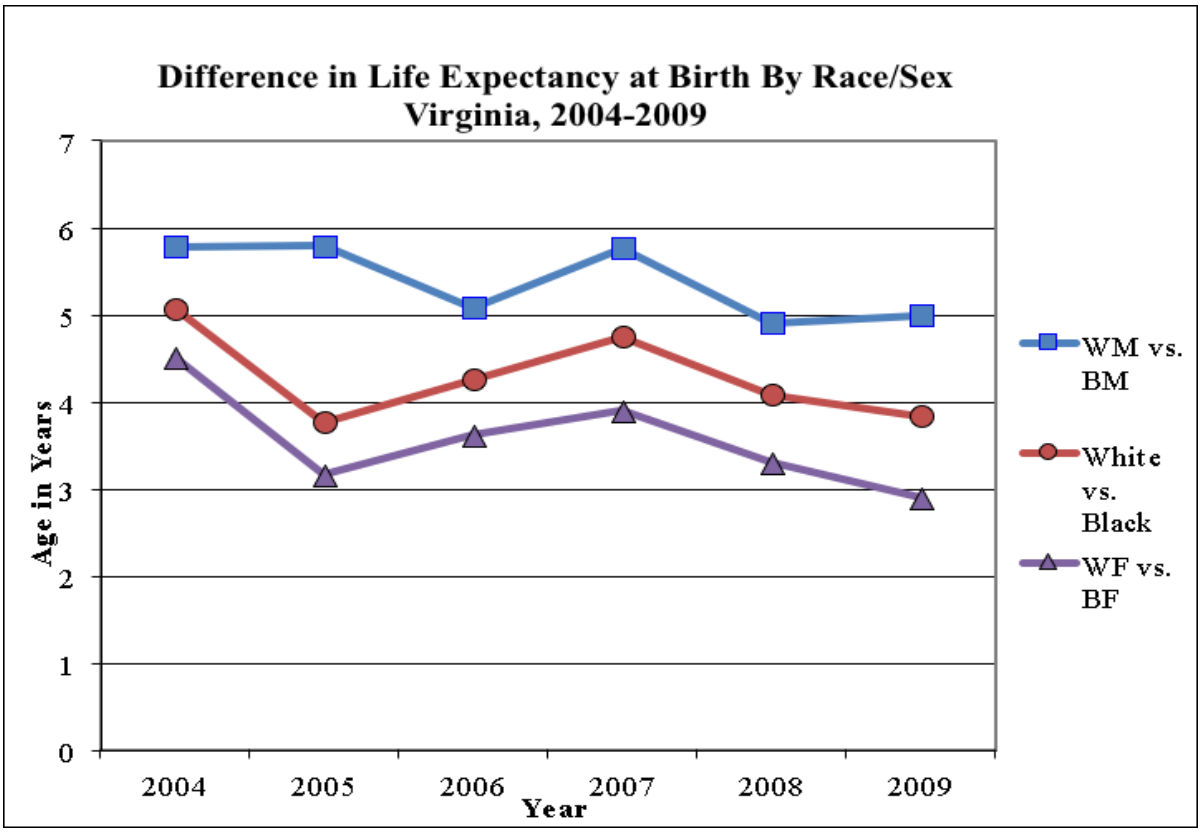
The life expectancy trend between 2004 and 2009 for individuals by race and sex is displayed in **Figure 3D**. Overall, the life expectancy among all groups increased over this 5-year period.



Source: Division of Health Statistics, Virginia Department of Health
Figure 3D

Figure 3E shows the difference in life expectancy at birth by race and sex during this time period:

- **Whites** were expected to **live 3.8 years longer** than **Blacks in 2009,** compared **to 5.2 years longer in 2004.**
- White males were expected to live longer than Black males by 5.0 years in 2009, compared to 5.8 years in 2004 (a 0.8 year decrease).
- White females were expected to live 2.9 years longer in 2009, compared to 4.5 years longer in 2004 (a decrease by 1.6 years).
- **Disparities/inequities** in life expectancy appear to be **decreasing over time,** with a greater influence among women than men.



Source: Division of Health Statistics, Virginia Department of Health
Figure 3E

Mortality rate: The age-adjusted morality rate for the 14 leading causes of death by race and ethnicity are listed in **Chart 3F**. For several causes of death, the number of events was too small to calculate reliable rates for Asians and Hispanic/Latinos. The number of events for Native Americans/American Indians was too small in all categories to calculate reliable rates.

The **three leading causes of death** (heart disease, cancer, and cerebrovascular disease/stroke) account for approximately **two-thirds of deaths** for Whites **and** Blacks. For these causes, Blacks had a mortality rate **1.3 times higher** than Whites.

For the remaining 11 causes of death, Whites had the higher rates for six (chronic lower respiratory disease-CLRD, unintentional injury, Alzheimer's disease, influenza, suicide, and chronic liver disease), and Blacks had the higher rate for five (diabetes, nephritis, septicemia, pneumonitis, and primary hypertension). However, the total mortality rate for those 11 causes is **20% higher** for African Americans than Whites. Asian Americans and Hispanic/Latinos had **significantly lower mortality rates for all causes of death** in which there were sufficient numbers to calculate a rate. These lower rates obscure differences in health status among subgroups of Asian Americans and Hispanic/Latinos.

However, the overall comparisons reinforce evidence that immigrant groups, on average, have better health status than native born Americans. Unfortunately, this health advantage deteriorates the longer immigrants remain in the United States. Health outcomes of children of immigrants and successive generations more closely mirror the health of native-born Americans [20].

Resident Age-Adjusted Death Rates By Race, per 100,000 Population Virginia, 2009

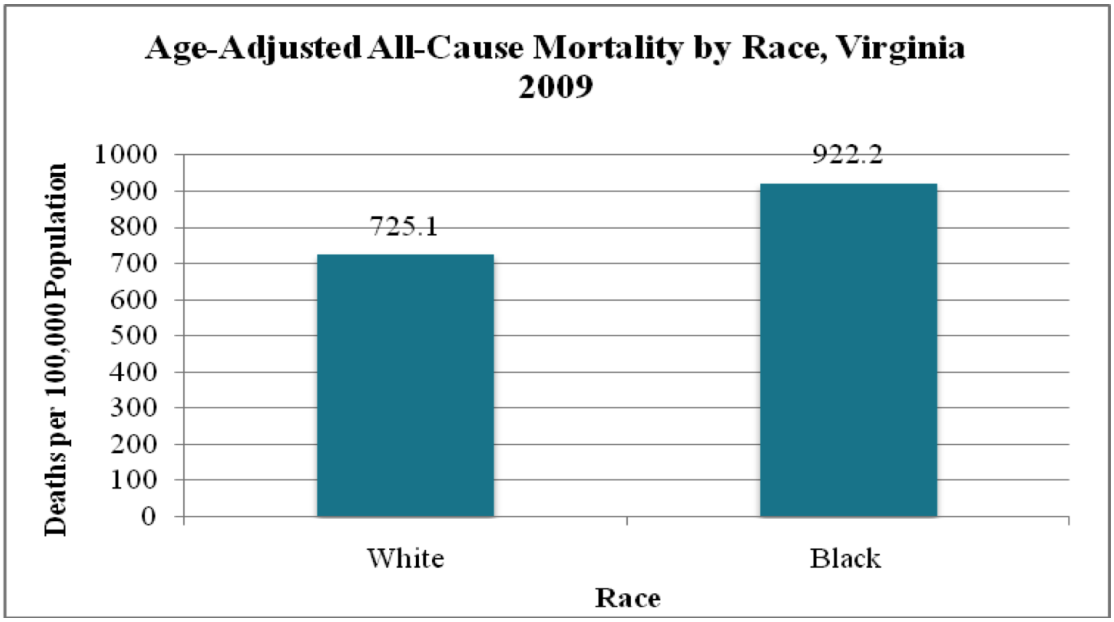
Cause of Death	Race			
	White	Black	Asian	Hispanic
Heart Disease	164.8	218.9	74.4	56.5
Cancer	172.8	208.8	97.8	86.9
Cerebreovascular	39.2	58.7	33.0	22.6
CLRD	42.4	29.1	*	*
Unintentional Injury	35.5	26.8	15.0	18.8
Diabetes	16.3	37.6	12.7	*
Alzheimers	23.9	22.5	*	*
Influenza	16.3	16.1	*	*
Nephritis	16.2	37.9	17.1	*
Septicimia	15.4	28.6	9.9	*
Suicide	13.7	6.1	5.6	4.4
Pnumonitis	5.9	8.5	*	*
Chronic Liver Disease	8.1	6.4	*	*
Primary Hypertension	5.7	14.5	*	*

* Number of cases too small (20 or less) to calculate a reliable rate
Source: Division of Health Statistics, Virginia Department of Health

Chart 3F

[Cerebrovascular = Stroke] [CLRD = Chronic Lower Respiratory Disease (e.g. emphysema, chronic bronchitis]

Figure 3G shows the all-cause mortality rate per 100,000 individuals in Virginia for Blacks and Whites. Blacks have an age-adjusted all-cause mortality rate that is 1.27 times higher than Whites.



Source: Division of Health Statistics, Virginia Department of Health
Figure 3G

The shorter life expectancy and high mortality rates of socioeconomically disadvantaged populations (less educated and African American) lead to many excess deaths in Virginia. It is estimated that **if all residents in Virginia had the same mortality rate as the five most affluent counties in Virginia, 24.3% of deaths between 1990 and 2006 would have been averted.** This is an average of almost **12,000 excess deaths per year** [51]. In addition to the significant number of lives that are lost, health disparities/inequities have a great financial cost to the Commonwealth of Virginia.

Cost of Health Disparities/Inequities

"Health care costs have been rising for several years. Expenditures in the United States on health care surpassed $2.3 trillion in 2008, more than three times the $714 billion spent in 1990, and over eight times the $253 billion spent in 1980. Stemming this growth has become a major policy priority, as the government, employers, and consumers increasingly struggle to keep up with health care costs."

-Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Care Expenditures Data, January 2010.

Chapter Overview

- In addition to the significant human cost of health disparities, the 2012 Health Equity Report highlights the substantial economic costs resulting from health disparities across socioeconomic, racial, and geographic groups in the Commonwealth of Virginia. The costs represent lost opportunities to invest in health and the potential of all Virginians.

- The cost of health disparities associated with limited educational attainment is the equivalent of about 1.9% of Virginia's Gross Domestic Product (GDP). Given that health care costs in Virginia represented 18% of its GDP in 2009, education related health disparities account for about 10% of the costs associated with the entire health care sector.

Cost of Health Disparities/ Inequities to the Commonwealth of Virginia

This report introduces a cost estimate that is aimed at quantifying the economic impact of health disparities/inequities of five major health risks among Virginians: stroke, heart disease, cancer, low birth weight, and injuries (both intentional and unintentional), and the overall costs of premature death. These costs could be interpreted as the potential benefits to the economy of the Commonwealth from improving the health outcome of groups suffering from significant disparities/inequities.

The cost of health disparities/inequities can represent an important share of national income. There exists a substantial body of literature showing significant economic costs associated with health outcome disparities/inequities. This section estimates those costs for Virginia. Please refer to the full report at www.vdh.viriginia.gov/healthpolicy for more information.

Direct Cost Estimates

Direct costs are calculated by using race (Black compared to White) and area of residence data (estimated from the hospital discharge data) while costs associated with income and education data are estimated using regression analysis (see Cost of Health Inequities/Disparities full report at www.vdh.viriginia.gov/healthpolicy).

As seen in **Chart 4A,** this analysis indicates that **the annual direct costs of health disparities/inequities reach into the hundreds of millions of dollars** for each socioeconomic factor considered. Low incomes and low education are associated with the greatest disparities/inequities and highest disparity/inequity costs. In addition, significant excess costs exist among African Americans compared to Whites and rural compared to urban residents. Heart disease appears to be associated with the largest direct cost, and **low income and education are associated with heart disease disparities that exceed $200 million annually.** These estimates can be considered lower bound estimates because they do not include other costs such as doctors' visits and medicines incurred outside the hospital.

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Estimated Yearly Direct Costs for Four Factors Associated with Health Outcome Disparities/Inequities, Virginia 2006-2008				
Disparity Factor	**Health Risk**	**Disparity**	**Average Direct Cost**	**Direct Cost[1]**
Race (Black compared to White)	Stroke	4,042	11,079	44,783,000
	Heart Disease	7,331	9,183	67,318,000
	Cancer	2,670	10,707	28,586,000
	Low Birth Weight	1,161	14,144	16,422,000
	Intentional Injury[2]	266	5,407	1,438,000
	Unintentional Injury	188	9,516	1,789,000
Rural / Urban	Stroke	1,711	11,079	18,957,000
	Heart Disease	3,360	9,183	30,854,000
	Cancer	582	10,707	6,231,000
	Low Birth Weight	0	14,144	0
	Intentional Injury	0	5,407	0
	Unintentional Injury	6,031	9,516	57,390,000
Income (<$10,000)	Stroke	3,749	11,079	41,542,000
	Heart Disease	21,289	9,183	195,492,000
	Cancer	2,740	10,707	29,336,000
	Low Birth Weight	0	14,144	0
	Intentional Injury	1,568	5,407	8,475,000
	Unintentional Injury	1,403	9,516	13,354,000
Education (less than high school)	Stroke	3,583	11,079	39,702,000
	Heart Disease	25,132	9,183	230,778,000
	Cancer	0	10,707	0
	Low Birth Weight	1,135	14,144	16,054,000
	Intentional Injury	2,879	5,407	15,564,000
	Unintentional Injury	5,649	9,516	53,759,000

Note: [1] Costs are rounded to thousands (all in 2009 US dollars). The same applies for subsequent tables. [2] Intentional and unintentional injuries are separated since they have different average direct costs. [3] Both the disparities (in terms of patient numbers) and the direct cost data are three year averages (2006- 2008) from inpatient hospital discharge billing data.
Source: Virginia Tech Department of Agricultural & Applied Economics
Chart 4A

Morbidity Cost Estimates

Morbidity cost is estimated based on the number of workdays lost as well as the disparate outcomes from direct cost estimation.

As seen in **Chart 4B**, **the largest morbidity cost also comes from heart disease, due to the large number of patients. Also, being Black or having low education is associated with significant morbidity costs from low birth weight**. Excess costs are found among each of the disadvantaged demographic groups and all outcomes, except for low birth weight among rural and lowest income groups and for cancer among the least educated. **Note:** Again, these are conservative assumptions and should be considered the lower bounds of the true morbidity cost.

Estimated Yearly Morbidity Costs for Four Factors Associated with Health Outcome Disparities/Inequities, Virginia 2006-2008

Disparity Factor	Health Risk	Disparity	Total Morbidity Cost
Race (Black compared to White)	Stroke	4,042	8,110,000
	Heart Disease	7,331	33,511,000
	Cancer	2,670	52,041,000
	Low Birth Weight	1,161	115,983,000
	Injuries	454	1,065,000
Rural / Urban	Stroke	1,711	19,160,000
	Heart Disease	3,360	15,359,000
	Cancer	582	11,344,000
	Low Birth Weight	0	0
	Injuries	5,963	13,987,000
Income (<$10,000)	Stroke	3,749	17,773,000
	Heart Disease	21,289	97,317,000
	Cancer	2,740	53,406,000
	Low Birth Weight	0	0
	Injuries	2,971	6,969,000
Education (less than high school)	Stroke	3,583	16,986,000
	Heart Disease	25,132	114,883,000
	Cancer	0	0
	Low Birth Weight	1,135	113,389,000
	Injuries	8,528	20,004,000

Note: All in 2009 US dollars.
Source: Virginia Tech Department of Agricultural & Applied Economics
Chart 4B

Mortality Cost Estimates

These costs are estimated based on the death records from 2006 to 2008 in Virginia and based on lost income associated with premature death. As seen in **Chart 4C**, once again, heart disease remains the most costly health risk in most cases, while significant costs are also associated with other health risks across demographic groups. Similarly, excess costs are seen among all disadvantaged groups. Low birth weight among urban/rural residents is the only outcome for which excess mortality costs do not exist for the more disadvantaged population.

Estimated Yearly Mortality Costs for Four Factors Associated with Health Outcome Disparities/Inequities, Virginia 2006-2008

Disparity Factor	Health Risk	Disparity	Average Age of Death	Mortality Cost
Race (Black compared to White)	Stroke	128	54.95	60,634,000
	Heart Disease	402	54.72	197,278,000
	Cancer	341	55.42	153,279,000
	Low Birth Weight	66	65	131,056,000
	Injury	5.44	48.22	4,028,000
Rural / Urban	Stroke	1	54.95	1,515,000
	Heart Disease	327	54.72	162,125,000
	Cancer	307	55.42	131,729,000
	Low Birth Weight	0	65	0
	Injury	290	48.22	224,166,000
Income (<$10,000)	Stroke	422	54.95	187,062,000
	Heart Disease	1,842	54.72	835,543,000
	Cancer	680	55.42	287,659,000
	Low Birth Weight	247	65	490,226,000
	Injury	133	48.22	98,153,000
Education (less than high school)	Stroke	410	54.95	181,783,000
	Heart Disease	4,581	54.72	2,078,195,000
	Cancer	1,601	55.42	676,983,000
	Low Birth Weight	21	65	41,105,000
	Injury	1,484	48.22	1,098,672,000

Note: All in 2009 US dollars
Source: Virginia Tech Department of Agricultural & Applied Economics
Chart 4C

Total Cost Estimates

Total costs are obtained by combining Direct Cost, Morbidity Cost, and Mortality Cost. As seen in **Chart 4D**, the annual total costs of health disparities/inequities for these five health risk categories associated with **race, rural residence, poverty and low education reach $917 million, $692 million, $2.36 billion and $4.69 billion, respectively**. The total disparity/inequity cost for these five outcomes associated with low levels of education exceeds **1.2% of the 2009 Gross Domestic Product (GDP)** of Virginia, and the disparity costs generated by low income is more than **0.6% of the total GDP**. These large estimates of disparity cost are consistent with previous studies [29, 9, 23]. The largest disparity factor, associated with education gaps exceeds 1.2% (less than high school, based on original grouping) and if an alternative grouping is used, it can reach **1.9% of Virginia's GDP**.

Among the disparity/inequity factors, low income and education have the largest negative economic impact on the society as a whole, which suggests that **reductions in poverty or increases in individual years of educational attainment may significantly reduce health related economic losses** of the Commonwealth. Mortality costs are the biggest component of disparity/inequity. Low birth weight among rural populations is the only comparison in which the least advantaged group does not experience excess total costs.

While this report shows the total costs of health disparities/inequities are large, **these are likely the lower bounds of the total economic loss** because the report:

- Considers costs of patients for general hospital, inpatient costs.
- Considers only five major health risks, and
- Excludes individuals under 35 years of age and 65 years and older.

In addition, the estimated morbidity and mortality costs are only economic losses and do not include pain and suffering and other psychological costs of illness and death.

Estimated Yearly Total Costs for Four Factors Associated with Health Outcome Disparities/Inequities, Virginia 2006-2008					
Health Risk	**Cost Type**	**Race**	**Rural / Urban**	**Income (<10,000)**	**Education (less than high school)**
Stroke	Direct Cost	44,783,000	18,957,000	41,542,000	39,702,000
	Morbidity Cost	8,110,000	19,160,000	17,773,000	16,986,000
	Mortality Cost	60,634,000	1,515,000	187,062,000	181,783,000
	Total	113,528,000	39,631,000	246,376,000	238,472,000
Heart Disease	Direct Cost	67,318,000	30,854,000	195,492,000	230,778,000
	Morbidity Cost	33,511,000	15,359,000	97,317,000	114,883,000
	Mortality Cost	197,278,000	162,125,000	835,543,000	2,078,195,000
	Total	298,107,000	208,338,000	1,128,352,000	2,423,856,000
Cancer	Direct Cost	28,586,000	6,231,000	29,336,000	0
	Morbidity Cost	52,041,000	11,344,000	53,406,000	0
	Mortality Cost	153,279,000	131,729,000	287,659,000	676,983,000
	Total	233,906,000	149,304,000	370,402,000	676,983,000
Injury	Direct Cost	3,227,125	57,022,000	21,829,000	69,323,000
	Morbidity Cost	1,064,906	13,987,000	6,967,000	20,004,000
	Mortality Cost	4,028,236	224,166,000	98,153,000	1,098,672,000
	Total	8,320,000	295,176,000	126,951,000	1,187,998,000
Low Birth Weight	Direct Cost	16,422,000	0	0	16,054,000
	Morbidity Cost	115,983,000	0	0	113,389,000
	Mortality Cost	131,056,000	0	490,226,000	41,105,000
	Total	263,460,824	0	490,226,000	170,548,000
The Total of Five Health Risks	Direct Cost	160,336,000	113,0634,000	288,199,000	355,858,000
	Morbidity Cost	210,711,000	59,849,000	175,465,239	265,261,610
	Mortality Cost	546,275,000	519,535,000	1,898,642,000	4,076,738,000
	Total Cost	**917,322,000**	**692,448,000**	**2,362,306,000**	**4,697,858,000**

Note: All in 2009 US dollars.

Source: Virginia Tech Department of Agricultural & Applied Economics

Chart 4D

Mapping Total Cost

Finally, maps of the aggregate health disparity costs at the zip code level of the five health risks studied with respect to race and area of residence are shown in **Figures 4E** and **4F**. **Note:** Maps for educational attainment and income could not be generated because those estimates were based on regression analysis, whereas estimates for race and residential area are based on zip code level hospital discharge data.

Figure 4E Aggregate Health Disparity/Inequity Costs Associated with Race (in US Dollars), 2006-2008

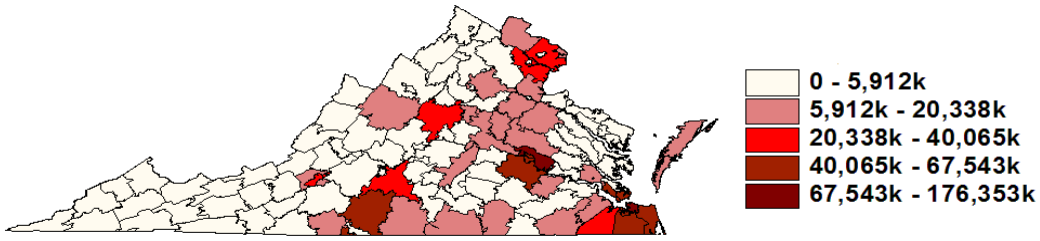
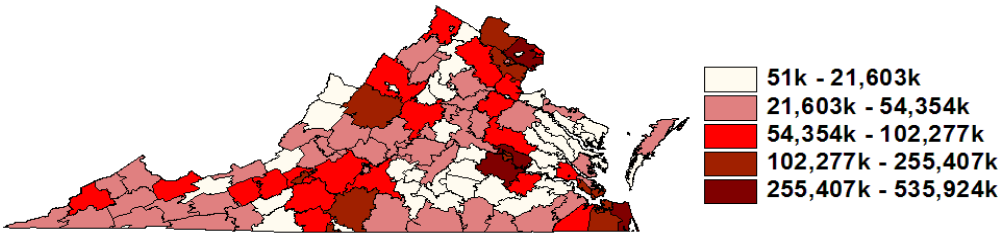


Figure 4F Aggregate Health Disparity/Inequity Costs Associated with Residential Area (in US Dollars), 2006-2008



From the maps above we may see the following patterns. Racial disparities/inequities are much more concentrated in metropolitan areas (Northern Virginia, Richmond, Virginia Beach) and Southside Virginia. For disparities/inequities associated with residential area, concentrated disparity/inequity costs exist also in the southwest end of Piedmont, including counties like Pittsylvania, Campbell and Halifax, the area between Northern Virginia and Richmond area, Hampton Roads, as well as some parts along the Appalachian Mountains.

The maps above remain consistent across different health risks. Thus, geographical targeting of policies that affect multiple health outcomes is likely appropriate, which may reduce health disparities/inequities most cost-effectively.

Disparity/ Inequity Cost Due to All Cause Mortality

Although it is not feasible to estimate the total cost of health disparities/inequities across all health risks, it is possible to calculate the mortality cost across all causes using the statewide death records from the VDH database.

Chart 4G presents the estimated total mortality cost when all causes of death are taken into consideration.

- As of 2009, the costs of all-cause mortality disparities/inequities by **low income and low education exceed 0.46% and 1.00% of the total GDP** of Virginia (1.00% and 1.45% under alternative grouping, respectively).
- Total mortality costs are substantially greater than those generated from the five separate health risks, with low income and low education groups showing particularly large increases in costs associated with mortality disparities.
- The total mortality costs for African Americans and rural populations are substantial as well.

These numbers are almost surely **lower bounds of the total economic costs** of health disparities, since no direct costs or morbidity costs are taken into consideration because of measurement difficulties.

Chart 4G Annual Total Mortality Costs of All Health Risks

	Factor	Cost of Health Disparity
Original Grouping	Race	546,275,000
	Rural / Urban	519,535,000
	Income (< $10,000)	1,898,642,000
	Education (less than high school)	4,076,738,000
Alternative Grouping	Income (< $ 20,000)	4,062,999,000
	Education (high school or less)	5,920,209,000

Source: Virginia Polytechnic Institute and State University, Department of Agriculture and Applied Economics
Chart 4G

Conclusion Regarding Costs of Health Disparities/Inequities

This report's Health Disparity Cost Analysis reinforces that existing health disparities across socioeconomic, racial, and geographic groups in the Commonwealth of Virginia generate huge economic losses. This economic loss implies a large foregone benefit associated with the relatively poor health of lower socioeconomic groups that would accrue if health disparities/inequities are eliminated.

The largest disparity factor for the five causes of morbidity and mortality chosen, associated with education gaps, **exceeds 1.2% (less than high school, based on original grouping) and 1.9% (high school or less, based on alternative grouping) of Virginia's GDP**, respectively. The proportion would be even higher if we take all types of health risks into consideration. These large estimates of disparity cost are consistent with previous studies [29, 9, 23]. However, these estimates are mostly likely lower bounds of the real economic costs since the study was limited to ages 35-64 (except for low birth weight) and all types of costs were not included. Given that health care accounted for 18% of Virginia's gross domestic product (GDP) in 2009, this suggests that **the costs of education-related health disparities are the equivalent of about 10% of costs associated with the entire health care sector.** Reducing health inequities could have a significant impact on Virginia's economy.

Among the three cost types, mortality cost is always the largest for all diseases and all socioeconomic correlates. Hence, reducing mortality disparities will result in the largest reductions in disparity related economic losses.

Health Opportunity Index (HOI)

"The real challenge lies not in debating whether disparities exist, but in developing and implementing strategies to reduce and eliminate them"

-Alan R. Nelson, MD, Chair, IOM Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care

Chapter Overview

- New to the 2012 Health Equity Report is the Health Opportunity Index (HOI). The HOI identifies and analyzes social and economic factors that are strongly associated with life expectancy in Virginia. The HOI identifies policy levers to enhance opportunities to be healthy and promote health equity.
- The HOI is strongly distributed by race and ethnicity, with African Americans and Latinos being the least likely to live in areas with high opportunity to be healthy. The HOI accounts for about 87% of the differences in life expectancy in Virginia.
- The report also includes the HOI analyses on two "Spotlight Diseases": HIV and Birth Outcome.

About the Health Opportunity Index

The Health Opportunity Index (HOI) was created and designed to identify those areas and populations that are most vulnerable to adverse health outcomes. It identifies the impact of a set of social determinants that are important for assessing the health of a community. The development of the HOI consisted of using a geographical information system (GIS). The use of this system provides valuable information for understanding the distribution of health, disease, and SDOH across the Commonwealth. While health disparities/inequities exist among certain disadvantaged populations, using GIS demonstrates that outcomes are often geographically defined in association with SDOH. Emphasizing the conclusion that "place matters" when it comes to health equity.

The geographical unit used in these analyses is the **census tract**. Census tracts are similar to groups of neighborhoods, which averages about 4,000 people. The chosen health outcome of interest used to evaluate the HOI was **life expectancy**.

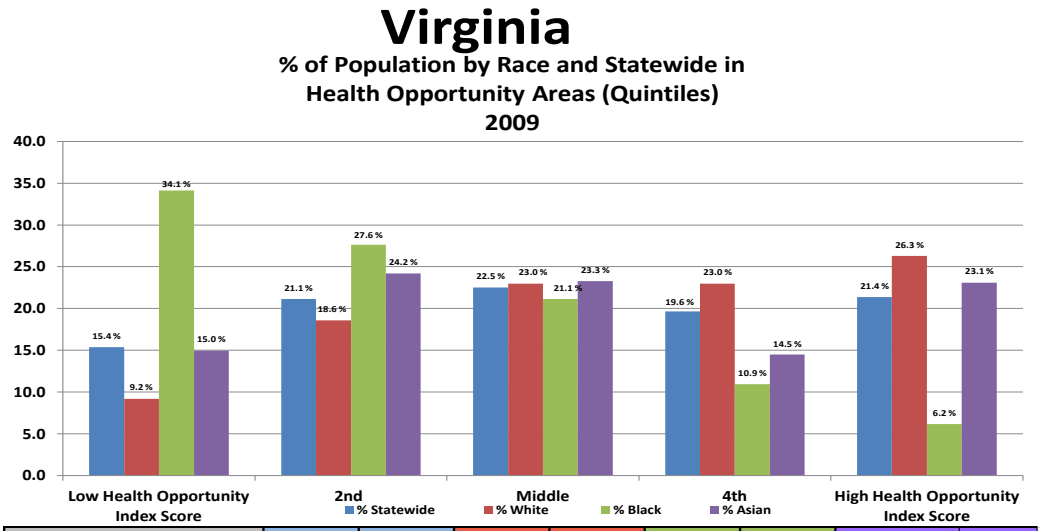
The HOI is composed of **ten indicators** that reflect a broad array of social determinants of health: (1) Education (2) EPA Environmental Hazards (3) Affordability of transportation and housing, (4) Household Income Diversity, (5) Job Participation, (6) Population Density, (7) Racial Diversity, (8) Population Churning, (9) Townsend Index Material Deprivation, and (10) Local Commuting Patterns. Each indicator is clearly defined and structured (over 30 variables are used in their construction) to further understanding of a clear social, economic or environmental process.

The maps of life expectancy and HOI provide a geographic picture of how life expectancy differs dramatically across Virginia. Some areas in inner city and rural Virginia experience an average life span of up to 19 years below the state average and 26 years below areas with the maximum life span in the state. Not surprisingly, health opportunity is distributed in a manner very similar to that of life expectancy.

(For more information on how the ten indicators are measured and what each indicator means, please see Appendix A.)

The Distribution of the Health Opportunity Index Across Socioeconomic, Racial/Ethnic, and Geographic Groups in Virginia

As with more traditional measures of socioeconomic status, the Health Opportunity Index (HOI) is not equally distributed across the population in Virginia. The bar charts in this section breakdown HOI into five categories (quintiles), from the lowest 20% of HOI scores (signifying the least opportunity to be healthy) up through the highest 20% (signifying the greatest opportunity to be healthy). The Virginia population is divided into each of the quintiles to display how racial, ethnic, socioeconomic, urban, and rural populations are distributed in terms of opportunities to be healthy.

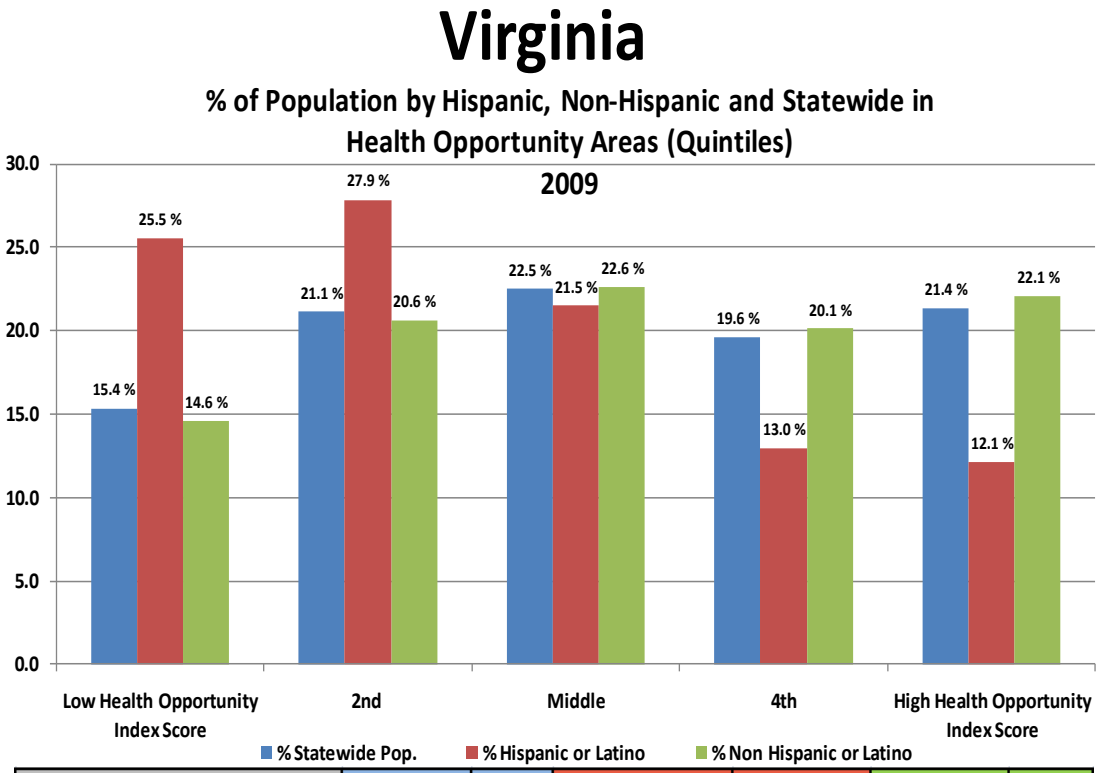


Health Opportunity Index Quintile	Statewide Pop.	% Statewide Pop.	White Pop.	% White	Black Pop.	% Black	Asian Pop.	% Asian
Low Health Opportunity Index Score	1,201,345	15.4	501,289	9.2	525,505	34.1	56,914	15.0
2nd	1,653,452	21.1	1,012,857	18.6	425,237	27.6	92,066	24.2
Middle	1,762,423	22.5	1,252,636	23.0	325,340	21.1	88,482	23.3
4th	1,535,754	19.6	1,252,799	23.0	168,246	10.9	55,156	14.5
High Health Opportunity Index Score	1,672,073	21.4	1,433,246	26.3	94,872	6.2	87,810	23.1
Total	7,825,047	100	5,452,827	100	1,539,200	100	380,428	100

Figure 5A

Figure 5A divides HOI into five groups (quintiles) **statewide** from lowest score to highest. Each group is then broken down by race (White, Black, and Asian). Several trends are evident:

- The total population (blue) is roughly equally distributed in terms of the HOI score of the census tracts they live in. The smallest portion of residents (15.4%) lives in census tracts with the lowest HOI score.
- The White population (red) is least likely to live in areas with low HOI (9.2%) and most likely to live in areas with high HOI (26.3%).
- The Black/African American population (green) is most likely to live in areas with low HOI (34.1%) and least likely to live in areas with high HOI (6.2%).
- The Asian population (blue) is fairly equally divided within the second lowest HOI (24.2%) through the highest HOI (23.1%).
- Black Virginians are 3.7 times more likely to live in census tracts with low HOI than Whites.
- Whites are 4.2 times more likely to live in high HOI census tracts than Blacks.
- Asian Virginians are 1.6 times more likely to live in census tracts with low HOI than White Virginians.
- Whites are 1.1 times more likely to live in high HOI census tracts than Asians.

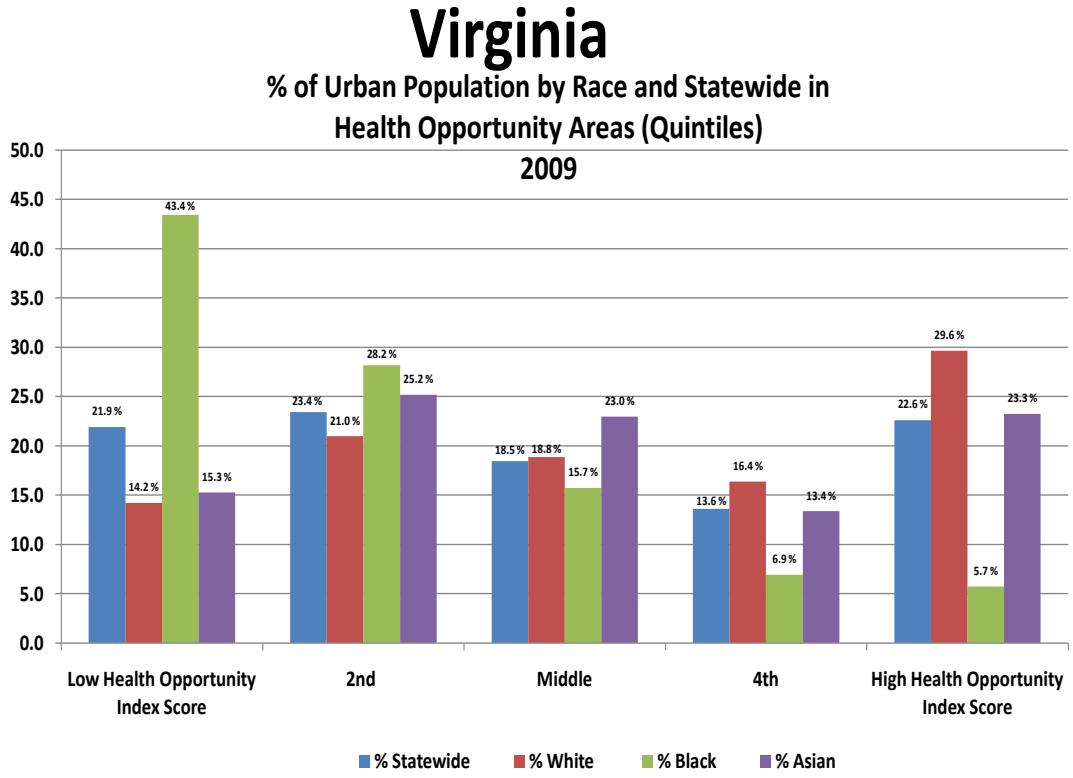


Health Opportunity Index Quintile	Statewide Pop.	% Statewide Pop.	Hispanic or Latino Pop.	% Hispanic or Latino	Non Hispanic or Latino Pop.	% Non Hispanic or Latino
Low Health Opportunity Index Score	1,201,345	15.4	138,045	25.5	1,063,300	14.6
2nd	1,653,452	21.1	150,554	27.9	1,502,898	20.6
Middle	1,762,423	22.5	116,067	21.5	1,646,356	22.6
4th	1,535,754	19.6	70,111	13.0	1,465,643	20.1
High Health Opportunity Index Score	1,672,073	21.4	65,575	12.1	1,606,498	22.1
Total	7,825,047	100	540,352	100	7,284,695	100

Figure 5B

Figure 5B shows the distribution of the **Hispanic/Latino population** across HOI quintiles.

- Hispanics (red) are more likely to live in census tracts with low HOI and less likely to live in census tracts with high HOI.
- Non-Hispanics (green) are 1.8 times more likely to live in high HOI census tracts.
- Hispanics (25.5%) are 1.7 times more likely to live in the lowest HOI census tracts than non-Hispanics (15.4%).

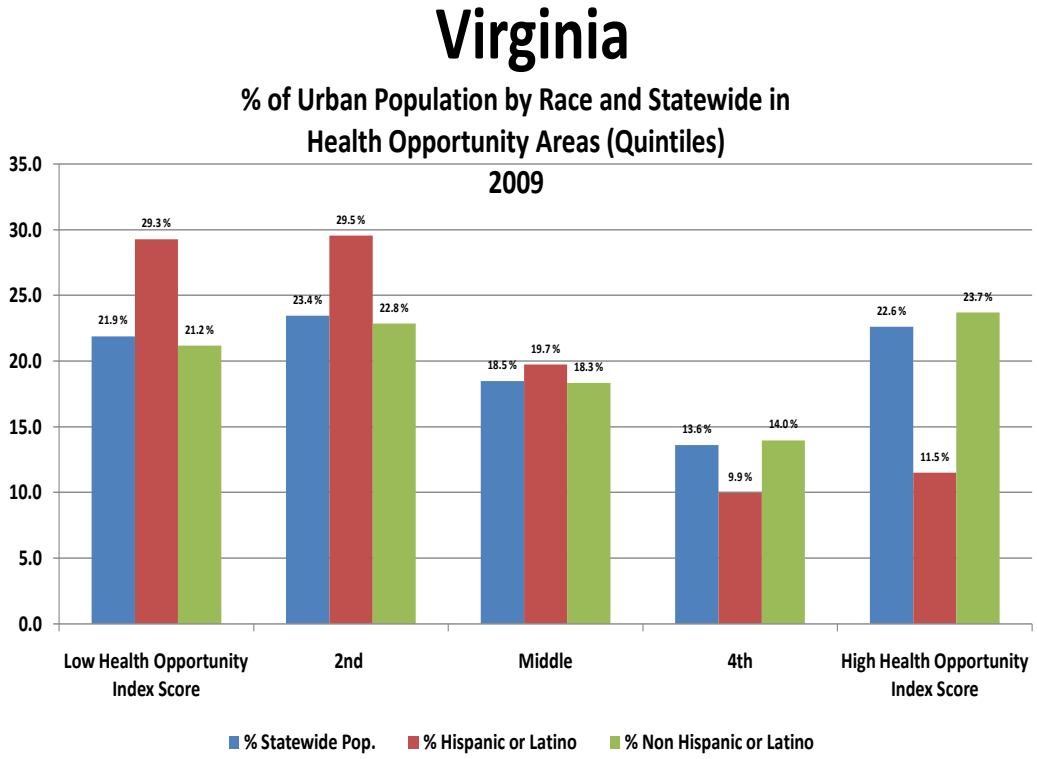


Health Opportunity Index Quintile	Statewide	% Statewide	White	% White	Black	% Black	Asian	% Asian
Low Health Opportunity Index Score	1,138,951	21.9	471,356	14.2	498,671	43.4	53,844	15.3
2nd	1,219,704	23.4	696,332	21.0	323,582	28.2	88,768	25.2
Middle	960,668	18.5	625,819	18.8	180,738	15.7	80,955	23.0
4th	707,606	13.6	543,332	16.4	79,534	6.9	47,126	13.4
High Health Opportunity Index Score	1,176,652	22.6	983,730	29.6	65,536	5.7	82,044	23.3
Total	5,203,581	100	3,320,569	100	1,148,061	100	352,737	100

Figure 5C

Figure 5C above displays how racial groups in **urban areas of Virginia** are distributed within quintiles of the HOI.

- The total urban population (blue) is fairly equally distributed in the lowest, 2nd lowest, and highest quintiles; with smaller percentages living in the middle and 4th quintiles.
- The urban White population (red) is most likely to live in the highest HOI (29.6%) and least likely to live in the lowest HOI (14.2%).
- The urban Black/African American population (green) is most likely to live in the lowest HOI (43.4%) and, as HOI increases, they are less and less likely to live in those areas. They are least likely to live in high HOI areas (5.7%).
- The urban Asian population is most likely to live in the second lowest HOI areas (25.2%), followed closely by the highest HOI areas (23.3%) and the middle HOI areas (23.0%).
- The urban Black population is 3.1 times more likely to live in the lowest HOI areas than Whites; Whites are 5.2 times more likely to live in the highest HOI areas than Blacks.
- The Asian population is 1.1 times more likely to live in low HOI areas than Whites; the White population is 1.3 times more likely to live in high HOI areas than Asians.

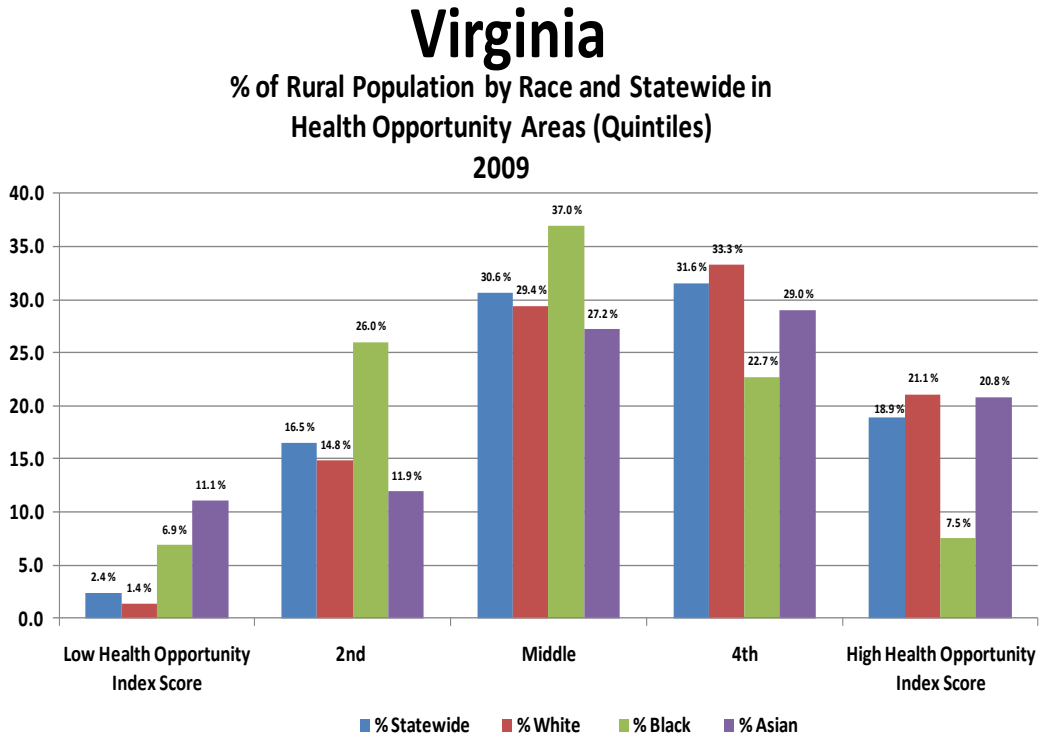


Health Opportunity Index Quintile	Statewide Pop.	% Statewide Pop.	Hispanic or Latino Pop.	% Hispanic or Latino	Non Hispanic or Latino Pop.	% Non Hispanic or Latino
Low Health Opportunity Index Score	1,138,951	21.9	135,608	29.3	1,003,343	21.2
2nd	1,219,704	23.4	136,826	29.5	1,082,878	22.8
Middle	960,668	18.5	91,349	19.7	869,319	18.3
4th	707,606	13.6	46,055	9.9	661,551	14.0
High Health Opportunity Index Score	1,176,652	22.6	53,349	11.5	1,123,303	23.7
Total	5,203,581	100	463,187	100	4,740,394	100

Figure 5D

Figure 5D shows the distribution of the **urban Hispanic/Latino** population across HOI quintiles.

- Urban Hispanics (red) are most likely to live in the two lowest HOI quintiles and less likely to live in census tracts with high HOI.
- Urban Non-Hispanics (green) are roughly equally likely to live in the lowest, 2nd lowest, and highest HOI areas.
- Urban Hispanics (29.3%) are 1.3 times more likely to live in the lowest HOI census tracts than non-Hispanics (21.9%).
- Urban non-Hispanics (23.7%) are 2.1 times more likely to live in the highest HOI areas than Hispanics (11.5%).



Health Opportunity Index Quintile	Statewide	% Statewide	White	% White	Black	% Black	Asian	% Asian
Low Health Opportunity Index Score	62,394	2.4	29,933	1.4	26,834	6.9	3,070	11.1
2nd	433,748	16.5	316,525	14.8	101,655	26.0	3,298	11.9
Middle	801,755	30.6	626,817	29.4	144,602	37.0	7,527	27.2
4th	828,148	31.6	709,467	33.3	88,712	22.7	8,030	29.0
High Health Opportunity Index Score	495,421	18.9	449,516	21.1	29,336	7.5	5,766	20.8
Total	2,621,466	100	2,132,258	100	391,139	100	27,691	100

Figure 5E

Figure 5E above displays how racial groups in **rural areas of Virginia** are distributed within quintiles of the HOI.

- The total rural population (blue) is most likely to live in the middle and 4th HOI census tracts (62.2%), with 2.4% living in the lowest HOI areas.
- The rural White population (red) is most likely to live in the 4th HOI area (33.3%) and least likely to live in the lowest HOI (1.4%)
- The rural Black/African American population (green) is most likely to live in the middle HOI (37.0%) and least likely to live in the lowest HOI areas (6.9%). They are almost as likely to live in the highest HOI areas (7.5%).
- The rural Asian population is most likely to live in the second highest HOI areas (29.0%), followed closely by the middle HOI areas (27.2%). They are least likely to live in the lowest HOI areas (11.1%).
- The rural Black population is 4.9 times more likely to live in the lowest HOI areas than Whites; Whites are 2.8 times more likely to live in the highest HOI areas than Blacks.
- The rural Asian population is 7.9 times more likely to live in low HOI area than Whites; the rural White population is almost equally as likely to live in high HOI areas as Asians

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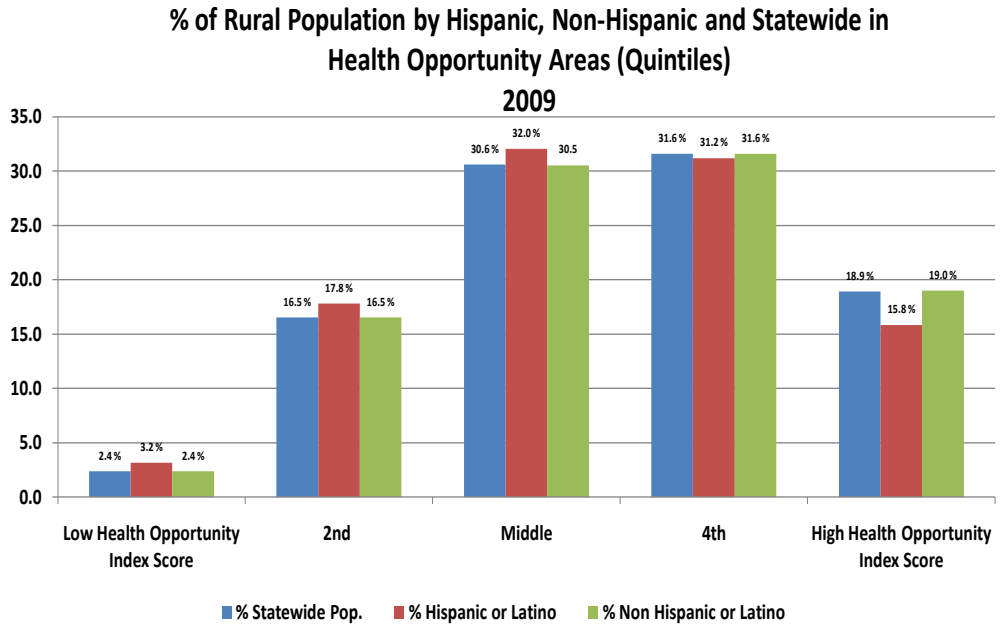
Virginia

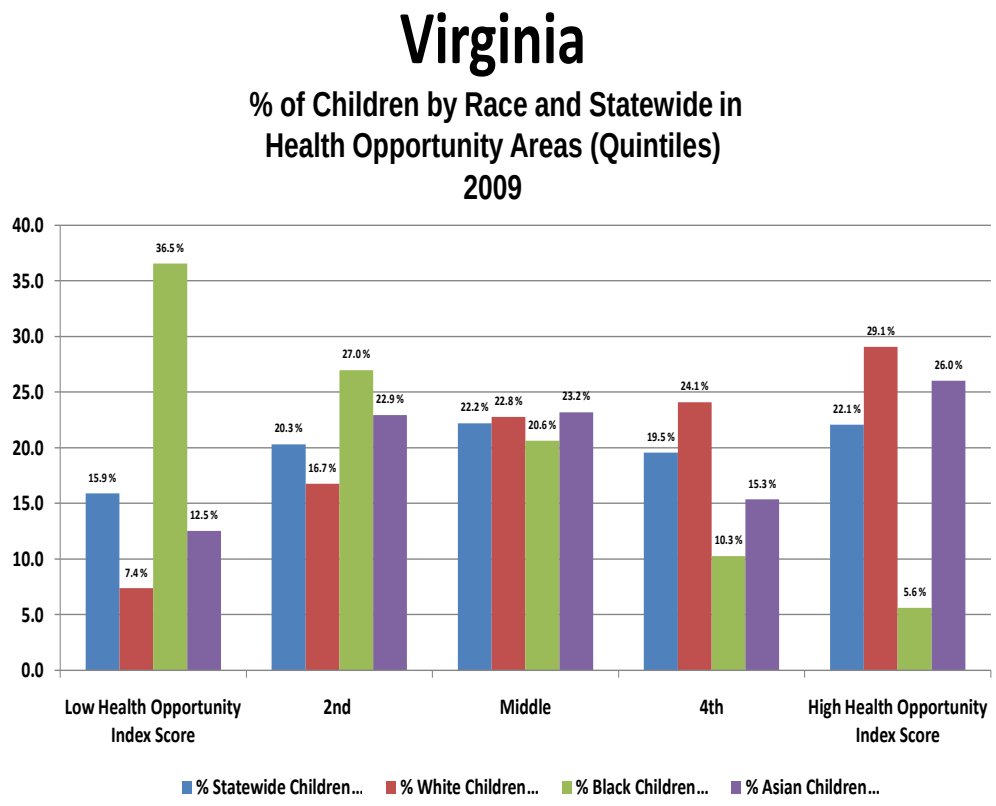


Health Opportunity Index Quintile	Statewide Pop.	% Statewide Pop.	Hispanic or Latino Pop.	% Hispanic or Latino	Non Hispanic or Latino Pop.	% Non Hispanic or Latino
Low Health Opportunity Index Score	62,394	2.4	2,437	3.2	59,957	2.4
2nd	433,748	16.5	13,728	17.8	420,020	16.5
Middle	801,755	30.6	24,718	32.0	777,037	30.5
4th	828,148	31.6	24,056	31.2	804,092	31.6
High Health Opportunity Index Score	495,421	18.9	12,226	15.8	483,195	19.0
Total	2,621,466	100	77,165	100	2,544,301	100

Figure 5F

Figure 5F shows the distribution of the **rural Hispanic/Latino** population across HOI quintiles.

- Rural Hispanics (red) are most likely to live in the middle and 2nd highest HOI quintiles (63.2%) and least likely to live in census tracts with the lowest HOI (3.2%).
- Rural Non-Hispanics (green) are most likely to live in the middle and 2nd highest HOI quintiles (62.1%) and least likely to live in census tracts with the lowest HOI (2.4%).
- Rural Hispanics (3.2%) are 1.3 times more likely to live in the lowest HOI census tracts than rural non-Hispanics (2.4%).
- Rural non-Hispanics (19.0%) are 1.2 times more likely to live in the highest HOI census tracts than rural Hispanics (15.8%).



Health Opportunity Index Quintile	Statewide Children 0~17 Yrs.	% Statewide Children	White Children 0~17 Yrs.	% White Children 0~17 Yrs.	Black Children 0~17 Yrs.	% Black Children 0~17 Yrs.	% Asians 0~17	% Asian Children 0~17 Yrs.
Low Health Opportunity Index Score	292,136	15.9	85,037	7.4	157,230	36.5	11,335	12.5
2nd	373,603	20.3	193,487	16.7	116,102	27.0	20,780	22.9
Middle	408,531	22.2	263,114	22.8	88,692	20.6	21,003	23.2
4th	359,589	19.5	278,282	24.1	44,143	10.3	13,893	15.3
High Health Opportunity Index Score	406,327	22.1	335,869	29.1	24,093	5.6	23,561	26.0
Total	1,840,186	100	1,155,789	100	430,260	100	90,572	100

Figure 5G

Figure 5G above looks at how **children** are divided with the five HOI into five groups in Virginia from lowest score to highest (quintiles). Each group is then broken down by race (White, Black, and Asian).

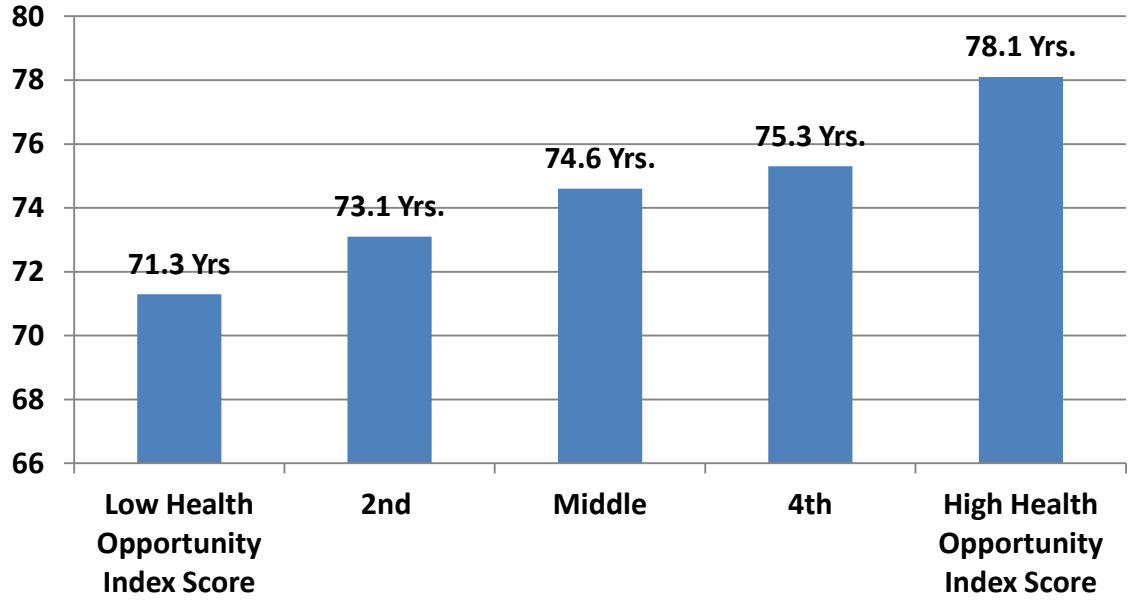
- The total population (blue) of children in Virginia is least likely to live in the lowest HOI areas (15.9%) and most likely to live in the middle and highest HOI areas (44.3%)
- White children (red) are least likely to live in areas with low HOI (7.4%) and most likely to live in areas with high HOI (29.1%).
- Black/African American children (green) are most likely to live in areas with low HOI (36.5%) and least likely to live in areas with high HOI (5.6%)
- Asian children (blue) are most likely to live in areas with the highest HOI (26.0%) and least likely to live in areas with the lowest HOI (12.5%).
- Black children are 4.9 times more likely to live in census tracts with low HOI than White children. White children are 5.2 times more likely to live in areas with high HOI than Black children.
- Asian children are 1.7 times more likely to live in census tracts with low HOI than White children. White children are 1.1 times more likely to live in high HOI areas than Asian children.

The Health Opportunity Index and Life Expectancy in Virginia

Figure 6A shows the breakdown of the HOI into five categories (quintiles) in Virginia from the 20% of the population with the lowest HOI score, up through the 20% of the population with the highest HOI score. The life expectancy for each portion of the population is shown. As is clearly evident, Virginians living in census tracts with the lowest HOI have the lowest average life expectancy. Each successively higher HOI score is associated with a higher average life expectancy. The 20% of Virginians living in census tracts with the highest HOI have the highest average life expectancy of all.

Virginia

Figure 6A. Life Expectancy at Birth by Health Opportunity Areas (Quintiles)
2005~2009

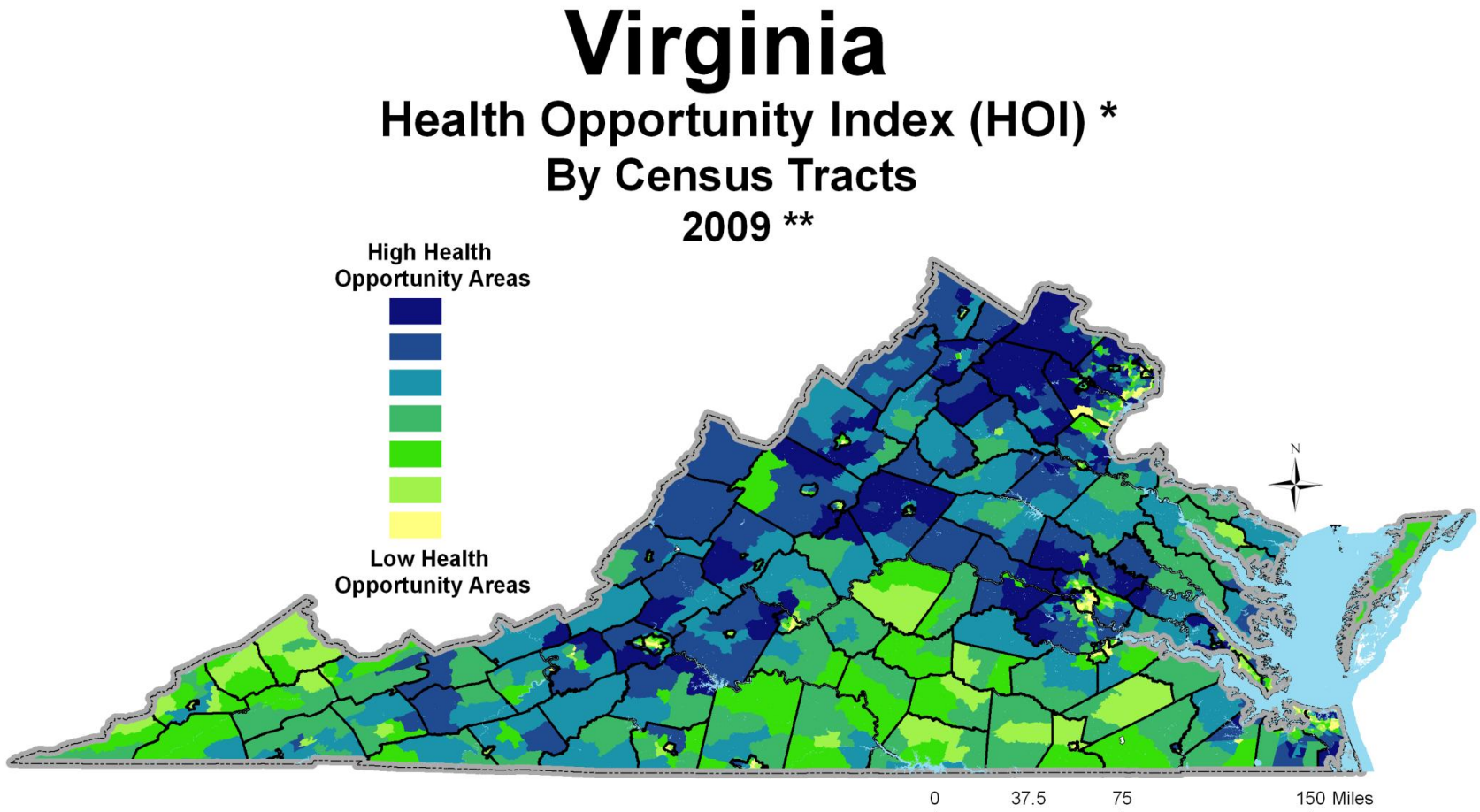


GIS Mapping of the Health Opportunity Index and Life Expectancy

The following maps geographically display the distribution of HOI at the census tract level across the Commonwealth and its association with life expectancy. As described previously, the HOI provides an indicator of the opportunities that are available for local residents to be healthy. The HOI identifies critical social determinants of health that may be amenable to intervention through state and local legislative policy and community collaboration to build on assets present within and among communities. It is reasonable to conclude that long term efforts to enhance aspects of the HOI that are deficient in geographic areas with low life expectancy can support improved long term health outcomes.

The maps are color coded in shades from yellow to blue. The yellow end of the spectrum represents lower life expectancy or lower score for the HOI (i.e. less opportunity). The blue end of the spectrum represents higher life expectancy or higher score on the HOI (i.e. more opportunity). The yellow end of the spectrum on the maps showing the association between the HOI and life expectancy represents no positive association; the blue end of the spectrum of the maps represents a strongly positive association (i.e. high HOI is associated with high life expectancy; or low HOI is associated with low life expectancy).

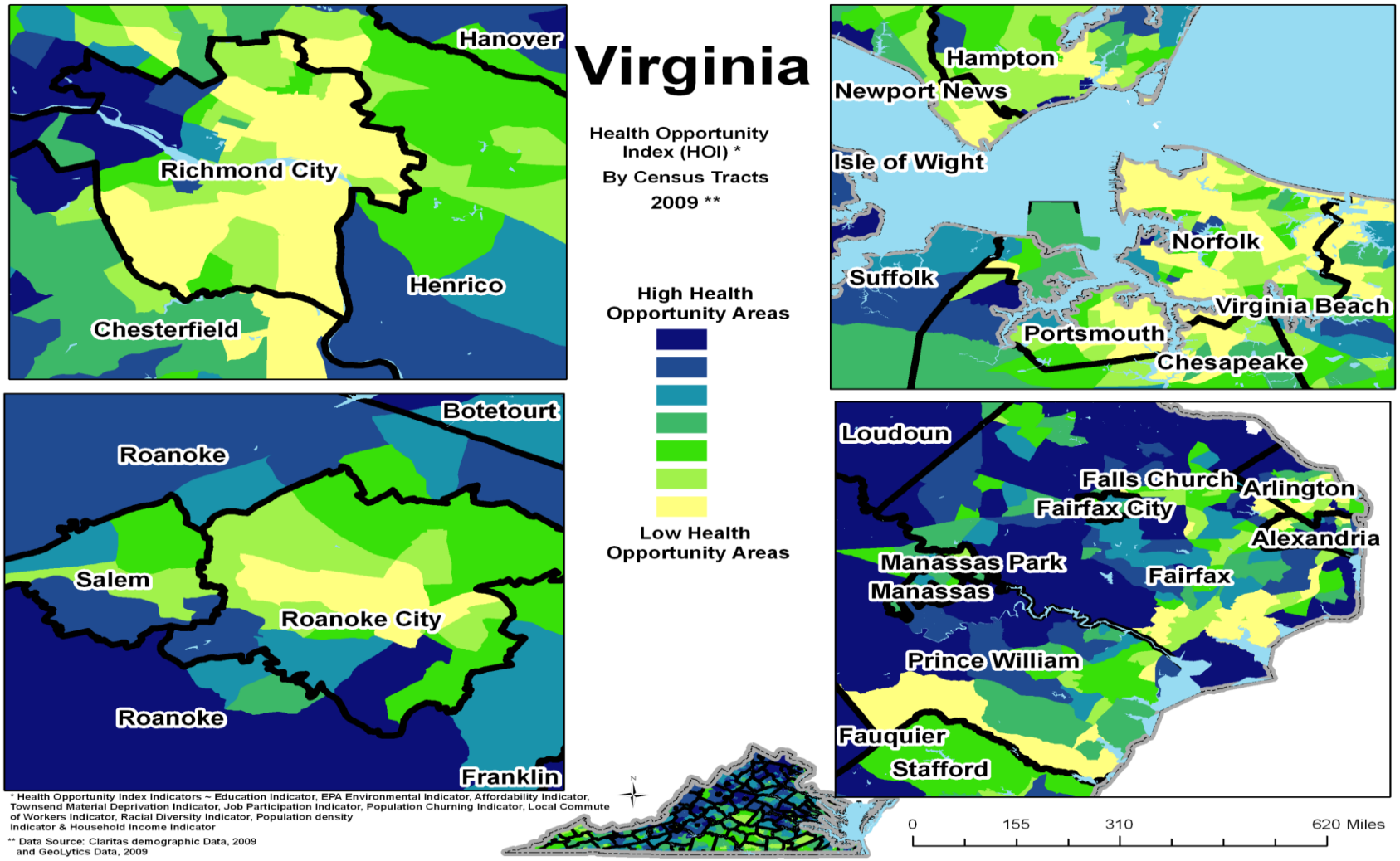
(Map 1) The map shows the distribution of the composite Health Opportunity Index (HOI), containing all 10 of the indicators, across Virginia. **The darker color areas are indicated to have high health opportunity while, the yellow color areas have low health opportunity.** Higher health opportunity is found in northern Virginia, extending to part of Prince William area, and the Northern Shenandoah Valley. Areas of Hampton Roads, Southside, Southwest & Northern Neck, are also characterized by low health opportunity.



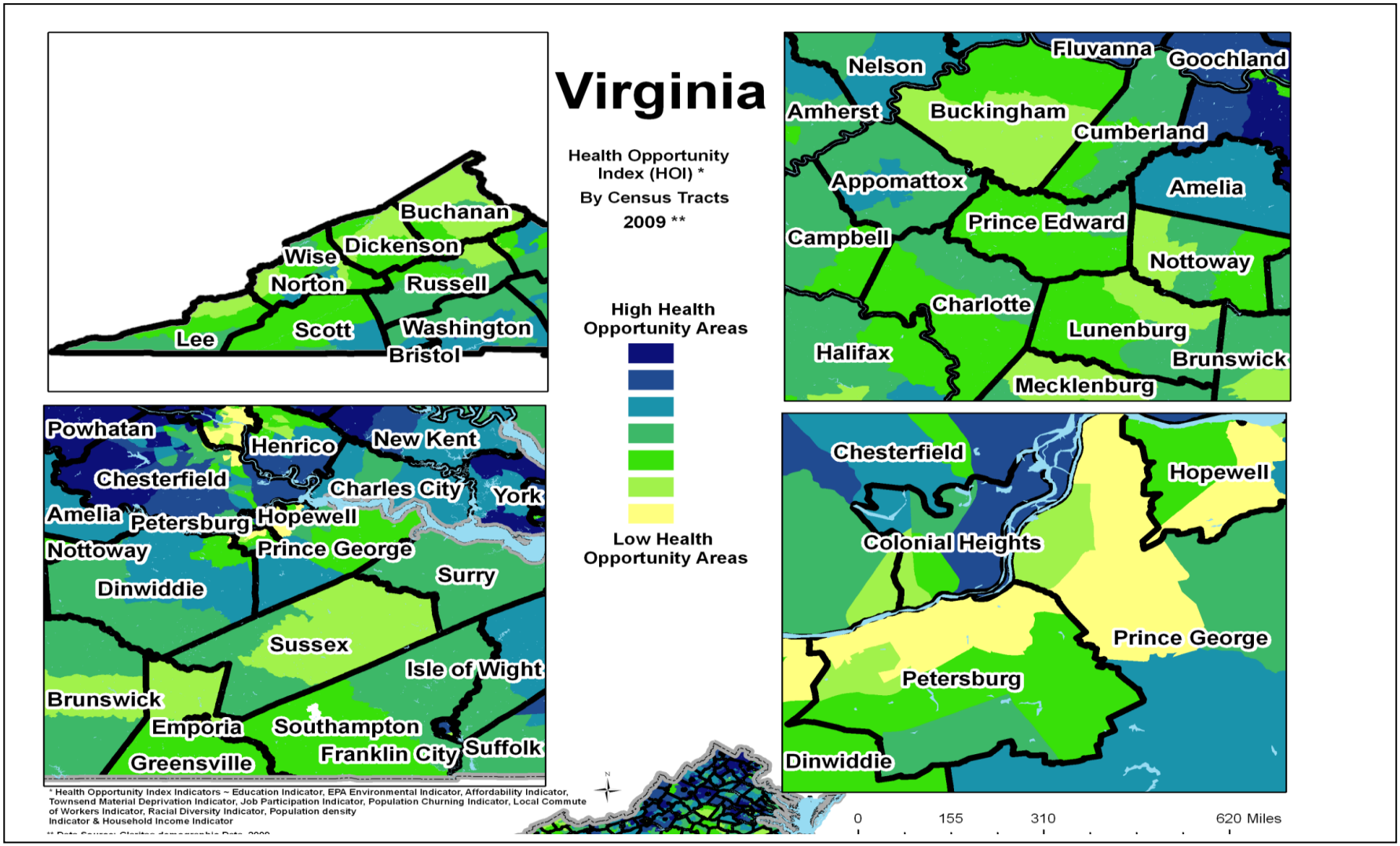
* Health Opportunity Index Indicators ~ Education Indicator, EPA Environmental Indicator, Affordability Indicator, Townsend Material Deprivation Indicator, Job Participation Indicator, Population Churning Indicator, Local Commute of Workers Indicator, Racial Diversity Indicator, Population density Indicator & Household Income Indicator

** Data Source: Claritas demographic Data, 2009 and GeoLytics Data, 2009

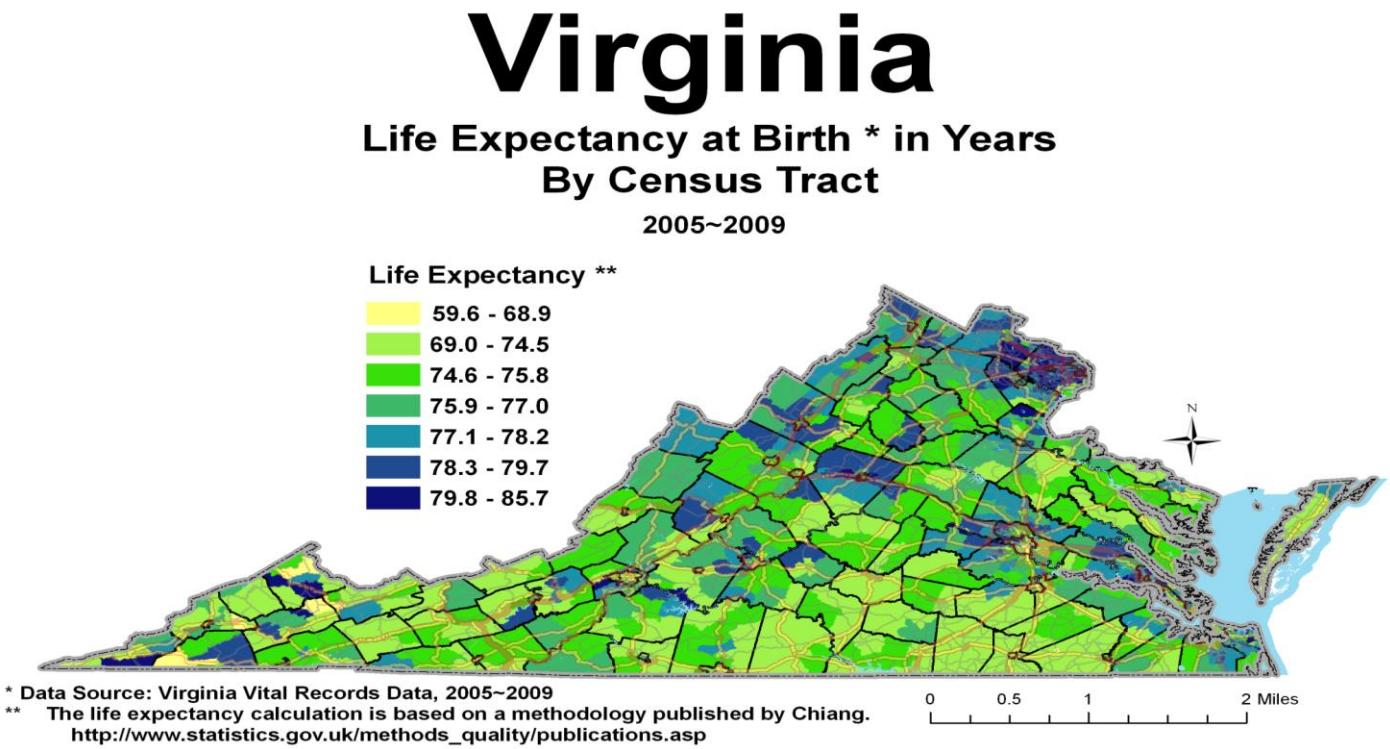
(Map 2) This shows the Richmond metro area (upper left corner), Hampton Roads area (upper right corner), Roanoke metro (lower left corner) and Northern Virginia (lower right corner). **The darker color areas are indicated to have high health opportunity while, the yellow color areas have low health opportunity.** Again on closer inspection, significant clusters of census tracts with low health opportunity exist across Richmond, Hampton Roads, and Roanoke. While Northern Virginia is primarily characterized by higher health opportunity, multiple census tracts of low health opportunity can be seen in Fairfax, Prince William, Arlington and Alexandria.



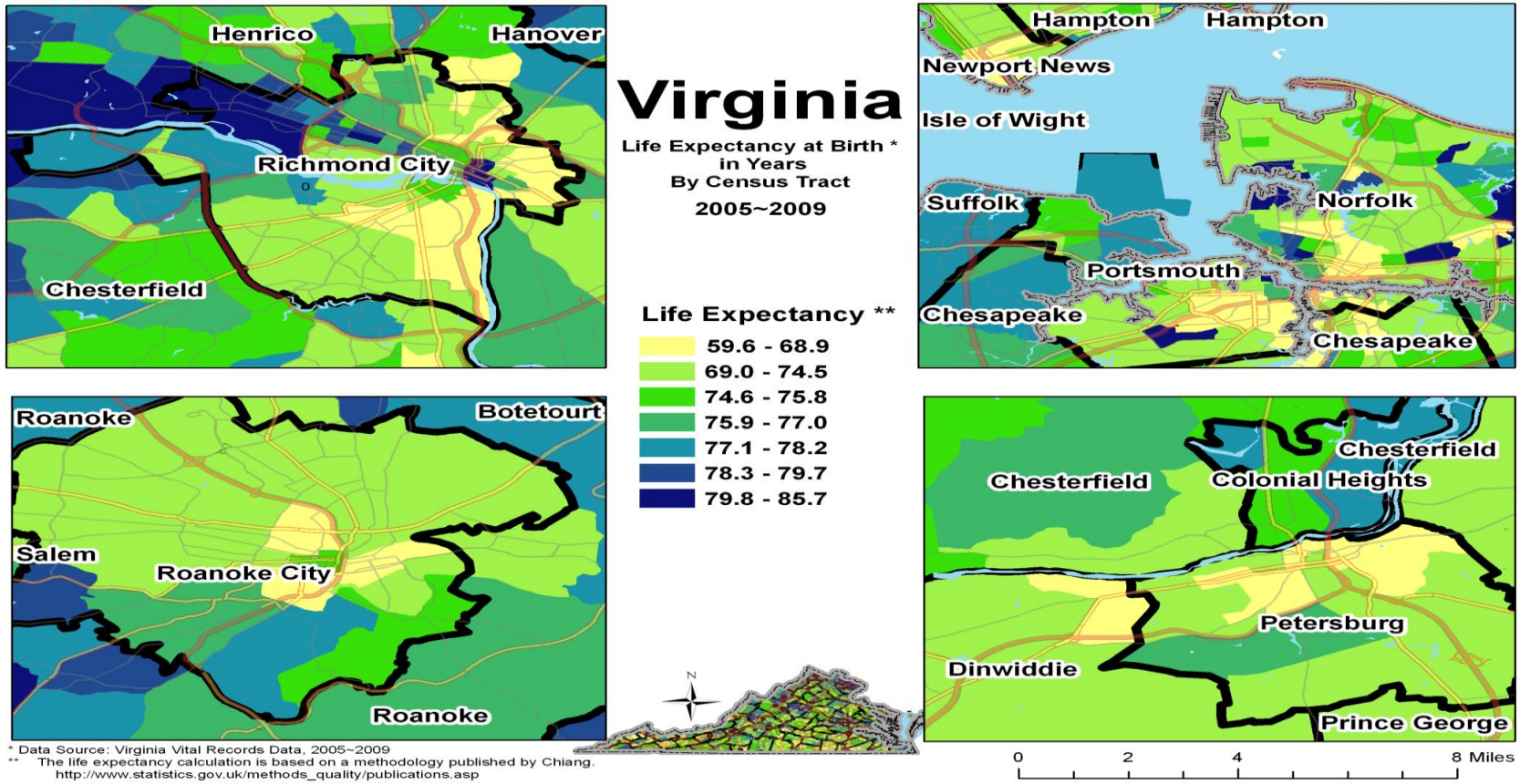
(Map 3) This map shows the Southwest Virginia (upper left corner), Southside Virginia (upper right corner), Emporia~Greensville area (lower left corner) and Colonial Heights~Petersburg (lower right corner).**The darker color areas have high health opportunity while, the yellow color areas have low health opportunity.** These close ups of Southside and Southwest Virginia identify census tracts in multiple counties and the city of Petersburg with lower health opportunity.



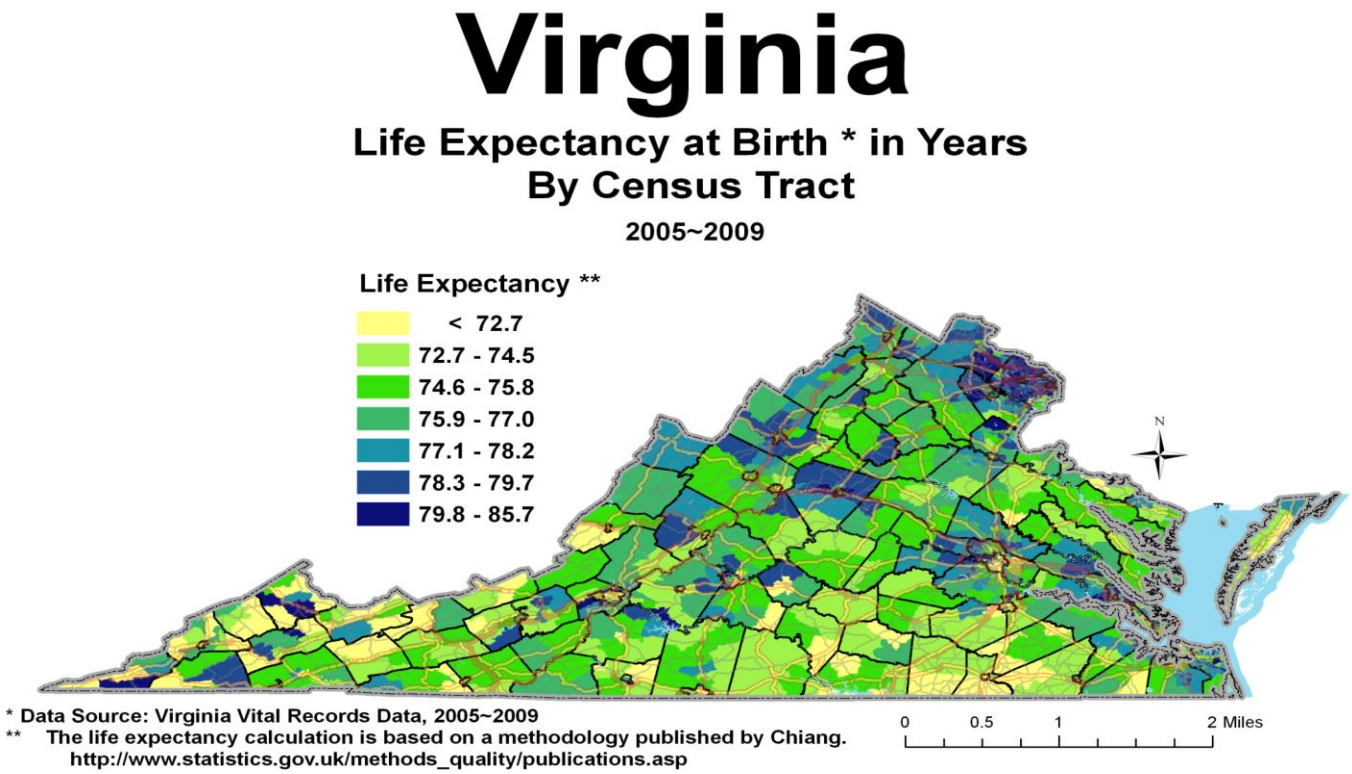
(Map 4) This map shows life expectancy at birth by census tract. It is an average number of years that a person can expect to live after birth. The yellow color areas indicate that a person born in these census tracts is expected to live as few as 59.6 years, which is over 19 years below the state average and 26 years below the maximum life expectancy in Virginia. Meanwhile the darker color area indicates that persons born in these areas are expected to live up to 79.8 to 85.7 years before they die. These areas have life expectancy above the state average. The highest live expectancy occurs in Northern Virginia, some parts of Central Virginia, Hampton Roads, and a few scattered census tracts in Southwest Virginia. Low life expectancy stretches across Southside, Southwest, Eastern Shore, Northern Neck and between Northern Virginia and Richmond. Several census tracts with the lowest life expectancy, as low as 59.6 years, are seen in Southwest Virginia.



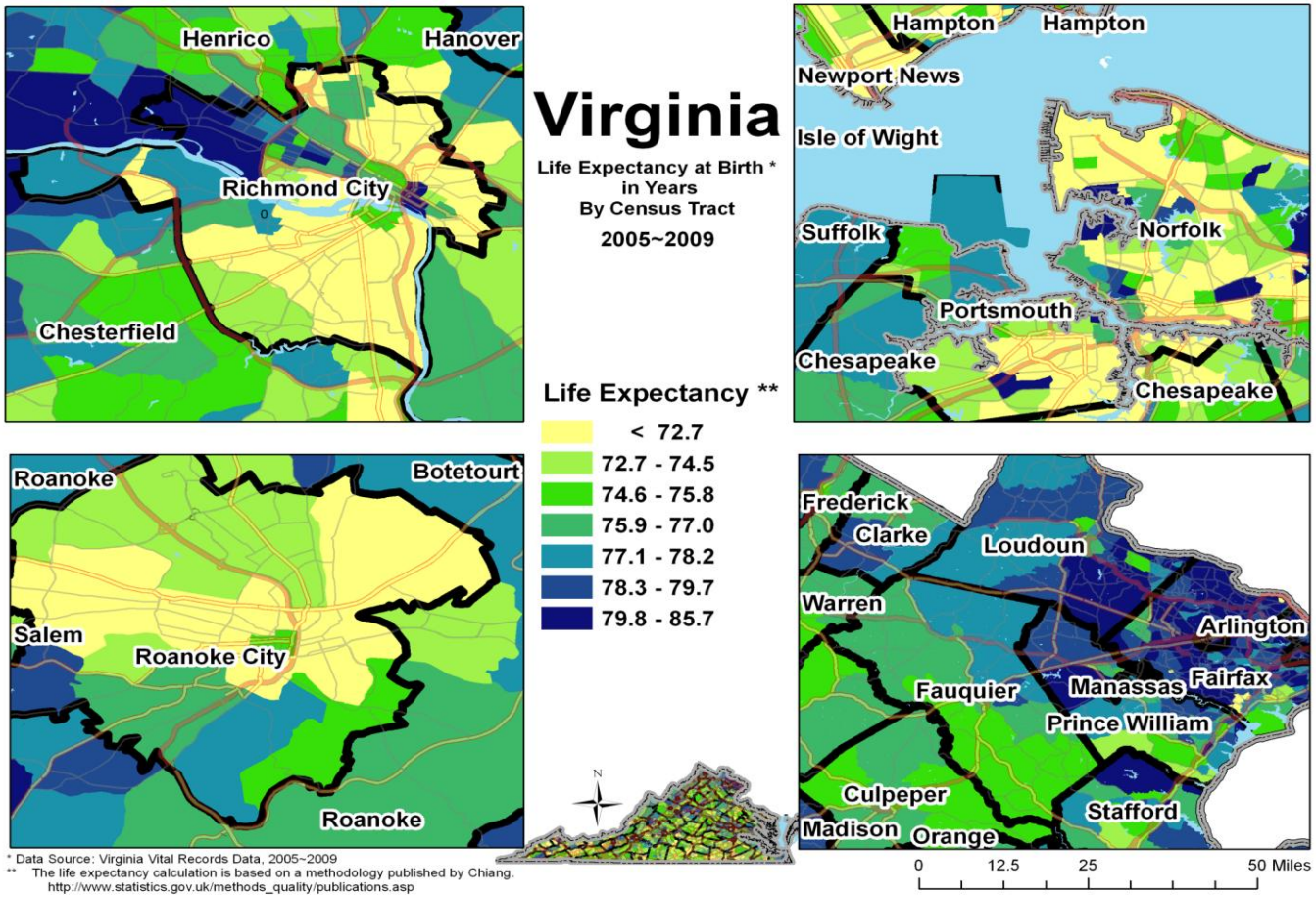
(Map 5) This map shows the Richmond metro (upper left corner), Hampton Roads (upper right corner), Roanoke (lower left corner) and Colonial Heights~Petersburg (lower right corner).This map also shows life expectancy at birth by census tract. The yellow color areas indicate that a person born in these census tracts is expected to live as much as 19 years below the state average and 26 years less than the maximum life expectancy in Virginia. Meanwhile, the darker color areas indicate that persons born in these areas are expected to live up to 79.8 to 85.7 years before they die. These areas have life expectancy above the state average. Upon closer inspection, the shortest life expectancy, as low as 59.6 years clusters in inner city areas of Hampton Roads, Petersburg, Richmond, and Roanoke.



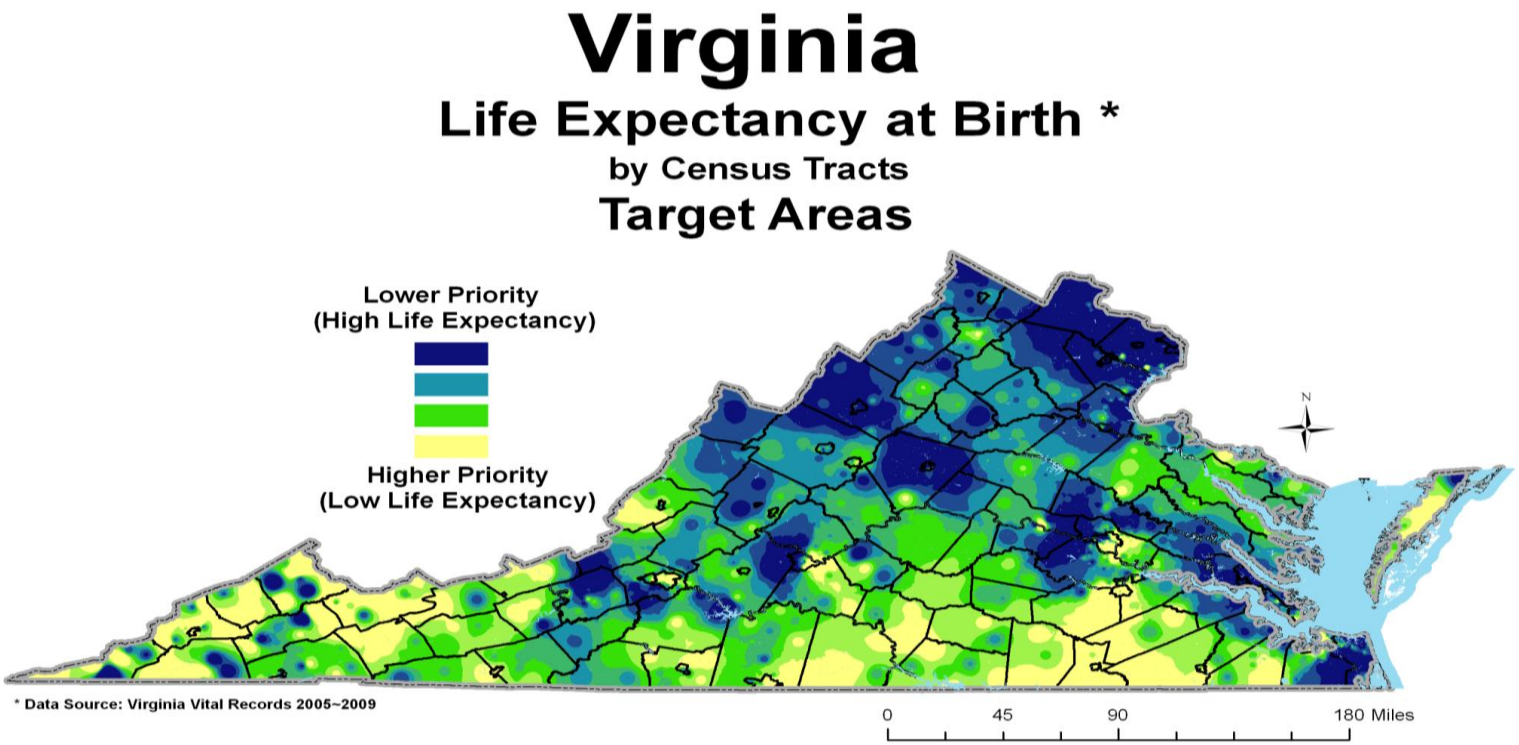
(Map 6) This map shows life expectancy at birth by census tract. It is an average number of years that a person can expect to live after birth. The yellow color areas indicate that a person born in those areas is expected to live less than 72.7 years. Meanwhile, the darker color areas indicate that persons born in these areas are expected to live up to 79.8 to 85.7 years before they die. These areas have life expectancy above the state average. Throughout the remainder of the report, comparisons to the HOI use this range of life expectancy (<72.7 to 85.7). This range of life expectancy, allows one to more clearly see areas with lower life expectancy. Again, those areas can be found across Southside, Southwest, and the Eastern Shore.



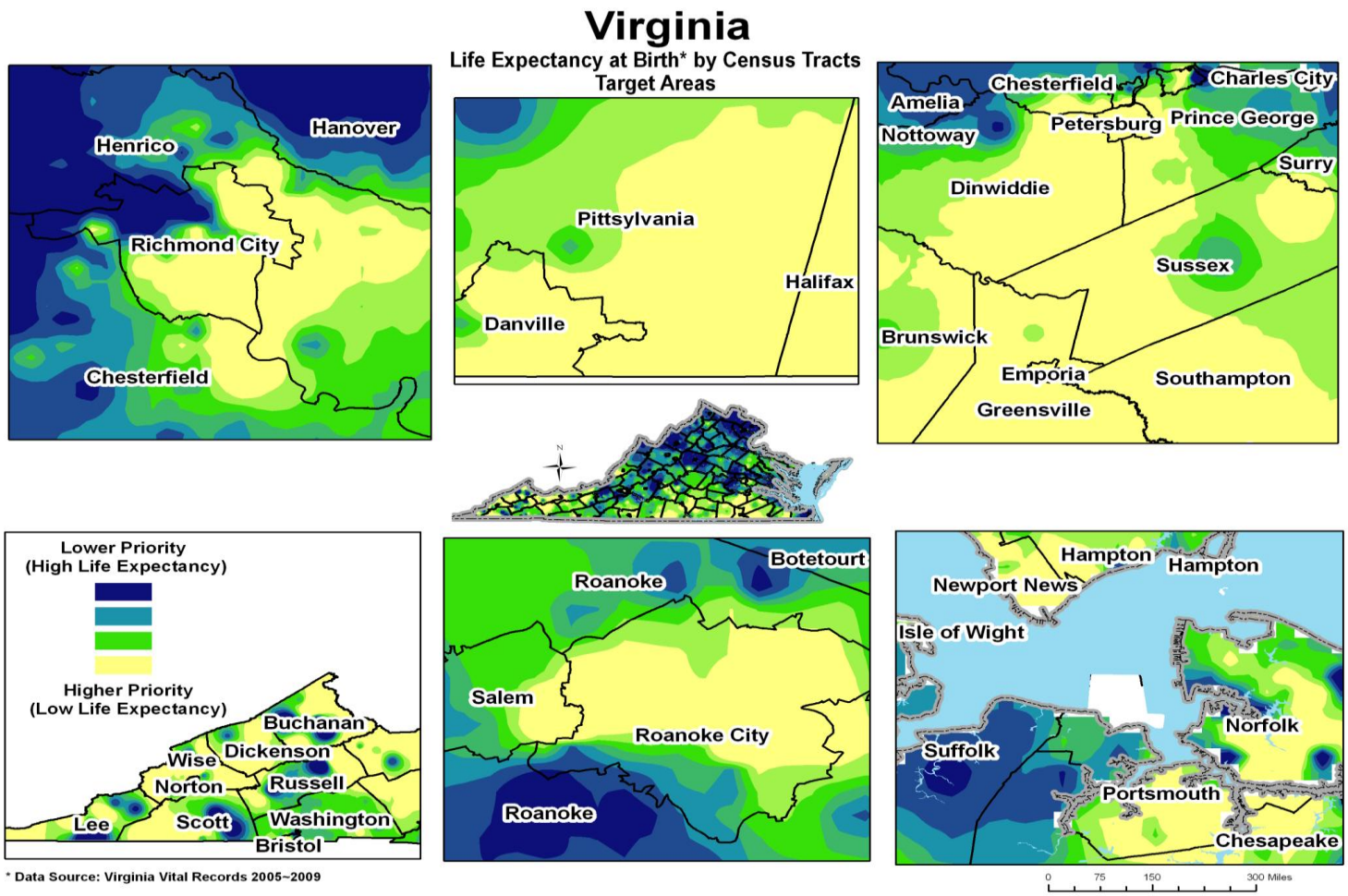
(Map 7) This map shows the Richmond metro area (upper left corner), Hampton Roads area (upper right corner), Roanoke metro (lower left corner) and Northern Virginia (lower right corner). This map shows life expectancy at birth by census tract. A person born in yellow colored areas is expected to live less than 72.7 years. Meanwhile, the darker color areas indicate that persons born in these areas are expected to live up to 79.8 to 85.7 years before they die. These areas have life expectancy above the state average. This map shows clustering of census tracts with low life expectancy in Hampton Roads, Richmond and Roanoke. Northern Virginia is primarily characterized by census tracts with high life expectancy, although some areas of green and yellow are also present, indicating neighborhoods where this outcome is lower.



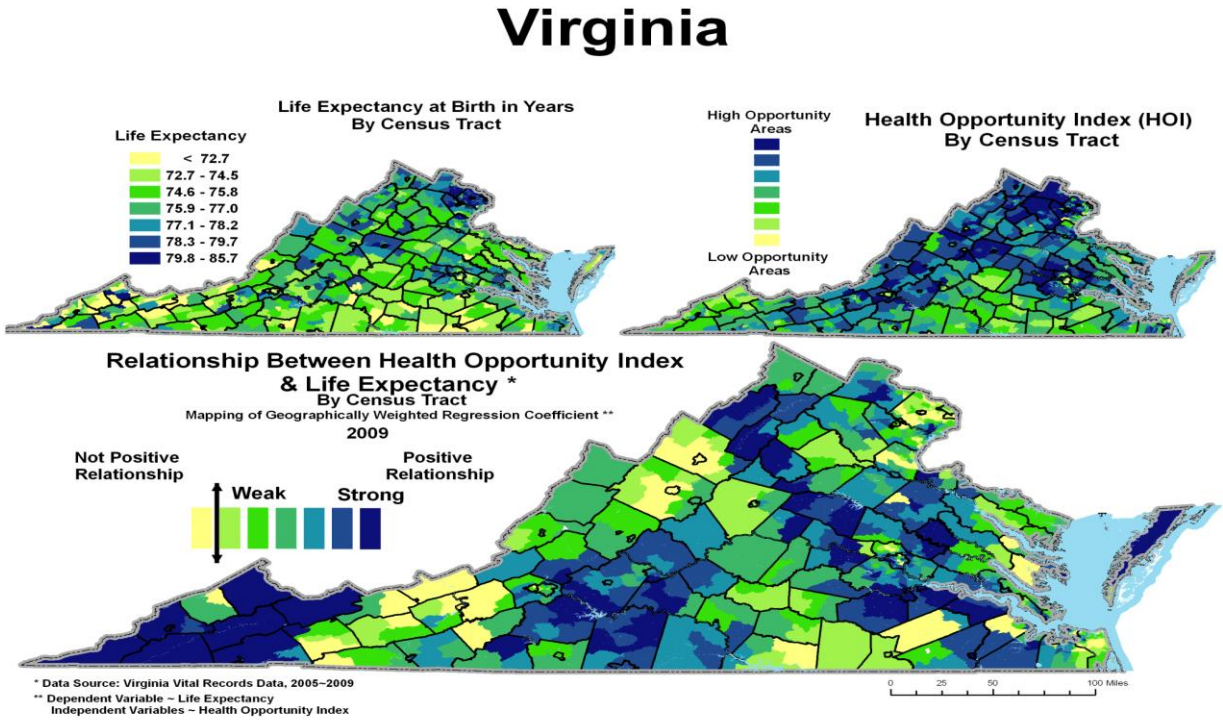
(Map 8) This map identifies high priority target areas for improving life expectancy using a clustering method to cross jurisdictional or census tract boundaries. Yellow areas are considered high priority target areas based on short life expectancy.



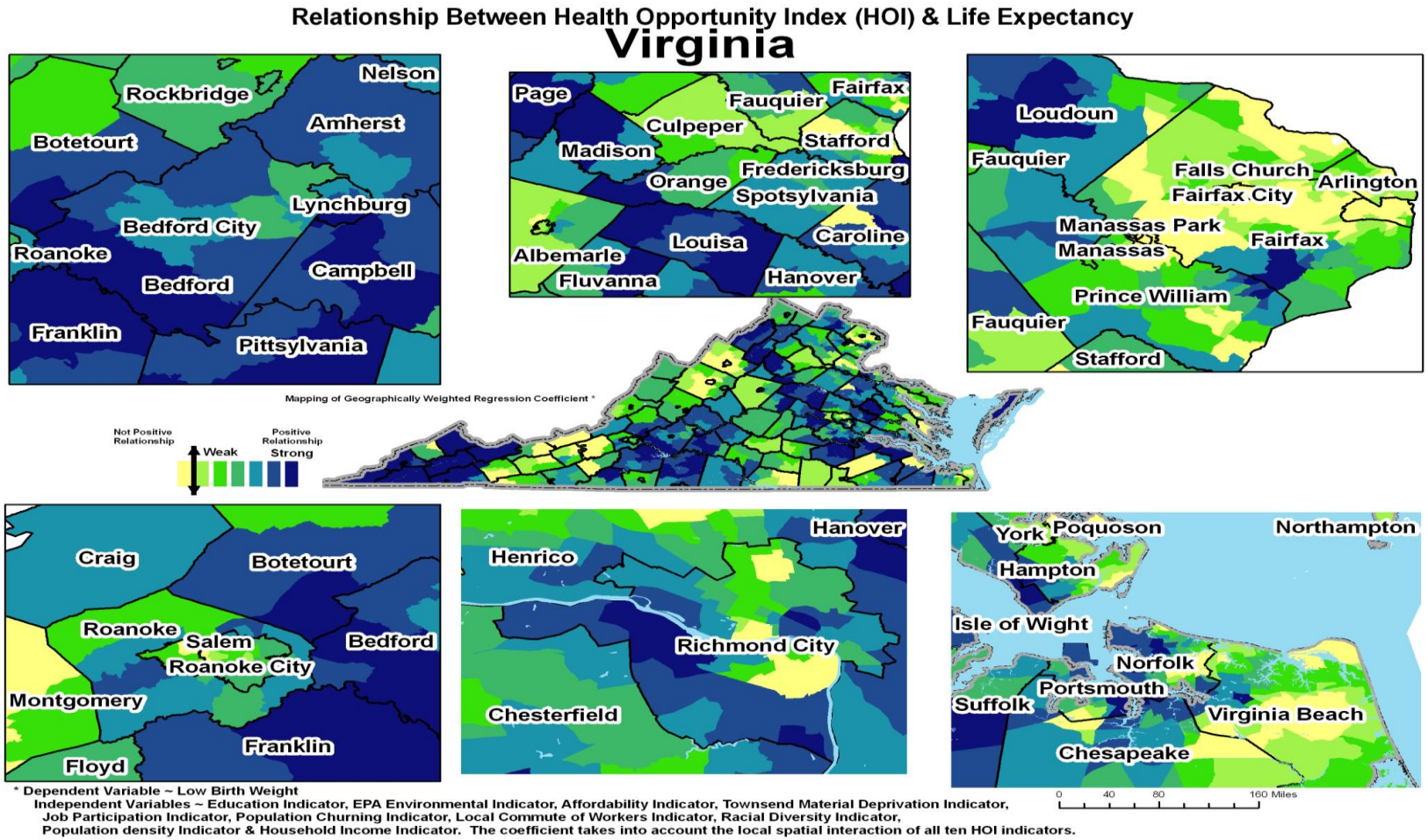
(Map 9) This map shows that the spatial distribution of high priority target areas to improve life expectancy varies. The high density of low life expectancy in Richmond City, Danville, Petersburg and Southside, Roanoke, and Hampton Roads, can easily be seen on the map below. There are also areas that are noted for low HOI scores.



(Map 10) This map allows one to simultaneously identify the life expectancy within census tracts (upper left), the distribution of the health opportunity index (upper right), and the association between HOI and life expectancy (lower). The base map shows the relationship between the composite HOI and life expectancy. Darker areas have a strong positive relationship with HOI (high HOI is associated with high life expectancy; low HOI is associated with low life expectancy). Lighter areas have a weaker relationship between HOI and life expectancy. Yellow areas indicate that HOI has little impact on life expectancy. The map on the bottom shows the strength of the association between the health opportunity index and life expectancy across census tracts. The strongest relationships exist in Southwest Virginia; Western Southside Virginia; and a long stretch of census tracts from Northwest Virginia, through Central Virginia, into the Petersburg area, and to parts of Hampton Roads. There is also a strong association on the Eastern Shore. While other areas of the Commonwealth do not show as strong an association between the HOI and life expectancy, there is still a positive association in all areas except those that are yellow. This means the HOI helps explain life expectancy throughout Virginia except in some census tracts in Southwest Virginia, a few in Northwest, and scattered census tracts in the remainder of the state.



(Map 11) This map shows the association between life expectancy and HOI. The dark areas show a positive relationship while the yellow areas show no positive relationship.



Results of Health Opportunity Index and Life Expectancy

Several key findings emerge from the HOI and life expectancy analysis. The HOI is strongly distributed by race and ethnicity, with African Americans and Latinos being the least likely to live in census tracts with high opportunity to be healthy. Whites and Non-Hispanics are most likely to live in census tracts with high opportunity to be healthy. Asians are more likely to live in low opportunity areas than Whites, but almost as likely to live in high opportunity areas. Children of color are also significantly more likely to live in low opportunity areas than White children, who are most likely to live in areas of high opportunity.

The distribution of health opportunity differs in urban and rural areas. In urban areas, Blacks and Hispanics are much more concentrated in low opportunity areas than they are in rural areas, although in both regions they are least likely to live in high opportunity census tracts. Across rural and urban areas, Whites are most likely to live in high opportunity areas and least likely to live in low opportunity areas. At the same time, it is important to remember that there are many White Virginias who live in poverty and low health opportunity areas. In particular, rural Virginia, where the population is more likely to be White, has higher poverty rates than urban Virginia and a significant concentration of census tracts with limited health opportunities. This is especially apparent in southwest Virginia.

When comparing the quintiles of the HOI, there is a consistent increase in life expectancy from the lowest quintile (i.e. lowest 20%) to each successively higher quintile. The highest life expectancy is in the 20% of census tracts with the highest health opportunity. In light of the consistent relationship between HOI and life expectancy; and the dramatic racial differences in health opportunity, the 3-5 year difference in life expectancy between White and Black Virginians is not surprising.

There is an even more dramatic difference in life expectancy across census tracts than between races. The maps of life expectancy and HOI provide a geographic picture of how life expectancy differs dramatically across Virginia. S**ome areas in inner city and rural Virginia experience an average life span of up to 19 years below the state average (59.6 years compared to 78.5 years) and 26 years below areas with the maximum life span in the state (59.6 years compared to 85.7 years).** Not surprisingly, health opportunity is distributed in a manner very similar to that of life expectancy.

Health Opportunity Index Conclusions

While race and poverty explain over 70% of the variation in life expectancy across Virginia, the HOI explains 87% of the variation in life expectancy at the state level. The HOI includes key socioeconomic, demographic, and environmental processes that explain how race and class (and geography) influence health outcomes. **In effect the HOI helps answer the question 'how do race and poverty (and geography) act to influence life expectancy?**'

This makes the HOI useful as a guide for developing policies at the state level that influence the characteristic of the HOI indicators across Virginia. In addition, the HOI can assist state level policy makers and agencies in focusing funding and other resources in areas of Virginia where the HOI indicators they have influence over are deficient (e.g. the Virginia Department of

Education can influence educational attainment; the Virginia Department of Housing and Community Development can influence housing affordability and quality within communities).

Not only is the HOI beneficial at the state level, it also benefits local communities. Each community can use this information to determine the life expectancy in different neighborhoods and how it is associated with the indicators in the HOI. In collaboration with local and state partners, they can develop a better understanding of these and other factors that may be influencing health outcomes and develop a range of policies, programs, and interventions to promote health for all.

In general, the HOI is positively associated with life expectancy throughout Virginia, although to varying degrees. The stronger the relationship, the more likely this index is related to life expectancy in the census tract(s) of interest. A weak relationship may suggest that other indicators may be of greater importance. It may also suggest the need for further investigation with community partners to determine why an indicator is not associated with life expectancy when you would otherwise expect it to be. In fact, such indicators may be success stories in which the community has been able to achieve a better life expectancy than the HOI would indicate. In such situations, it is important for the community to attempt to understand what the successes are so they can be enhanced and shared with other communities.

It is important to remember that while the HOI contains several indicators known to be strongly associated with health outcomes, there are other SDOH indicators in neighborhoods that are not included, but which also influence health outcomes. Many are not included because appropriate data was not available or could not be easily integrated into the HOI. These include access to affordable and healthy foods, the persistence of poverty across generations, family structure, direct measures of social capital and support, crime, and incarceration. These and other SDOH should be considered as strategies are developed to promote health equity. Future iterations of the HOI will likely include additional indicators and variables as they become available in formats consistent with our methodology.

The appendix contains maps for each indicator within the HOI and its association with life expectancy. To use these maps:

1. First identify the life expectancy for the census tract(s) of interest;
2. Then use the map for the HOI indicator to determine the score (color) for the degree to which the indicator is present or absent;
3. Then use the map showing the association (color) between the indicator and life expectancy to determine how strong the relationship is.

Spotlight on Priority Health Disparities/Inequities-HIV/AIDS

HIV DISEASE

Infection with human immune deficiency virus (HIV) can lead to AIDS, a condition in humans in which the immune system begins to fail, leading to life-threatening opportunistic infections. HIV is transmitted mainly via unprotected sexual relations with an infected person, sharing contaminated needles, contaminated blood and blood products, perinatally from an infected mother to her infant or via breastfeeding through breast milk. There are other modes of transmission described in literature, however the number of cases documented is extremely small.

HIV damages the immune system of the infected person by destroying CD4+ T cells, without which the body is defenseless against various infectious diseases. AIDS is the late stage of HIV infection, when a person's immune system is severely damaged and has difficulty fighting diseases and some types of cancers.

People living with HIV may look and feel healthy for several years before symptoms related to immunodeficiency appear. Early identification and treatment are essential in delaying the onset of AIDS, limiting the damage done by HIV to the immune system, and limiting HIV transmission to uninfected individuals. Other diseases such as cardiovascular, kidney and liver disease, as well as cancers, are linked to untreated early HIV infection. An early diagnosis also means that people can be referred to services that can help them cope with their diagnosis and reduce additional risk behaviors.

The term "HIV disease" refers to persons who have a confirmed infection with the human immunodeficiency virus (HIV). This includes all stages of the disease, from infection to development of AIDS. Therefore, a new diagnosis of HIV disease does not necessarily mean that the disease is in its early stages, just that the person has been identified for the first time as being HIV positive regardless of the stage of the disease.

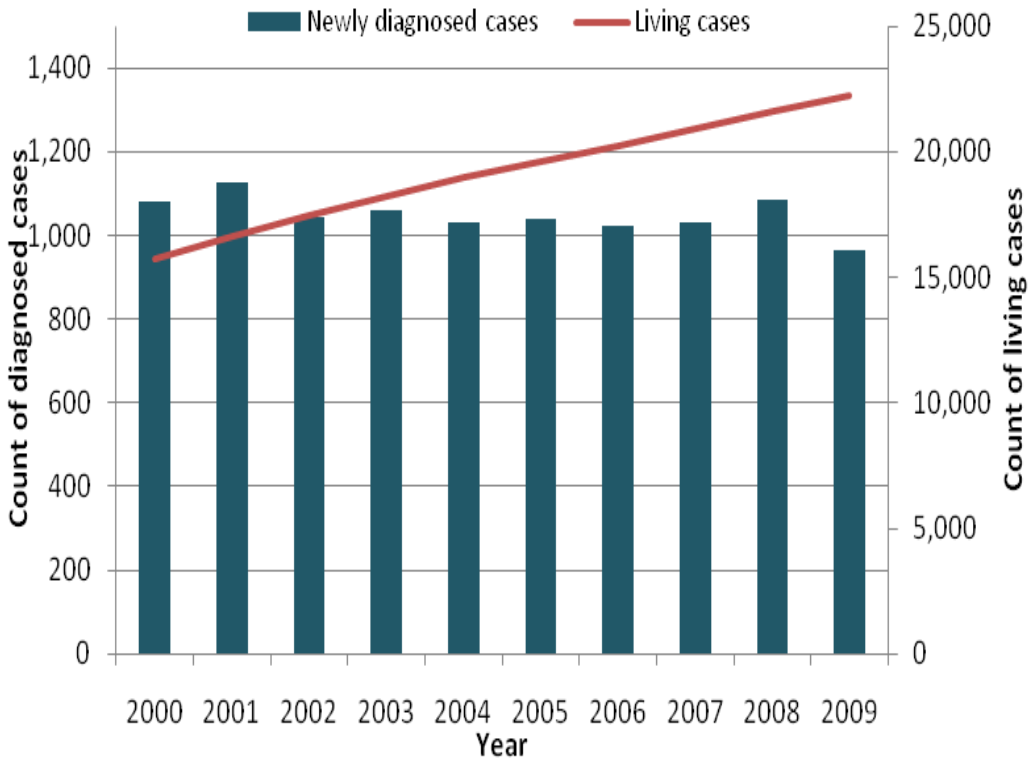
Background

Based on Centers for Disease Control and Prevention (CDC) estimates, about 56,000 people in the United States contracted HIV in 2006, and about 1,220 of those new infections occurred in Virginia. About 21,000 Virginians are known to be living with HIV/AIDS as of 2009. This represents a continual increase over time, as people are living longer with the disease due to treatment with antiretroviral drugs introduced in the early 1990's. In contrast, the number of newly diagnosed HIV disease cases in Virginia remained relatively stable over time. A drop in the count of new HIV disease diagnoses occurred in 2009, however data for subsequent years is needed in order to assess whether this is an anomaly or the beginning of a true reduction in the number of new HIV disease diagnoses.

Men are disproportionately affected by HIV in Virginia and nationwide. Between 2005 and 2009 in Virginia, the average rate of HIV disease diagnoses was 20 in 100,000 among men compared

to seven per 100,000 among women. Men accounted for 74% of the total diagnosed cases of HIV during the five year period.

Figure 7A: New HIV Disease Diagnoses and Persons Living with HIV Disease in Virginia, 2009



Minorities are also disproportionately affected. African-American persons comprise only 20% of Virginia's population; however, they represent nearly two out of three new cases of HIV disease. African-American females were 22 times more likely to be diagnosed than White females and African-American males 7 times more likely as compared to White males. Hispanics accounted for 9% of the total diagnosed cases in 2009 and were three times more likely to be diagnosed than their White counterparts. When assessing the age distribution, younger men 20-24 years old have the highest rate of HIV disease diagnosis among all age groups.

Figure 7B: Impact of Racial Health Disparities on HIV Disease Diagnoses in Virginia, 2009

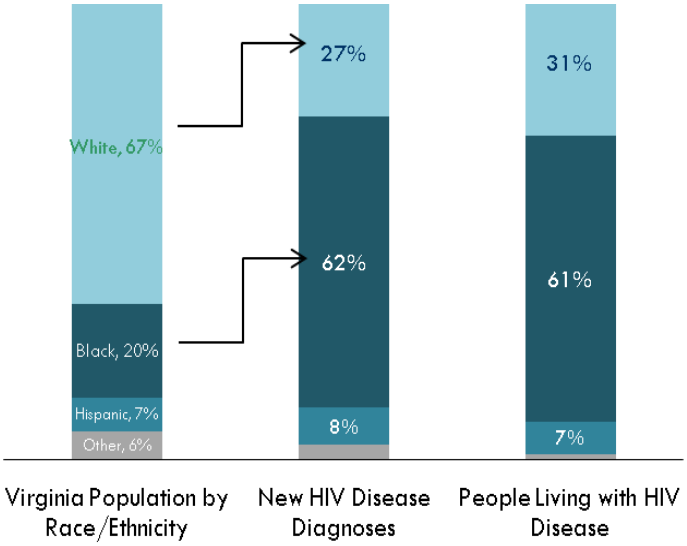
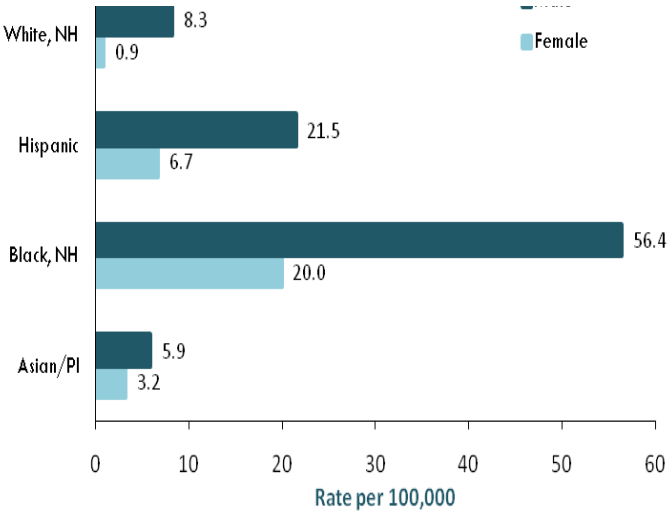


Figure 7C: Rates of HIV Disease Diagnoses by Race/Ethnicity and Gender in Virginia, 2009

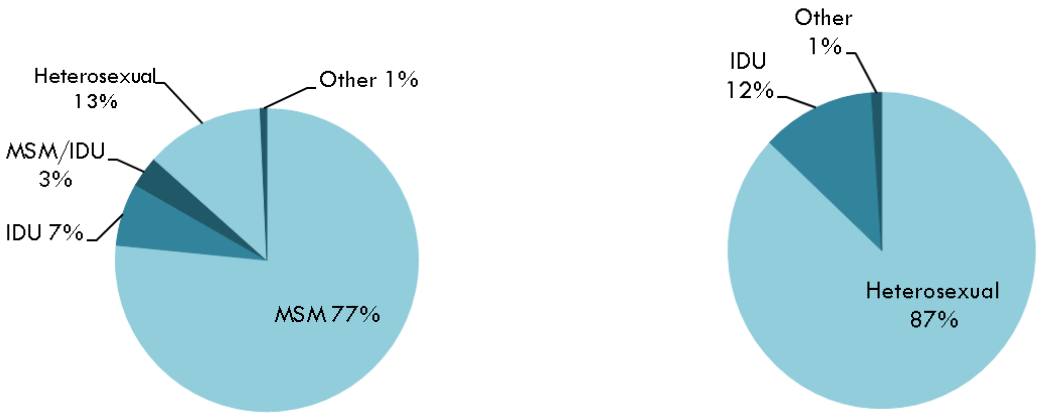


Men who have sex with men (MSM) are the population most severely affected by HIV. Nationwide, the Centers for Disease Control and Prevention (CDC) estimates show that although MSM are only 2% of the population nationwide, they represent more than half of the persons living with HIV disease in the United States, and are also the only group in which rates of new HIV diagnoses have increased steadily since the early 1990s.

In Virginia the highest burden of HIV disease is by far among MSM, which had the largest percentage (77%) of new male diagnoses between 2005 and 2009. Among females, 87% of new cases were attributed to heterosexual contact.

Figure 7D: Disease by Transmission Category in Virginia, 2005-2009

Men **Women**



Newly Diagnosed Cases of HIV Disease

Year of HIV diagnosis:	2004	2005	2006	2007	2008	2009*	2004-2008			
	No.	No.	No.	No.	No.	No.	No.	%	Rate	Trend
Total	1,034	1,039	1,021	1,031	1,081	965	5,206	100%	13.4	
Gender										
Male	741	736	749	777	813	747	3,816	73%	20.0	
Female	293	303	272	254	268	218	1,390	27%	7.0	
Age at HIV Diagnosis										
<15	0	5	3	0	1	1	9	0%	--	
15 - 19	35	31	49	58	74	57	247	5%	9.2	
20 - 24	120	134	133	135	163	169	685	13%	25.1	
25 - 29	127	147	128	151	153	125	706	14%	25.6	
30 - 34	155	144	130	123	124	109	676	13%	26.4	
35 - 39	181	151	158	117	137	110	744	14%	26.4	
40 - 44	152	167	159	138	138	115	754	14%	26.1	
45 - 49	100	114	99	123	130	126	566	11%	18.8	
50 - 54	89	74	74	94	75	69	406	8%	14.6	
55 - 59	29	37	42	42	56	48	206	4%	8.6	
60 - 64	22	19	20	25	15	15	101	2%	5.1	
65+	21	14	21	22	12	20	90	2%	1.9	
Unknown	3	2	5	3	3	1	16	0%	--	
Race/Ethnicity										
Black, non-Hispanic	634	616	622	621	702	600	3,195	61%	41.2	
White, non-Hispanic	287	295	278	266	260	245	1,386	27%	5.3	
Hispanic (all races)	93	101	90	102	89	85	475	9%	17.9	
Asian	5	14	12	22	19	18	72	1%	3.9	
Hawaiian/ Pacific Islander	2	1	1	2	0	0	6	0%		
Amer. Indian/ Alaska Native	3	0	2	2	0	1	7	0%	--	
Multi-race/ Unknown	10	12	16	16	11	16	65	1%	--	
Transmission Category										
Male-to-male sexual contact (MSM)	411	400	375	430	482	477	2098	40%	--	
Injection drug use (IDU)	68	52	36	36	37	33	229	4%	--	
MSM & IDU	28	16	19	11	15	14	89	2%	--	
Heterosexual contact	165	164	186	158	181	155	854	16%	--	
Pediatric	3	8	8	5	4	4	28	1%	--	
Blood recipient	0	1	1	0	0	0	2	0%	--	
No risk factor reported or identified	359	398	396	391	362	282	1,906	37%	--	

GIS Analysis of the HOI and HIV Rates

When the HOI is divided into five categories (quintiles) from the lowest 20% of scores to the highest 20%, **Figure 7E** shows that the rate of HIV is strongly patterned by HOI. The HIV rate is highest in census tracts in with the lowest HOI scores and the rate decreases as the HOI increases. In fact the HIV rate in the lowest HOI quintile is 4.9 times higher than the HIV rate in the highest HOI quintile.

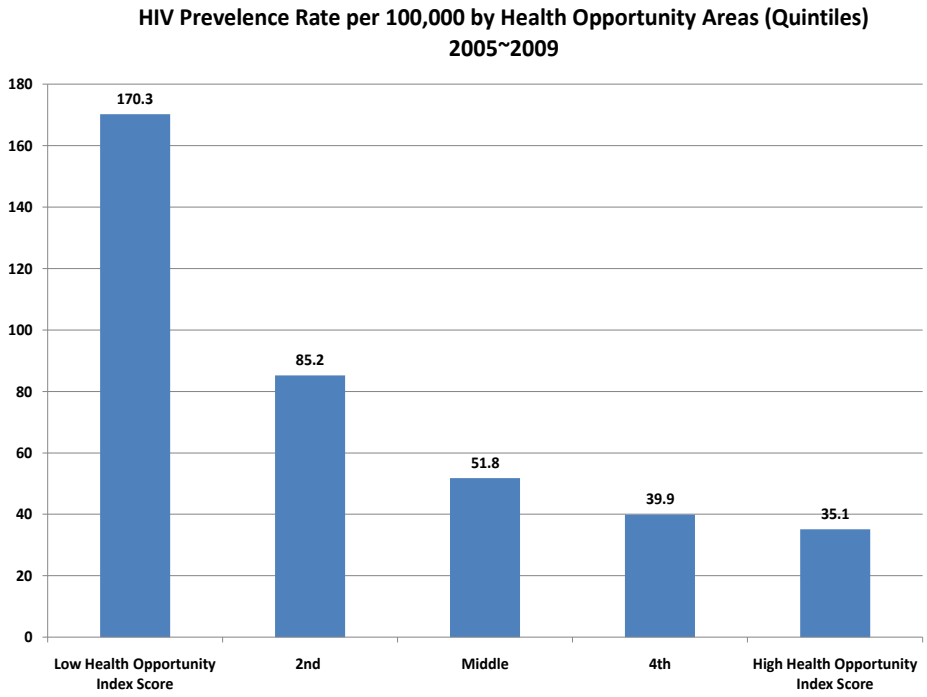
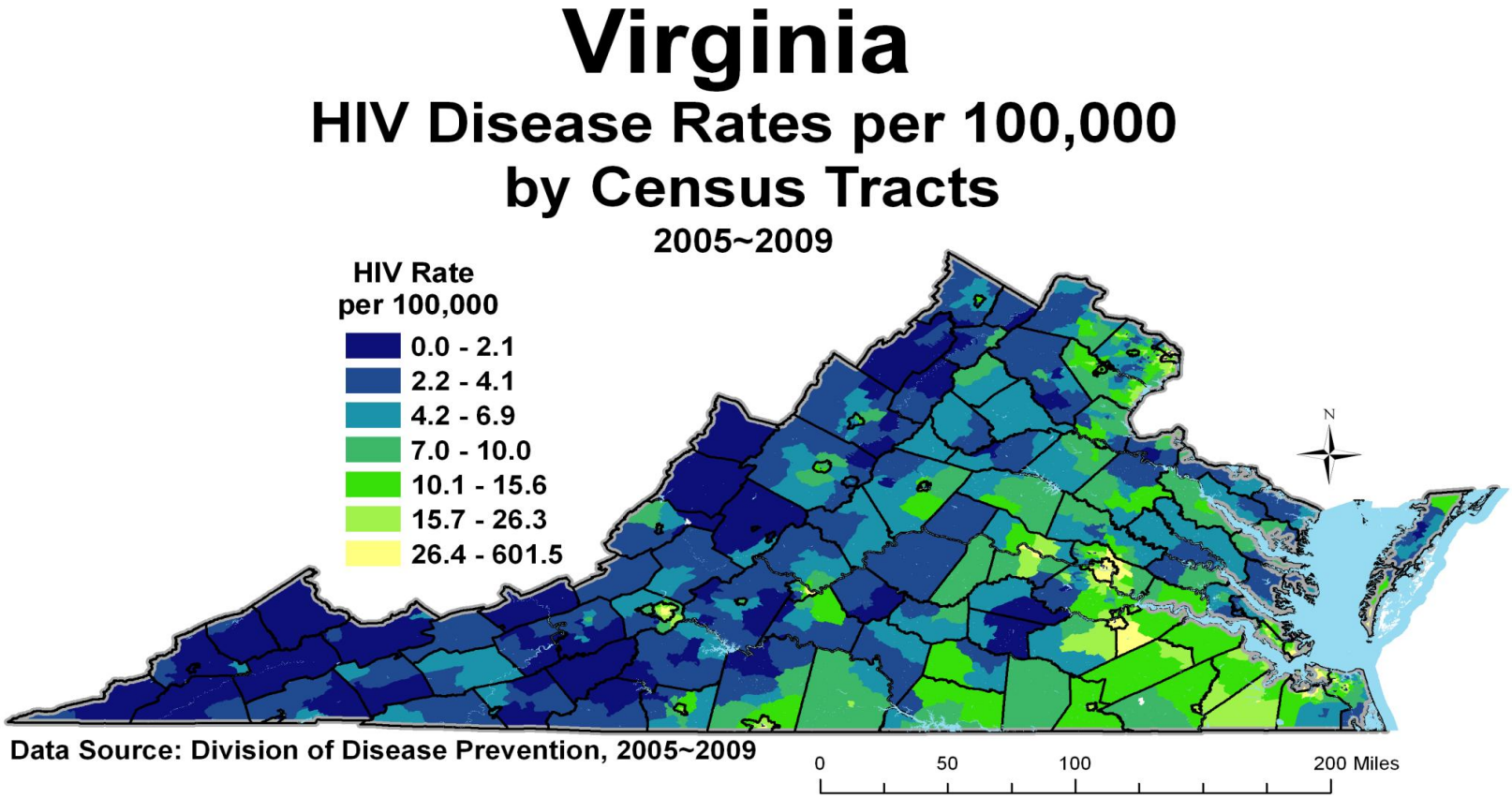
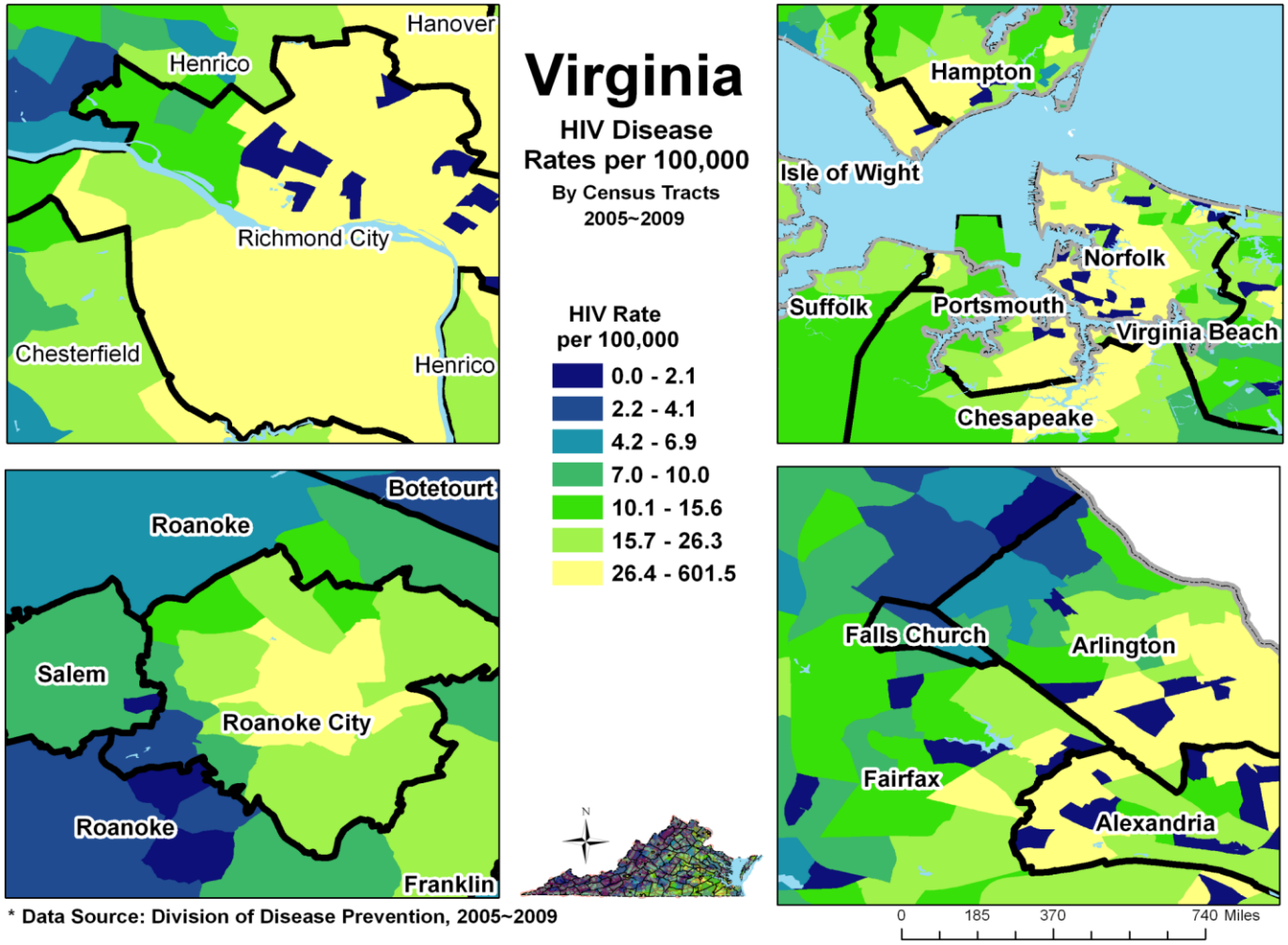


Figure 7E

(Map 12) This map show HIV disease rates by census tracts. It can readily be seen from below that HIV rates are differentially distributed across the Commonwealth with the highest rates generally being concentrated in the most urbanized areas (yellow). In rural areas, Southside Virginia has consistently higher rates of HIV than other rural areas of the state.

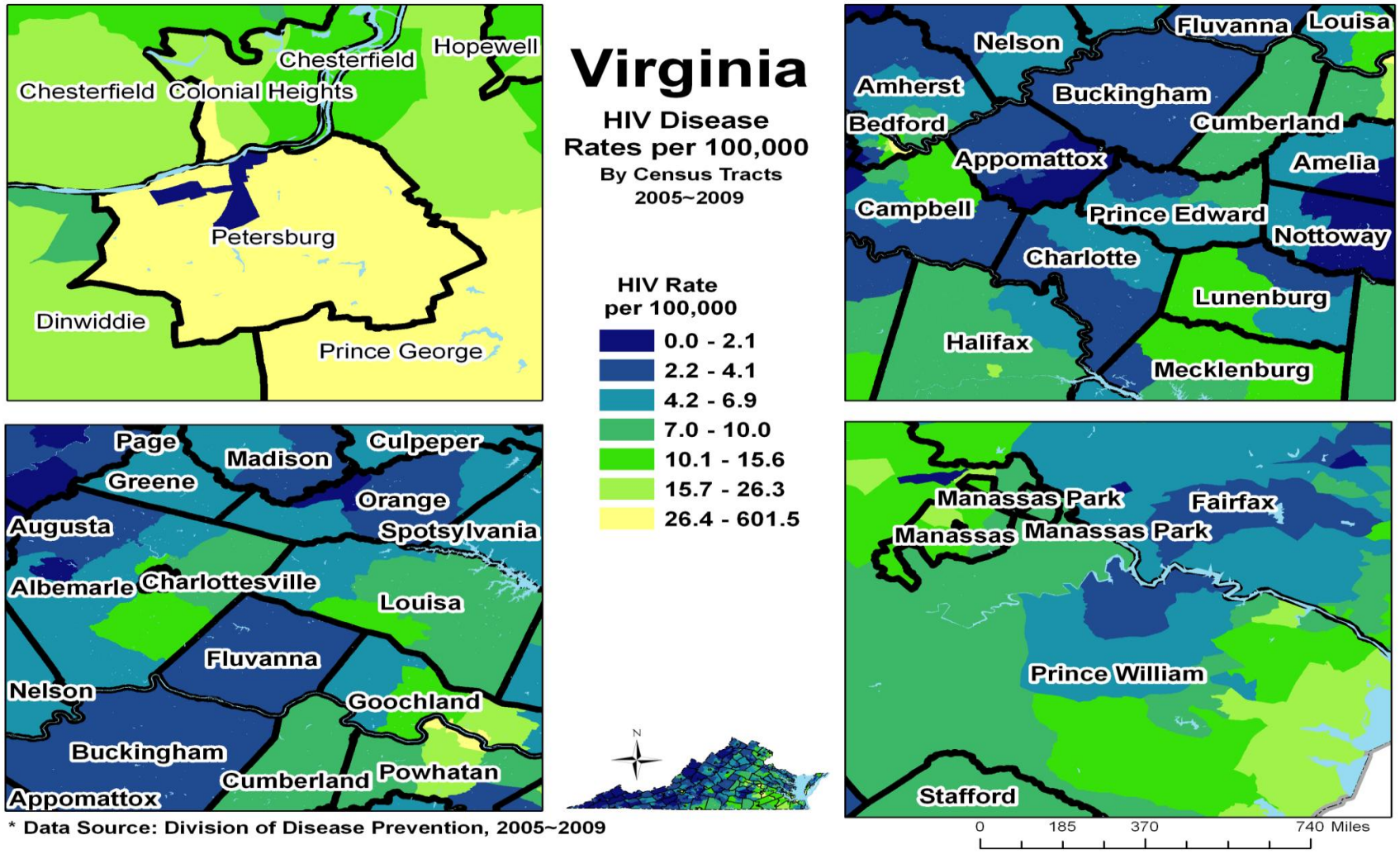


(Map 13) shows a close up of Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner), where high rates of HIV are present in multiple census tracts (yellow).



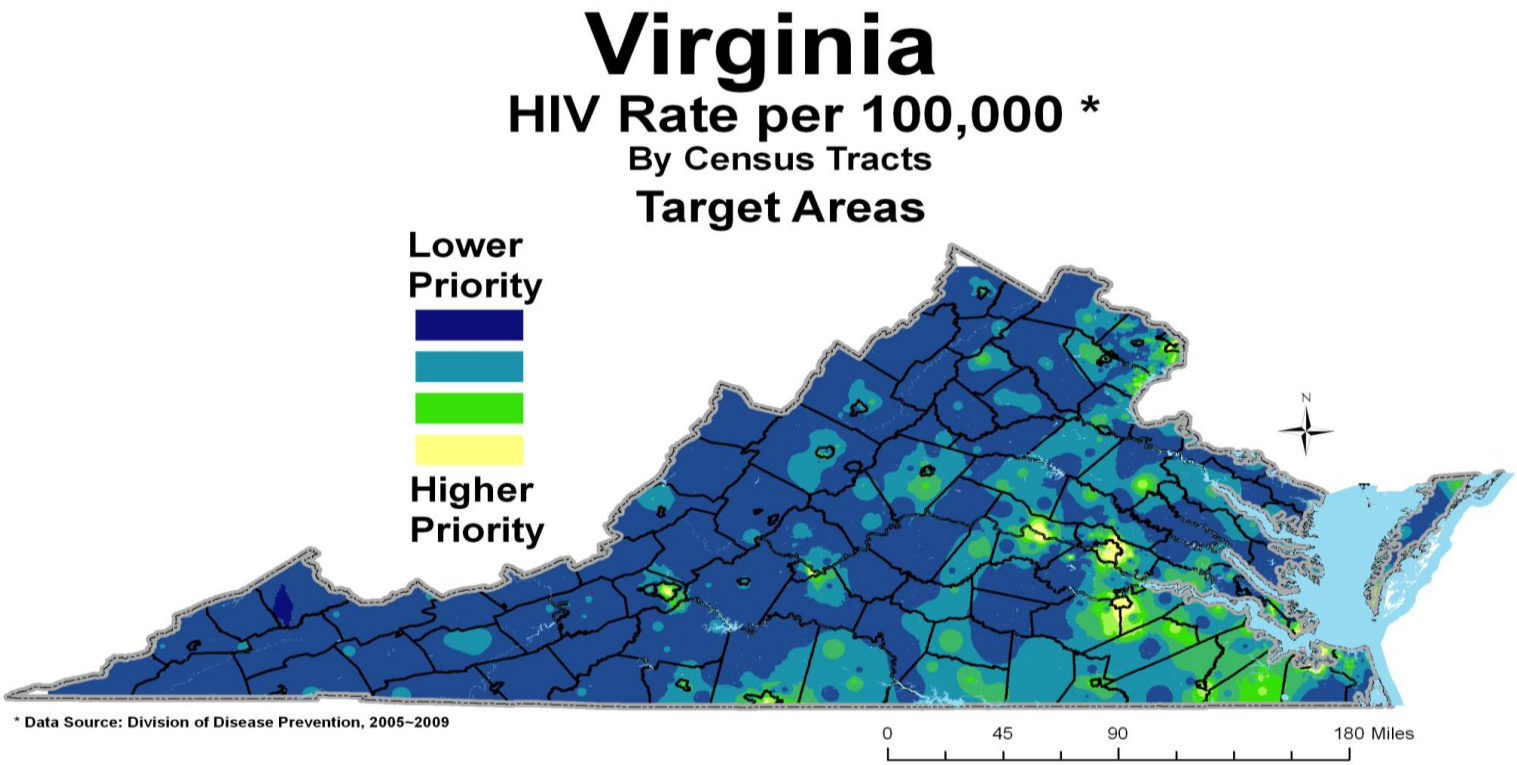
* Data Source: Division of Disease Prevention, 2005~2009

(Map 14) shows the Petersburg area (upper left corner), Southside Virginia (upper right corner), Charlottesville to Goochland areas (lower left corner) and Prince William County and Southern Fairfax (lower right corner). High rates are found in Petersburg, Prince George, Manassas, and Southern Prince William County.

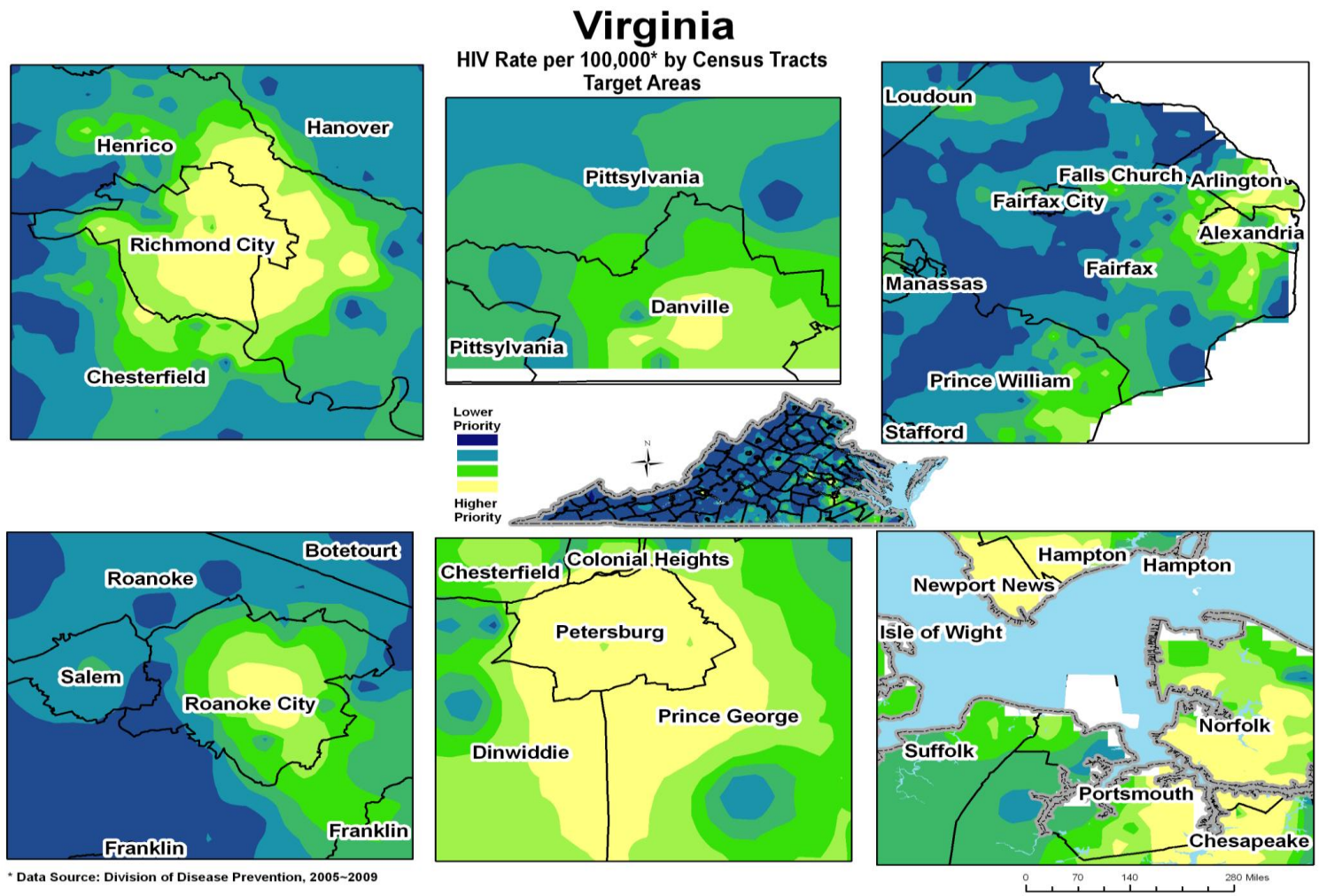


* Data Source: Division of Disease Prevention, 2005~2009

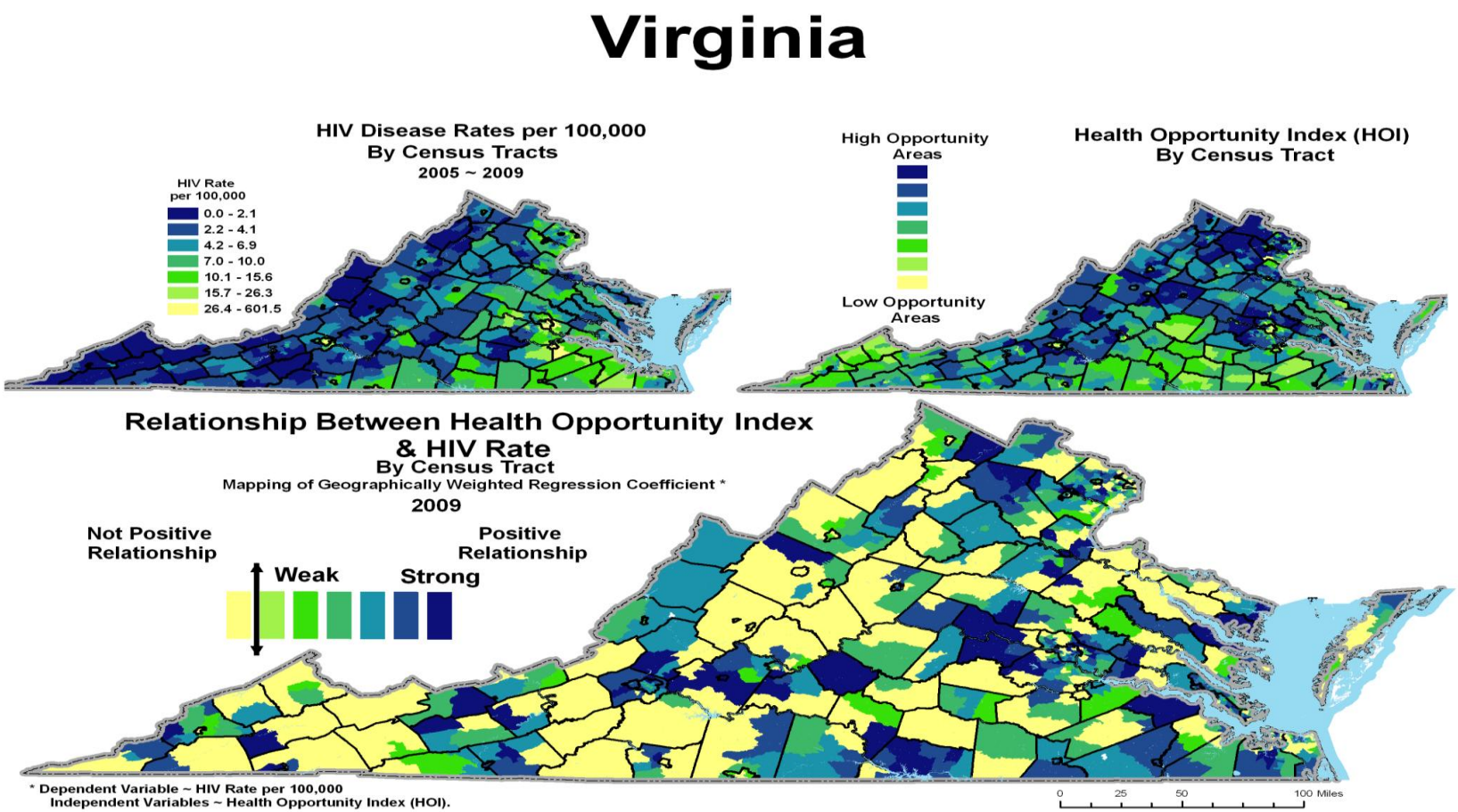
(Map 15) This map shows the priority target areas of HIV rates. In attempting to find the highest rate of HIV concentrations, a clustering method was used to clearly identify regional concentrations. This type of analysis displays concentration of high HIV rate without being limited by census tract or jurisdictional boundaries.



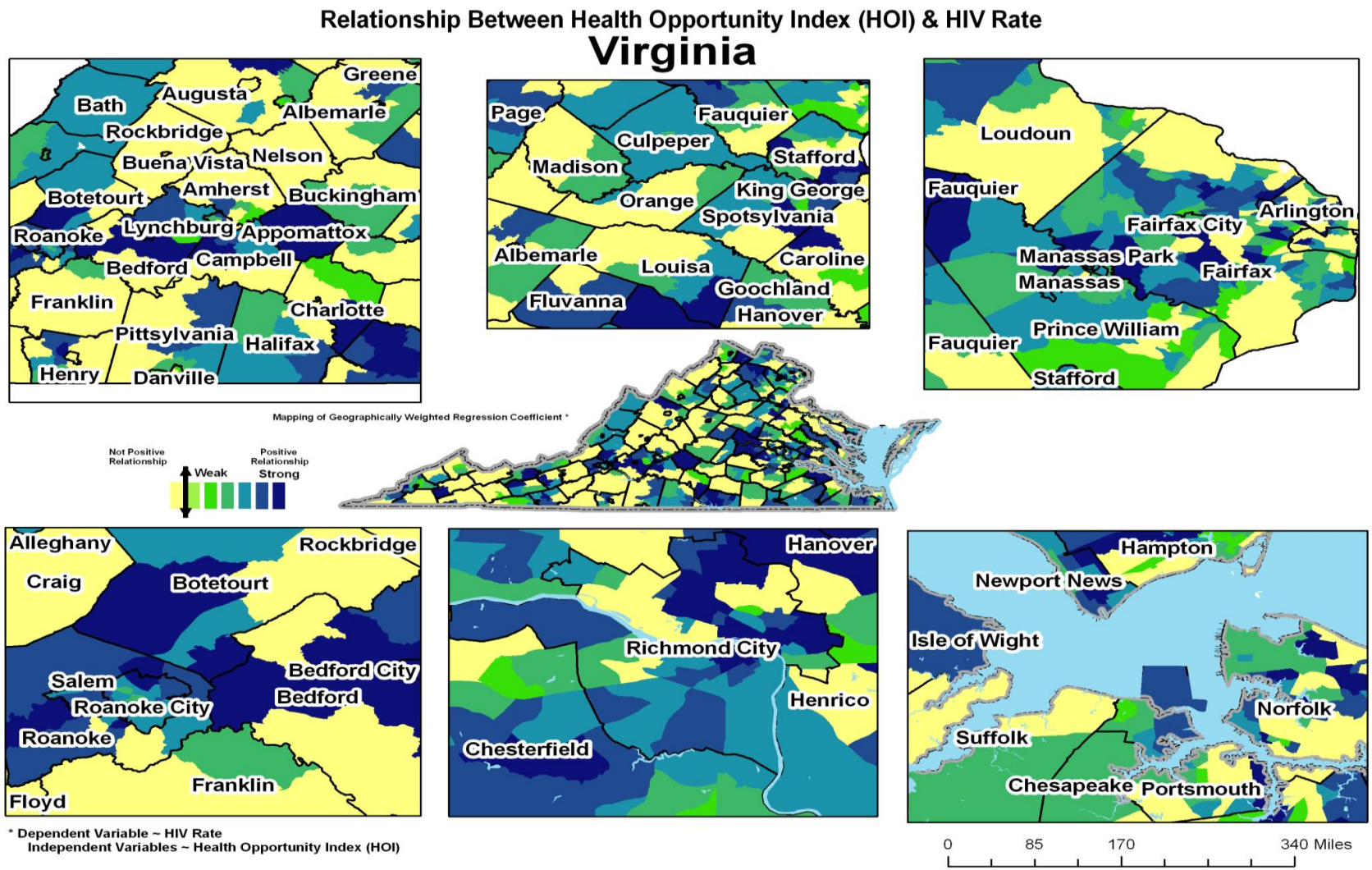
(Map 16) This map is a close up of priority target areas of HIV rates. It can readily be seen that the spatial distribution of HIV rate is uneven across the state. The high density of high HIV rate in the Southside, Richmond City, Petersburg, Roanoke City, Hampton Roads, Danville and Northern Virginia can easily be seen on the map below. Many of these areas are noted for the lowest HOI scores in the state. Yellow areas would be considered high priority target areas for addressing HIV.



(Map 17) This displays the HIV rate in the state, HOI, and the association between HIV rates and HOI. As with life expectancy, the HOI is strongly associated with HIV rates across Virginia. In fact up to 92% of the variance in HIV rate was explained by HOI. The map below provides an overview of the relationship between the HOI and HIV rates. The left corner map shows the HIV rate by census tract. The right corner map shows the Health Opportunity Index. The base map shows the association between the HIV rate and the HOI. The dark areas show a positive relationship while the yellow areas show no positive relationship.



(Map 18) The map shows the association between the HIV rate and the HOI. The dark areas show a positive relationship while the yellow areas show no positive relationship. A strong relationship between the HOI and HIV rates can be seen in many census tracts in Lynchburg, Appomattox County, Danville-Halifax, Northern Virginia, Roanoke, Richmond, and Hampton Roads.



Conclusions of HIV Analyses

There are large disparities in HIV rates for minority populations in Virginia, especially African-Americans and Hispanics. In addition, HIV is significantly more prevalent in the MSM community. HIV transmission is heavily determined by a combination of factors (individual behaviors, sexual networks, social and economic conditions). Moreover, members of all of these communities are at disproportionate risk for infection simply by having a higher likelihood of encountering an infected partner than someone in the general population.

One other very important aspect that should not be overlooked is the powerful stigma associated with a positive HIV status, which includes prejudice and negative attitudes directed at people living with HIV disease. That combined with stigma associated with a non-heterosexual orientation has a powerful impact. In certain situations an HIV positive status can result in being shunned by family, peers and the wider community, which can also deter infected or at risk individuals from seeking medical care and other services and complying with treatment recommendations.

Given that the HOI explains up to 92% of the variation in HIV across the state, it is critical to consider how the indicators within the HOI may influence risk and develop appropriate policies. For example the racial diversity indicator may relate to racial segregation and resulting sexual networks among African Americans and Hispanics. The socioeconomic indicators (Townsend Index Material Deprivation, affordability of housing and transportation, income diversity, educational attainment, job participation, and local community patterns) may provide some understanding of the association between SES and HIV. In addition, the population churning (i.e. turnover) indicator may have value as a measure of social capital and sexual networks as well. All of these indicators can be useful in understanding local risk and developing locally relevant policies and programs.

HIV Recommendations

Efforts to reduce HIV rates among disadvantaged populations and promote equitable outcomes have traditionally emphasized an individual-level focus as opposed to the population-level. According to Adimora and Schoenbach, the individual level neglects the systems, structures, and processes that facilitate HIV transmission. Such a focus ignores the knowledge that social forces such as sexual networks and stigma contribute to HIV rates and that the social and economic environment affect personal behaviors. Because focusing on the individual-level has not produced the desired decrease in inequities/disparities in the HIV rate among African Americans and Hispanics, the authors strongly advocate for a more comprehensive approach that considers the SDOH in determining an effective solution to decrease HIV rates among these populations [1].

Some of the SDOH identified as being critical contributors to this inequity include racial segregation and discrimination, inadequate access to affordable and adequate housing, educational attainment, and poverty. The local distribution of the HOI indicators may be a

helpful guide in the development of policies and programs that specifically tackle the known SDOH that contribute to the inequitable rates of HIV among African Americans and Hispanics.

As mentioned previously, there are other important neighborhood-level SDOH that are not included in the HOI at this time. Therefore, additional SDOH should be considered as important policy level factors as communities collaborate to address this critical health equity issue. Furthermore, since HIV cases can and are diagnosed in some instances years after the actual infection took place, GIS and spatial analyses involving HIV diagnosis rates may not always reflect the environments in which individuals lived when they became infected.

The appendix contains maps for each indicator within the HOI and its association with HIV. To use these maps:

1. First identify the HIV rate for the census tract(s) of interest;
2. Then use the map for the HOI indicator to determine the score (color) for the degree to which the indicator is present or absent;
3. Then use the map showing the association (color) between the indicator and the HIV rate to determine how strong the relationship is.

Spotlight on Priority Health Disparities/Inequities- Birth Outcomes (Infant Mortality and Low Birth Weight)

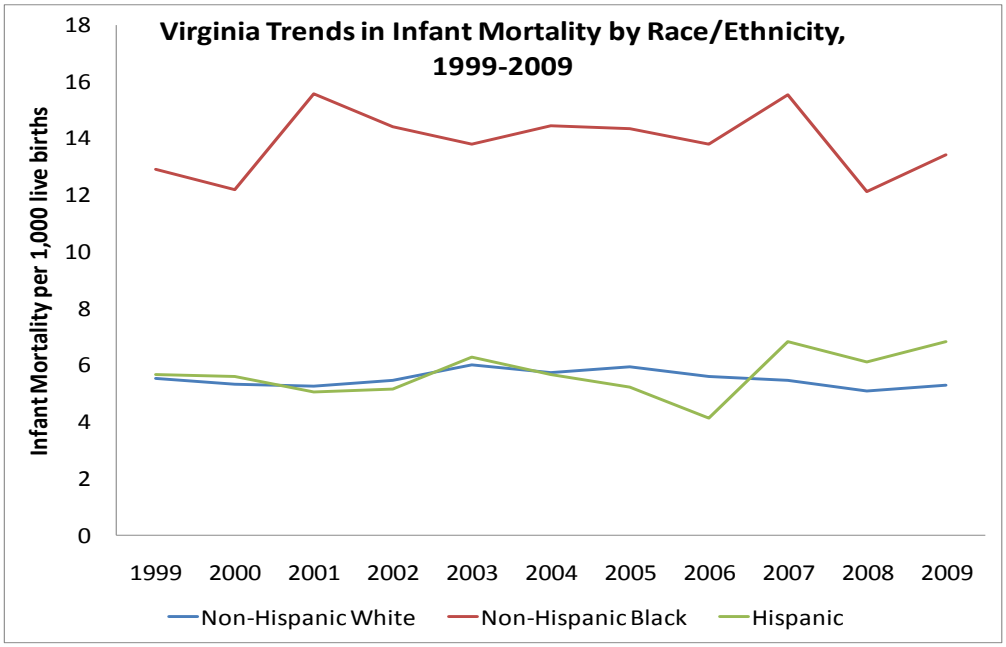
INFANT MORTALITY

Background

Like HIV/AIDS, significant health disparities/inequities exist in relation to birth outcomes, including low birth weight and infant mortality. The infant mortality rate is considered an indicator of the overall well being of a community. It reflects the health of the mother prior to pregnancy and throughout pregnancy, access to quality care across the lifespan, behaviors, family dynamics, social support, stress, social capital, family and community socioeconomic characteristics, and other factors [26]. Improving birth outcomes gives infants the best chance at being healthy throughout their life span. However, not everyone has the same chance. Birth outcomes differ by race/ethnicity, socioeconomic status, and place of residence.

In Virginia, the three leading causes of infant mortality from 2007-09 were (1) disorders of short gestation and low birth weight (157.5 deaths per 100,000 live births), congenital anomalies (122.5 deaths per 100,000 live births), and Sudden Infant Death Syndrome (SIDS) (68.4 deaths per 100,000 live births). Despite long-term declines nationally and statewide, in the past two decade infant mortality rates have leveled off from 12.9 deaths per 1,000 live births to about 7.1 deaths per live births. There have been annual fluctuations, but analyses of 4-year rolling trends showed little improvement in infant mortality. In 2007 the Center for Disease Control and Prevention rank Virginia the 12th highest in the nation, with 7.8 deaths per live births. In 2009, there were 740 infant deaths, and the infant mortality rate in Virginia was 7.0 infant deaths per 1,000 live births. In 2008 the state experienced the lowest infant mortality rate in history (6.7 per 1,000), but has yet to met the Healthy People 2020 goal of 6.0 infant deaths per 1,000 live births.

Disparities/inequities in infant mortality by race/ethnicity persist. Infant mortality among non-Hispanic Black infants (12.9 infant deaths per 1,000 live births) was still more than double that of non-Hispanic White infants (4.5 infant deaths per 1,000 live births) and Hispanic infants (5.9 infant deaths per 1,000 live births) from 2007 to 2009 (**Figure 8A**). Two thirds of infant deaths from 2007 to 2009 occurred in the first 28 days of life (neonatal period). Virginia's neonatal mortality rate was 4.8 deaths per 1,000 live births and the post neonatal mortality rate was 2.4 deaths per 1,000 live births during the same time period. Both neonatal and post neonatal mortality rates showed the same pattern of racial/ethnic disparity/inequity, where non-Hispanic Black infants had mortality rates more than twice that of non-Hispanic White infants.



Source: VDH Health Statistics compiled by the OFHS Division of Child and Family Health, 1999- 2009

Figure 8A

From 2007-09, infant mortality was two times higher among uninsured mothers (10.5 per 1,000) than those who were privately insured (5.1 per 1,000). When infant mortality was examined by race/ethnicity and insurance status, disparities/inequities increased (**Chart 8B**). Among uninsured non-Hispanic Black women, the infant mortality rate was 2.5 times higher than those who were privately insured (26.1 per 1,000 compared to 10.1 per 1,000); privately insured non-Hispanic White mothers had the lowest infant mortality, at 4.0 per 1,000 live births. Insurance status did not appear to affect infant mortality for Hispanic women, as there was no difference in mortality rates for Hispanic women who were uninsured (5.6 per 1,000), privately insured (5.5 per 1,000) or insured by Medicaid (5.9 per 1,000). Further, even though a greater percentage of non-Hispanic Black women had more than a high school education (41.6%) compared to Hispanic women (24.7%), non-Hispanic Black women still had higher infant mortality rates than Hispanic women from 2007-09. Even more startling, non-Hispanic Black women with more than a high school education had higher infant mortality rates than non-Hispanic White women with less than a high school education (9.4 compared to 8.4 infant deaths per 1,000 live births, respectively).

Although the statistics given do not pose a clear understanding of why these differences are seen among the racial line of the insured, uninsured and underinsured; many researchers are concluding that chronic stress amongst a racial group along with social determinants play a significant role in infant mortality rates.

Chart 8B. Infant mortality Rate per 1,000 Live Births in Virginia from 2007-2009		
Characteristics	**N**	**Rate**
Virginia	**2295**	**7.2**
Race of Infant		
White, non-Hispanic	826	4.5
Black, non-Hispanic	893	12.9
Hispanic, any race	255	5.9
Other, non-Hispanic	75	3.0
Gender of Infant		
Male	1112	6.8
Female	939	6.0
Infant Age At Death		
Neonatal (<28 days)	1538	4.8
Post neonatal (28-364 days)	757	2.4
Maternal Age		
Less than 19 years	157	10.5
19-24 years	712	8.3
25-34 years	884	5.3
35-44 years	292	5.7
Greater than 45 years	7	10.4
Maternal Education		
Less than High School	397	8.8
High School	780	8.0
More than High School	769	4.5
Marital Status		
Married	966	4.7
Not Married	1088	9.5
Plurality		
Singletons	1722	5.6
Multiples	332	28.5
Parity		
Primiparous (first pregnancy)	858	6.3
Multiparous (second pregnancy or higher)	1180	6.4
Entry into Prenatal Care		
First Trimester	1579	5.9
Second Trimester	237	6.2
Third Trimester	234	20.4
Smoking during pregnancy		
Smokers	214	10.7
Non-smokers	1840	6.1
Insurance Status At Delivery		
Medicaid	787	9.4
Private Insurance	1046	5.1
Uninsured	208	10.5

Source: VDH Health Statistics compiled by the OFHS Division of Child and Family Health, 2007-09.

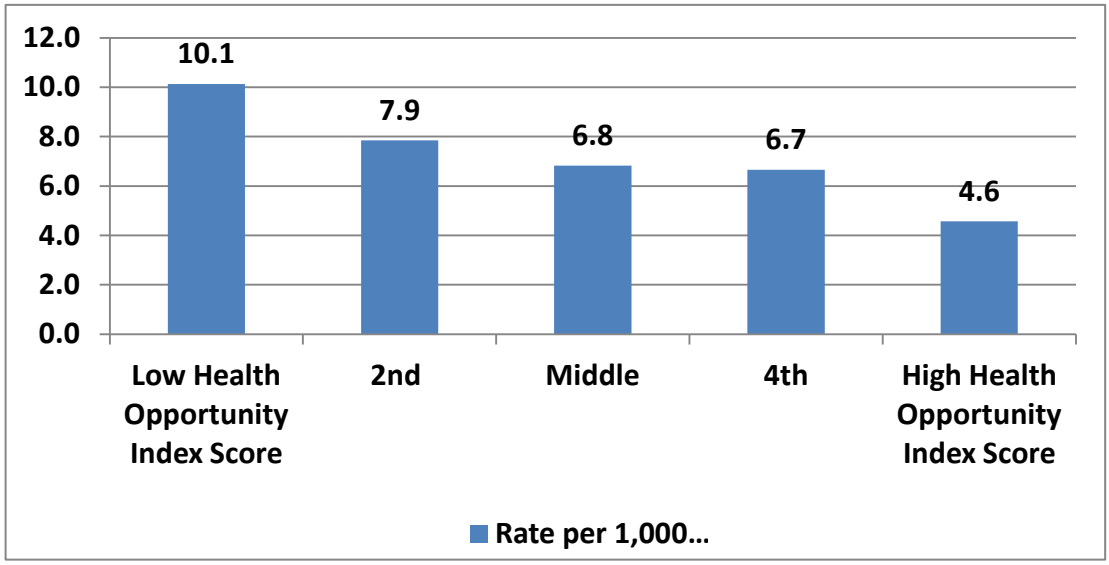
Chart 8B

The Health Opportunity Index and Infant Mortality

Figure 8C below shows the distribution of infant mortality across the population of Virginia divided into five equal categories (quintiles) of HOI, from the lowest 20% up to the highest 20%. There is a clear stepwise decrease in infant mortality rate as one moves from census tracts with the lowest HOI score to progressively higher HOI scores.

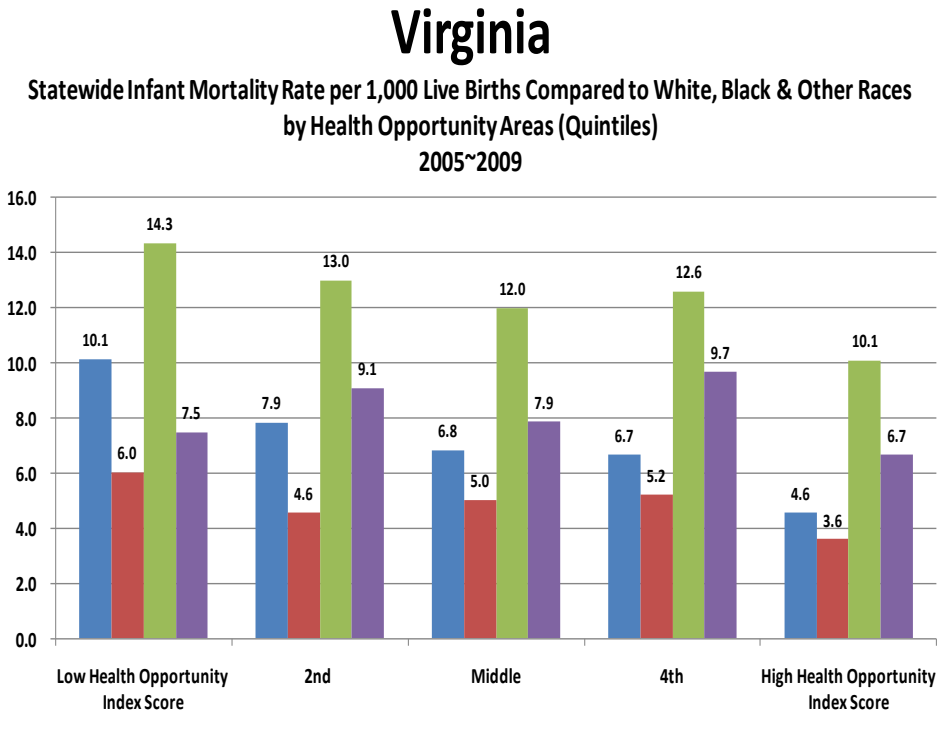
Virginia

Figure 8C. Infant Mortality Rate per 1,000 Live Births by Health Opportunity Areas (Quintiles) 2005~2009



Health Opportunity Index Quintile	# Birth	# Infant Mortality	Rate per 1,000 (IM)
Low Health Opportunity Index Score	104,377	1,058	10.1
2nd	122,535	962	7.9
Middle	114,032	779	6.8
4th	89,309	595	6.7
High Health Opportunity Index Score	93,114	426	4.6

Figure 8C



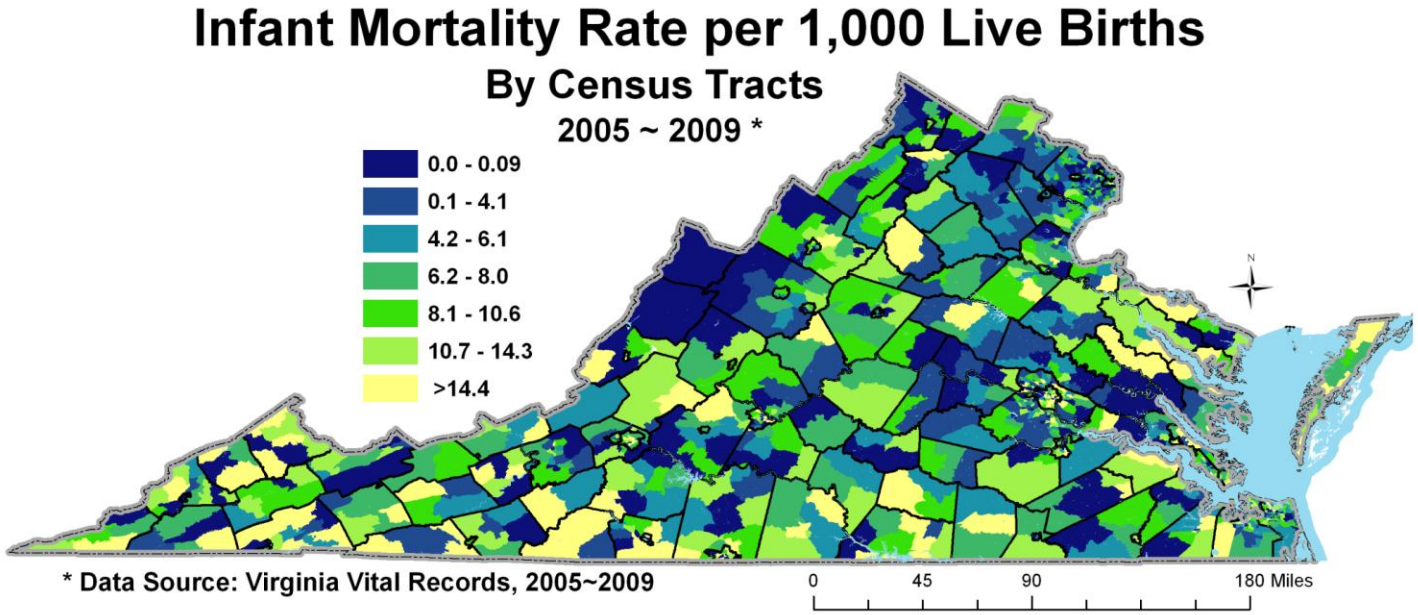
Health Opportunity Index Quintile	# Birth	# Infant Mortality	Rate per 1,000 (Statewide)	White Birth	White Infant Mortality	Rate per 1,000 (White)	Black Birth	Black Infant Mortality	Rate per 1,000 (Black)	Other Race Birth	Other Infant Mortality	Rate per 1,000 (Other)
Low Health Opportunity Index Score	104,377	1,058	10.1	32,594	197	6.04	47,131	676	14.34	24,652	185	7.5
2nd	122,535	962	7.9	60,240	276	4.58	30,595	398	13.01	31,700	288	9.1
Middle	114,032	779	6.8	70,788	356	5.03	20,213	242	11.97	23,031	181	7.9
4th	89,309	595	6.7	66,792	349	5.23	9,611	121	12.59	12,906	125	9.7
High Health Opportunity Index Score	93,114	426	4.6	69,955	252	3.60	5,648	57	10.09	17,511	117	6.7

Figure 8D

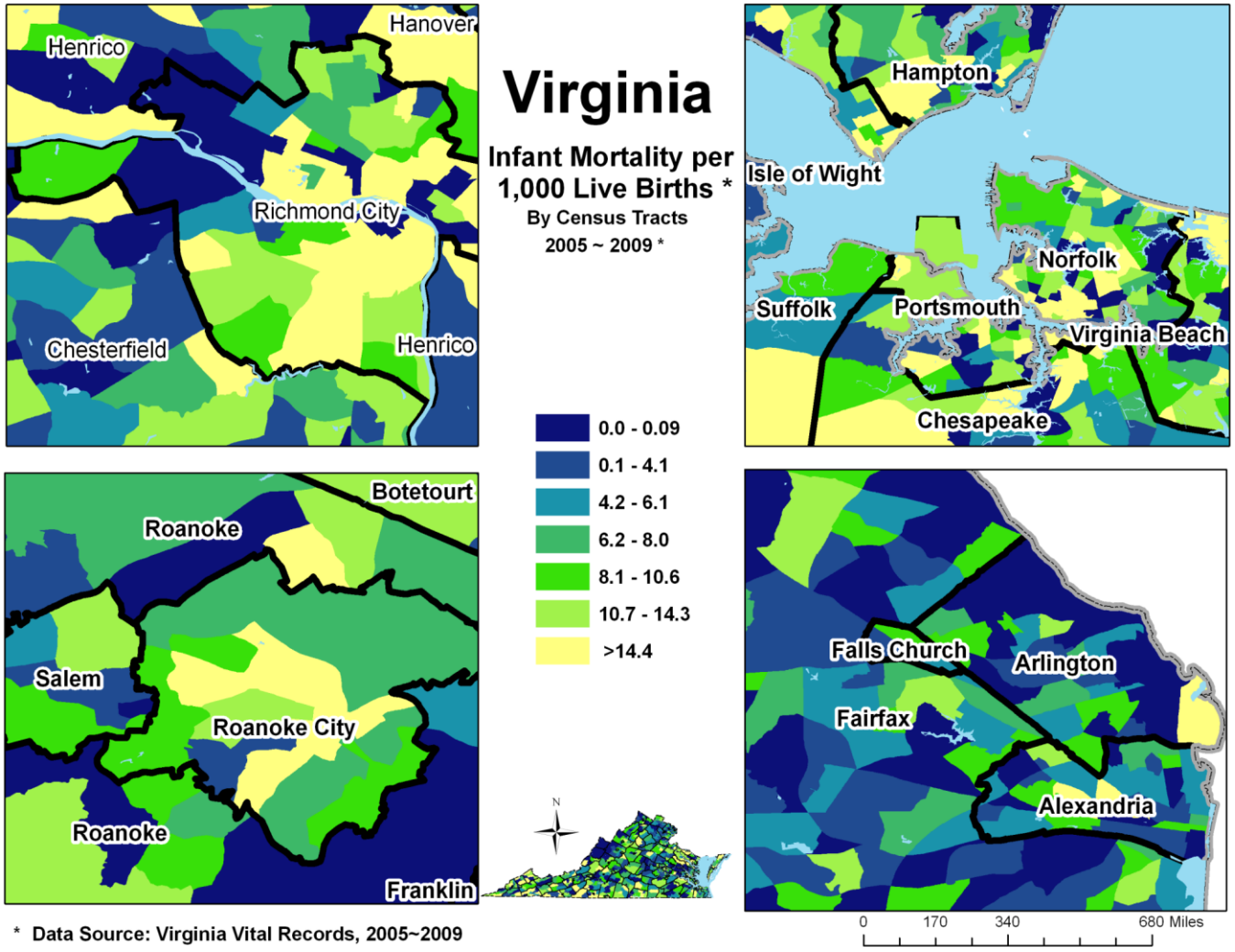
Figure 8D above shows infant mortality by HOI quintile (5 equal categories) stratified by race.

- The IMR for all births (blue), for births to Black women (green) and to White women (red) decreases going from lowest HOI quintile to highest.
- The IMR for births to other women (purple) is inconsistent as one moves from the lowest quintile of HOI to the highest.
- The IMR for births to Black women is highest across all quintiles of HOI. This finding is consistent with studies that stratify racial differences in IMR by educational attainment.

(Map 19) This map shows Infant Mortality Rate per 1000 live births by census tract for the period between 2005-2009 in Virginia. The darker areas show low infant mortality rate while the light areas show high infant mortality rate. It can be seen that the high rates are found in the Southwest and Southside areas and multiple cities throughout the state.



(**Map 20)** This map shows infant mortality during the period from 2005 to 2009. The Richmond metro area (upper left corner), Hampton Roads area (upper right corner), Roanoke metro (lower left corner) and Northern Virginia (lower right corner). Rates are highest in multiple census tracts in Richmond, Roanoke, and Hampton Roads, as well as scattered tracts in Alexandria and Arlington.

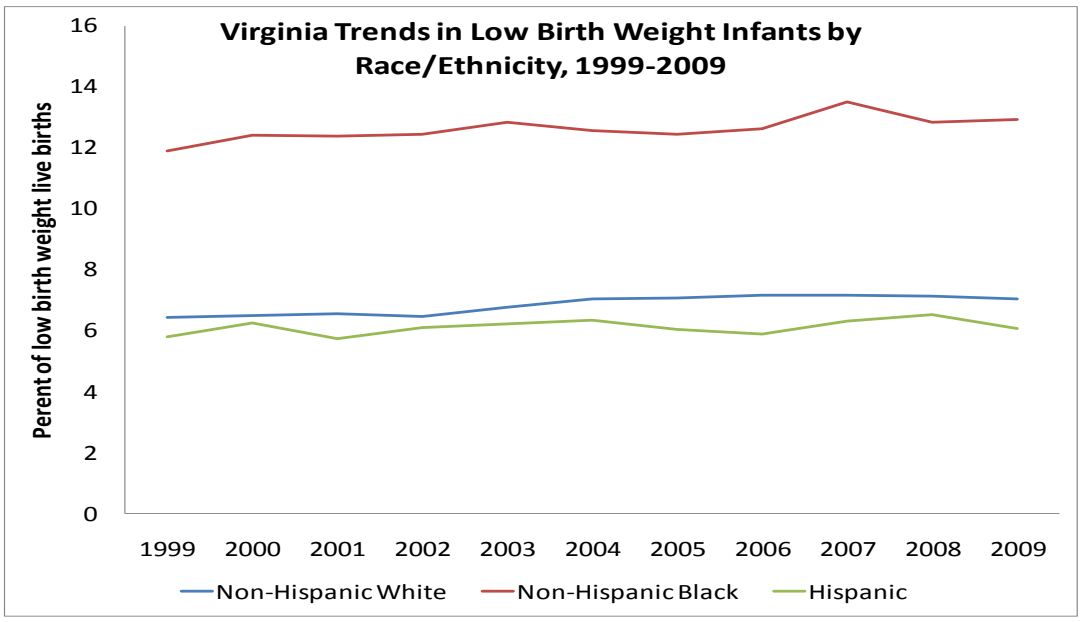


LOW BIRTH WEIGHT (LBW)

Significant health disparities/inequities also exist in relation to birth outcomes, especially low birth weight and infant mortality. Birth outcomes and the health of infants are important indicators of how a nation, state, or community defines its overall health status. In addition, low birth weight is a major risk factor for infant mortality and lifelong disabilities and a growing body of research suggests it is associated with a greater risk of chronic diseases in adulthood [43]. Striving for equity in the early years of life among all races, ethnicities, and socio-economic groups is of the utmost importance.

Background

Given that low birth weight and prematurity were the leading cause of infant death and that there is variation in measurements for prematurity (e.g. use of clinical estimate versus last menstrual period), the percentage of low birth weight infants was selected for this report. Birth weight is an important determinant of infant health and survival. Infants born LBW (<2500 grams) are at increased risk for immediate health problems, such as respiratory problems due to underdeveloped lungs, and long-term problems, such as developmental disabilities. In 2009, 8.4% of births in Virginia were LBW infants, which represented an 18% increase from 1990 (7.1% LBW). In 2007-09, LBW infants had a mortality rate that was almost 20 times higher than that of normal weight infants. Virginia must work to meet the Healthy People 2020 goal to reduce LBW to 7.8% of all live births. Although very low birth weight infants (VLBW, <1500 grams) only represented 1.6% of all live births in 2009, Virginia has not met the Healthy People 2020 goal to reduce VLBW births to no more than 1.4% of all live births. In 2007-09, VLBW infants had a mortality rate more than 15 times higher than that of infants who were between 1,500 and 2,499 grams and more than 83 times higher than normal birth weight infants.



Source: VDH Health Statistics compiled by the OFHS Division of Child and Family Health, 1999-2009

Figure 9A

Like infant mortality, racial disparities/inequities exist for low birth weight infants. From 2007 to 2009, the low birth weight rate for non-Hispanic Black infants (13.1 percent) was almost double the rate for non-Hispanic White and Hispanic infants (7.2 and 6.3 percent, respectively). Further, the Black-White low birth weight ratio among singleton live births has remained at or above 2.0 since 1990. Rates for low birth weight infants were higher among teens (10.7 percent), women with advanced maternal age (22.0 percent), women with a high school education or less (9.5, 9.6 percent, respectively), unmarried women (10.6 percent), smokers (13.6 percent), or women on Medicaid at delivery (10.6 percent) (Table 2).

The report reflects that the Healthy People 2020 goals to reduce infant mortality and low birth weight infants have not been met, and there are persistent disparities/inequities causing non-Hispanic Black women to be disproportionately affected by poor birth outcomes. Infants born to non-Hispanic Black women were twice as likely to die before their first birthday or be born low birth weight compared to infants born to non-Hispanic White women.

Chart 9B. Percent of Low Birth Weight Births in Virginia from 2007-2009

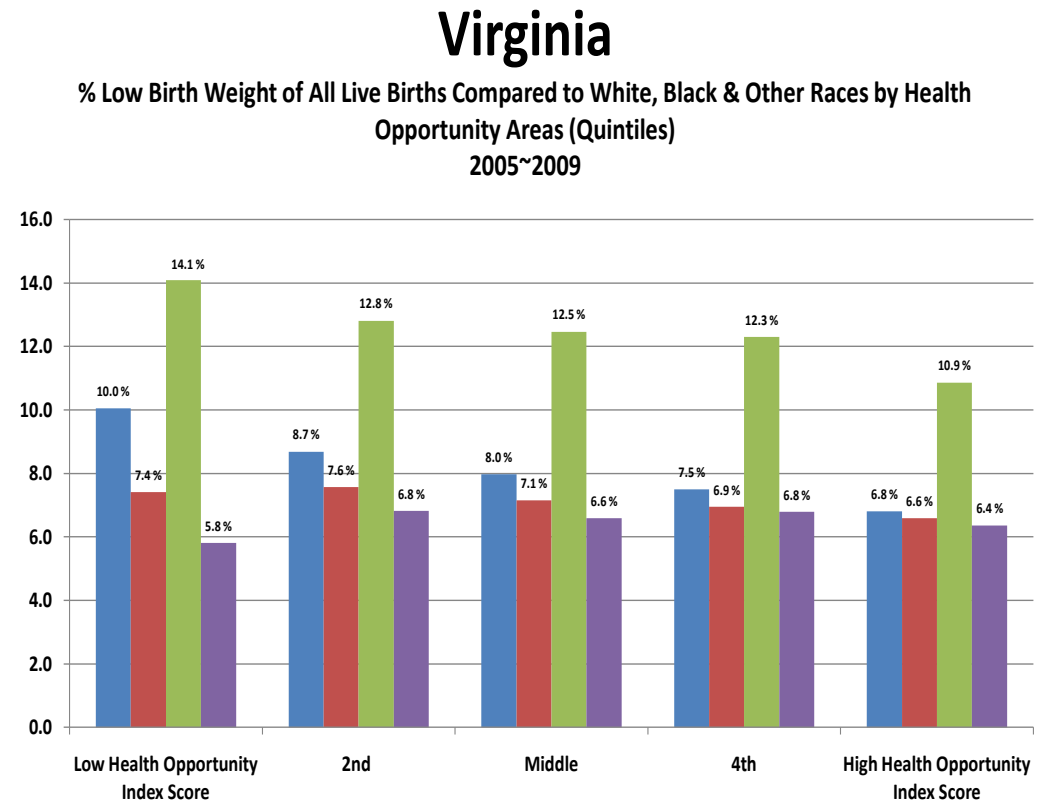
Characteristics	N	Rate
Virginia	**26816**	**8.4**
Race of Infant		
White, non-Hispanic	13041	7.2
Black, non-Hispanic	9093	13.1
Hispanic, any race	2703	6.3
Other, non-Hispanic	1965	7.8
Gender of Infant		
Male	12624	7.7
Female	14189	9.1
Maternal Age		
Less than 19 years	1601	10.7
19-24 years	7812	9.1
25-34 years	12619	7.6
35-44 years	4606	9.0
Greater than 45 years	148	22.0
Maternal Education		
Less than High School	4360	9.6
High School	9236	9.5
More than High School	12615	7.3
Marital Status		
Married	14754	7.2
Not Married	12061	10.6
Plurality		
Singletons	20204	6.6
Multiples	6199	56.8
Parity		
Primiparous (first pregnancy)	11892	8.7
Multiparous (second pregnancy or higher)	14877	8.1
Entry into Prenatal Care		
First Trimester	21629	8.1
Second Trimester	3231	8.5
Third Trimester	1360	11.8
Smoking during pregnancy		
Smokers	2723	13.6
Non-smokers	24092	8.0
Insurance Status At Delivery		
Medicaid	8877	10.6
Private Insurance	15260	7.4
Uninsured	1612	8.2

Source: VDH Health Statistics compiled by the OFHS Division of Child and Family Health, 2007-09.

Chart 9B

Low Birth Weight and the Health Opportunity Index

As with life expectancy and HIV, the HOI is similarly associated with low birth weight.



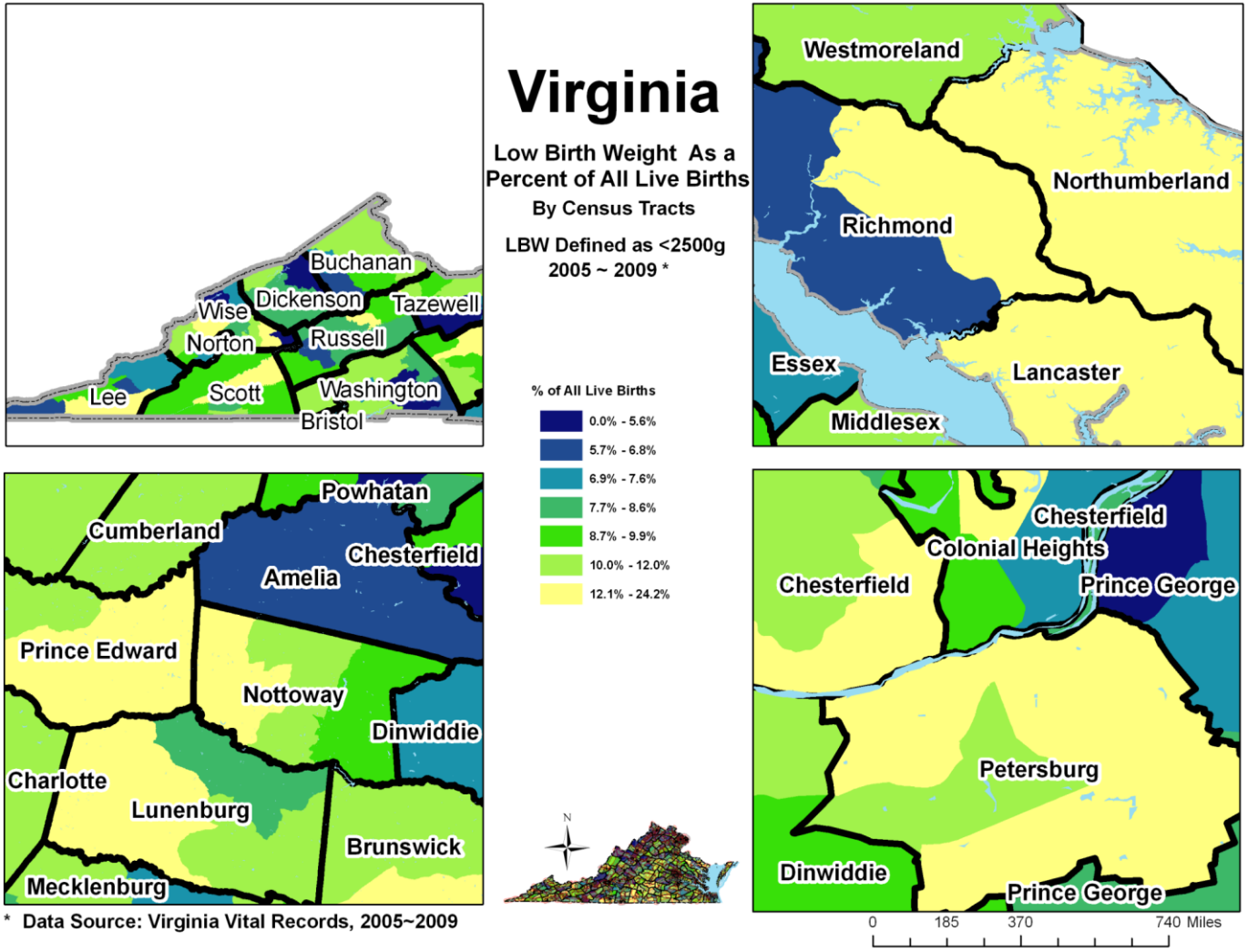
Health Opportunity Index Quintile	# Birth	# Low Birth Weight	% LBW (Statewide)	White Birth	White Low Birth	% LBW (White)	Black Birth	Black Low Birth	% LBW (Black)	Other Race Birth	Other Low Birth	% LBW (Other)
Low Health Opportunity Index Score	104,377	10,481	10.0	32,594	2,413	7.4	47,131	6,637	14.1	24,652	1,431	5.8
2nd	122,535	10,639	8.7	60,240	4,559	7.6	30,595	3,919	12.8	31,700	2,161	6.8
Middle	114,032	9,093	8.0	70,788	5,058	7.1	20,213	2,519	12.5	23,031	1,516	6.6
4th	89,309	6,694	7.5	66,792	4,636	6.9	9,611	1,182	12.3	12,906	876	6.8
High Health Opportunity Index Score	93,114	6,335	6.8	69,955	4,608	6.6	5,648	613	10.9	17,511	1,114	6.4

Figure 9C

Figure 9C above shows low birth weight (LBW) by HOI quintile (5 equal categories) stratified by race.

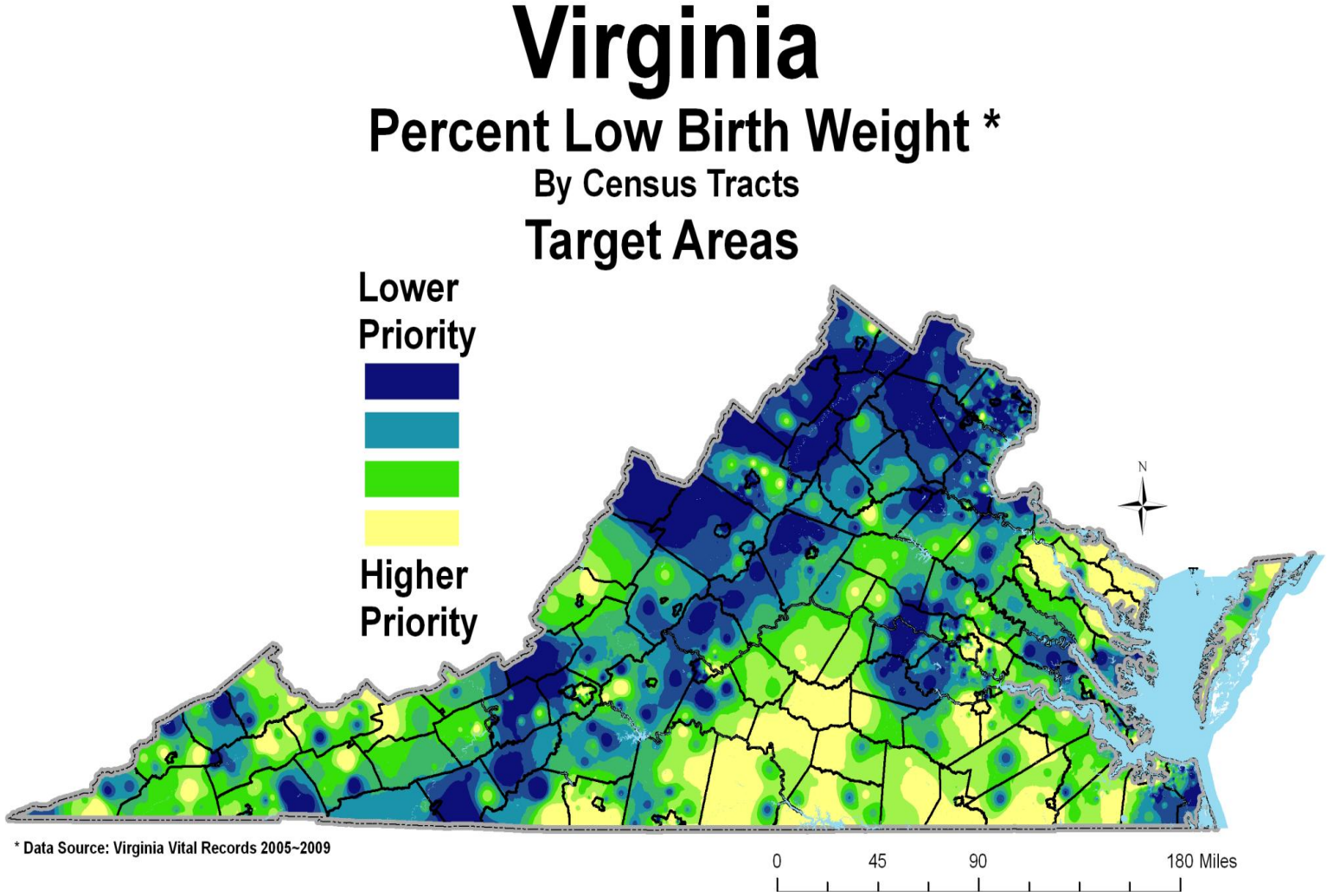
- LBW for all births (blue), for births to Black women (green), and for births to White women (red) decreases going from lowest HOI quintile to highest.
- LBW for births to other women (purple) is very similar as one moves from the lowest quintile of HOI to the highest.
- LBW for births to Black women is highest across all quintiles of HOI. This finding is consistent with studies that stratify racial differences in LBW by educational attainment.

(Map 23) This map shows low birth weight as a percent of all live births by census tract for a period between 2005~2009 in Southwest Virginia (upper left corner), Northern Neck (Upper right corner), Southside counties (lower left corner) and Colonial Heights~Petersburg (lower right corner). The darker areas show low percent of all live births while the light areas show high percent of all live births. High LBW percentages are found in census tracts across all of these regions.

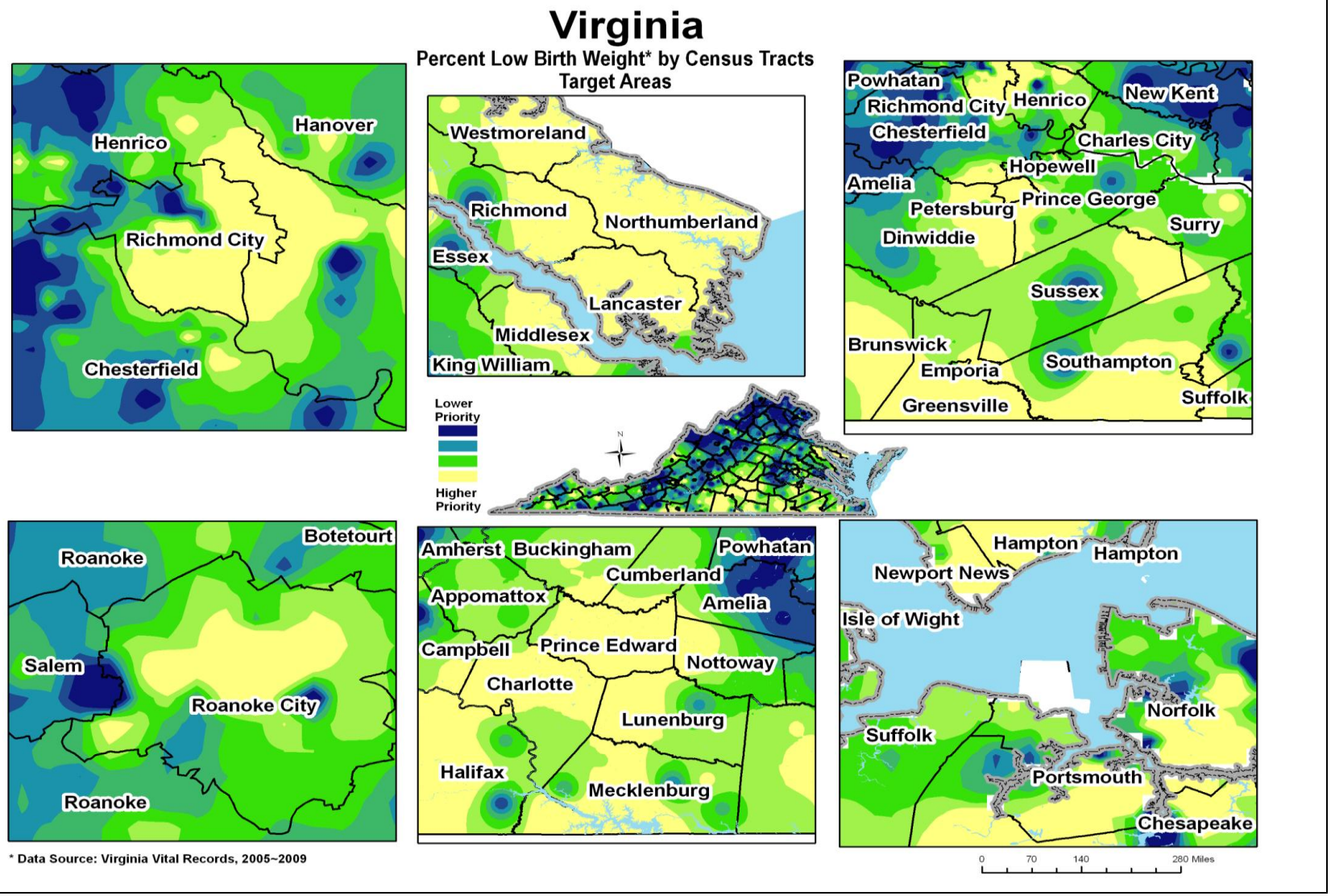


* Data Source: Virginia Vital Records, 2005~2009

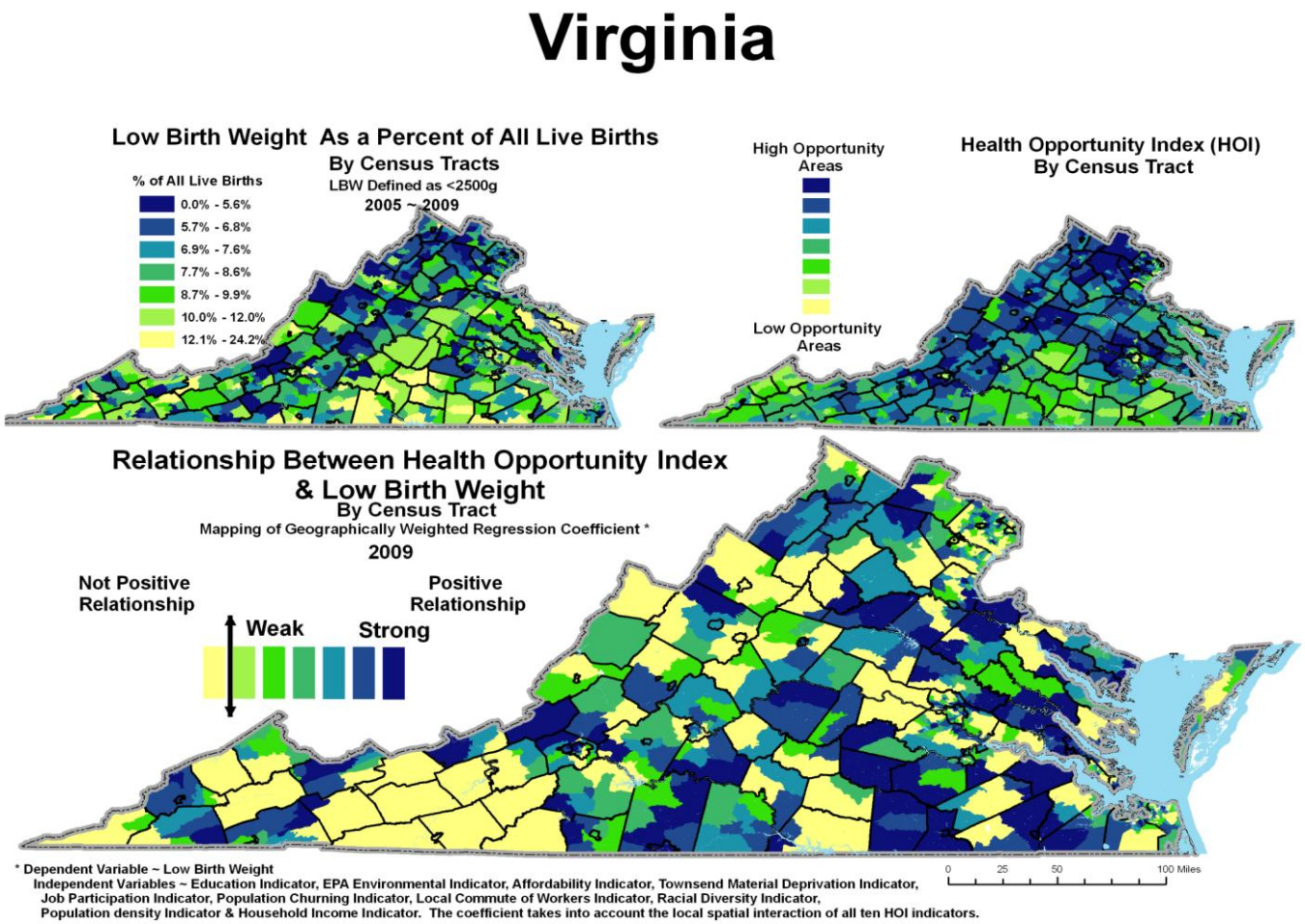
(Map 24) This map shows the high priority target areas with high percentages of low weight births. It can readily be seen that the highest percentages low birth weight is found in Southwest, Southside, and the Northern Neck. Many of these are also the areas that are noted for the low HOI. The yellow areas are considered high priority target areas for addressing low birth weight.



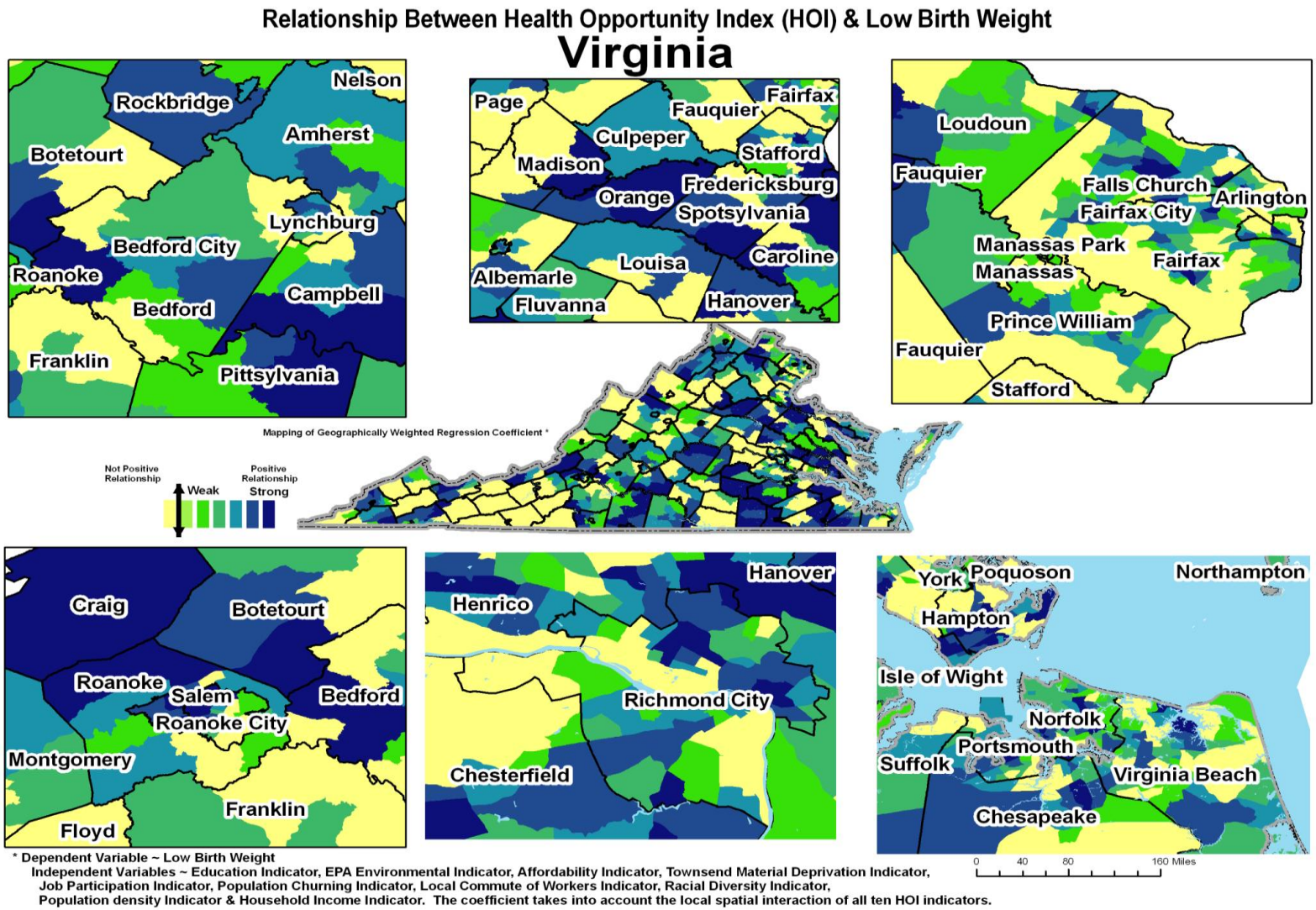
(Map 25) This map is a close up of the high priority target areas for low birth weight, which can be found in Richmond City, Northern Neck, Southside, Roanoke City, Hampton Roads and scattered parts of Southwest Virginia.



(Map 26) This map is a composite of low birth weight, HOI, and the association between the two. The left corner map shows the low birth weight as a percent of all live births by census tract. The right corner map shows the Health Opportunity Index. The base map shows the association between the low birth weight and HOI. The dark areas show a positive relationship while the yellow areas show no positive relationship. A positive relationship can be seen in parts of Southwest, Southside, West Central, Northern Neck, Hampton Roads, and Shenandoah Virginia.



(Map 27) This map shows the association between the percent LBW and HOI and the dark areas show positive relationship while the yellow areas show no positive relationship.



Conclusions of Birth Outcome Analyses

This report finds that infant mortality rates and percentages of low weight births are strongly associated with socioeconomic status (e.g. education and insurance). In addition, disparities/inequities affecting babies born to African American women are dramatic, with the risk consistently twice as high. This inequity can be attributed to the near three-fold increased rates of very low birth weight and very preterm births among African American infants. Outcomes are similar, although not as dramatic, among women living in communities with low HOI scores. African American women are most likely to live in such communities as well.

Communities with *high* rates of LBW births and *low* HOI scores should be targeted for interventions to improve their health outcomes. This can be done by implementing interventions that enhance the social, economic, environmental, and demographic factors that contribute the most to the low HOI score. While individual indicators within the HOI may be more strongly associated with LBW than others, it is important to remember that the ten indicators must always be analyzed in relationship to each other in order to provide an adequate understanding of the community context.

This report demonstrates in general, that low birth weight rates are associated with health opportunities and overall HOI scores. However, areas with low HOI scores and favorable birth outcomes may provide valuable information on protective factors at the community level that can be replicated in other communities.

The HOI, therefore, is a powerful tool that can provide context for both an understanding of how a community works and to assist in specifying policies and interventions and working with communities to improve their birth outcomes. The HOI provides guidance for community efforts to promote equitable birth outcomes by addressing neighborhood level social, economic and environmental factors.

The appendix contains maps for each indicator within the HOI and its association with LBW. To use these maps:

1. First identify the LBW percentage for the census tract(s) of interest;
2. Then use the map for the HOI indicator to determine the score (color) for the degree to which the indicator is present or absent;
3. Then use the map showing the association (color) between the indicator and the LBW percentage to determine how strong the relationship is.

Recommendations for Promoting Equitable Birth Outcomes

Unfortunately, the causes of racial disparities in birth outcomes are largely unexplained. Because most studies focus on differential exposures to risk and protective factors during pregnancy, such as maternal behaviors, prenatal care utilization, and psychosocial stress or infections, there is not an adequate amount of information that can accurately account for the racial gap in birth outcomes.

If we begin to focus on relationships and social and economic conditions and their effects on the health and well-being of the mother and the infant, we may begin to develop a better understanding of infant mortality inequities. This approach is grounded in the social determinants of health theory: women and their babies must be viewed not only as individuals, but as members of families, communities, and larger systems that have either positive or negative impacts upon their psychological and physical states. The social economic and environmental influences, as well as other risk and protective factors within women's places of residence, work, and leisure must all be considered as factors that influence birth outcomes.

In addition to the effects of SDOH, Michael Lu and colleagues point to the importance of understanding birth outcomes using a life course perspective. The life course perspective conceptualizes birth outcomes as the end product of not only the nine months of pregnancy but the entire life course of the mother before the pregnancy. Disparities in birth outcomes, therefore, are the result of both differential exposures during pregnancy and differential developmental trajectories across the life span [27].

Based on this premise, Lu and colleagues have developed a 12-point plan to close the Black-White gap in birth outcomes (**Chart 10A**). The goals of this plan are to: 1) improve healthcare for African American women (points 1-4); 2) strengthen African American families and communities (points 5-8); and 3) address social and economic inequities that create a disproportionate toll on the health of African American women over their life course (points 9-12). Points 5-12 all reference SDOH beyond the health care system.

Efforts to address this 12-point plan are supported by the current report. In addition, many of the HOI indicators are related to points 5-12 in this plan. The recommendations provided in the conclusion section of this report offer strategies and resources that support the historic life perspective approach and the recommendations of Lu and colleagues.

12-Point Plan to Close the Black-White Gap in Birth Outcomes Michael Lu, et al. 2010.
A Life-course Approach 1. Provide interconception care to women with prior adverse pregnancy outcomes 2. Increase access to preconception care to African American women 3. Improve the quality of prenatal care 4. Expand healthcare access over the life course 5. Strengthen father involvement in African American families 6. Enhance coordination an integration of family support services 7. Create reproductive social capital in African American communities 8. Invest in community building and urban renewal 9. Close the education gap 10. Reduce poverty among African American families 11. Support working mothers and families 12. Undo racism

Health Equity Report Conclusion

Ten Things to Know About Health

1. *Health is more than health care.*
2. *Health is tied to the distribution of resources.*
3. *Racism imposes an added health burden*
4. *The choices we make are shaped by the choices we have.*
5. *High demand + low control = chronic stress*
6. *Chronic stress can be toxic.*
7. *Inequality – economic and political – is bad for our health.*
8. *Social policy is health policy*
9. *Health inequalities are not natural.*
10. *We all pay the price for poor health.*

-Unnatural Causes [47]

Chapter Overview

- The 2012 Health Equity Report identified several key factors that are associated with health inequities outcome in Virginia. Poverty, limited educational attainment, socioeconomic status, built environment, and place of residence are some of the more significant factors that create unequal opportunities to be healthy.
- The effects of unequal opportunities to be healthy can be seen in the disparities/inequities in life expectancy, HIV rates, birth outcomes and other health indicators in the Commonwealth among racial/ethnic minority, low income, inner city and rural populations. These health disadvantages lead to a significant economic cost to the Commonwealth.
- It is through the use of the newly developed HOI that we are able to identify some of the life situations through which socioeconomic disadvantage may affect health. Illustrating the association between these social determinants and life expectancy across different geographic areas of the state, the HOI demonstrates that greater access to the positive conditions defined within the HOI is associated with longer life expectancy.

Health Equity Report Conclusion

Article 1, Section 1 of the Virginia Constitution states:

> "*That all men are by nature equally free and independent and have certain inherent rights, of which, when they enter into a state of society, they cannot, by any compact, deprive or divest their posterity; namely, the enjoyment of life and liberty, with the means of acquiring and possessing property, and pursuing and obtaining happiness and safety.*"

This section of Virginia's guiding document embodies many of the values we hold dear: "*enjoyment of life and liberty*;" "*pursuing and obtaining happiness and safety*." Health is clearly a prerequisite to live out these values. In fact, optimal health among all Virginians is inextricably bound to our values and our ability to fulfill our potential, which ultimately contributes to the Commonwealth's realization of its potential as well.

Unfortunately, this report demonstrates the existence of **significant disparities/inequities in opportunities for all Virginians to be healthy**. Poverty and limited educational attainment are clearly associated with poorer health outcomes across all populations. Significantly higher rates of poverty and lower rates of educational attainment are seen among African Americans, American Indians, and Hispanics. African American and American Indian children were 2-3 times more likely to live in poverty in 2009. Moreover, Blacks were just as likely to live in low poverty census tracts as they were to live in high poverty census tracts. In fact, they were about 4 times more likely to live in high poverty census tracts than other racial and ethnic groups.

Rural populations in Virginia experienced similar levels of reduced opportunities to be healthy. Poverty was seen to extend across multiple areas of rural Virginia, including Southside, southwest, and the Eastern Shore. In addition, overall opportunities to be healthy, as defined by the distribution of the HOI across populations, were strongly patterned by income, race/ethnicity and place of residence (i.e. rural).

Education and income predict health so consistently because they influence individuals' self-perception and treatment in society, job opportunities and job security, resource availability in order to be healthy, environments in which they live, ability to make and carry out healthy decisions, exposure to other SDOH, and levels of stress and coping strategies [28]. For example, individuals and families living in poverty often must prioritize basic survival (paying rent and utilities, having sufficient food to eat, etc.) over engaging in healthy behaviors. In addition, they may experience poorer quality housing, limited access to health promoting resources, increased risk of violence, fewer educational and job opportunities, and other barriers that directly or indirectly influence health. As a result of these socioeconomic and environmental challenges, individuals in disadvantaged communities are also more likely to face higher levels of stress over extended periods of time from socioeconomic and environmental challenges that adversely affect the body (referred to as allostatic load) by causing over activation of the body's stress response system [28, 32].

The results of high and/or sustained levels of stress may include: 1) psychological effects such as anxiety, depression, and a feeling of helplessness; 2) over activation of the ”fight or flight” response, which increases the risk of hypertension and heart disease; 3) increased levels of the stress hormone cortisol which may increase the risk of obesity, diabetes, and depression; 4) increased levels of hormones that alter the body’s immune function and increase the risk of infection. Individuals often cope with high levels of stress through behaviors such as eating, drinking alcohol, smoking cigarettes, and using illegal drugs. Finally, the effects of excessive stress may build up over time and produce negative health consequences throughout an individual’s entire life and across generations [26, 28, 32].

Studies have found that individual socioeconomic status (SES) (e.g. level educational attainment, income level, wealth) and other social determinants have a greater impact on predicting health status than health behaviors and access to health care combined [22, 15, 24, 31]. In addition, neighborhood level socioeconomic factors affect health independently of individual level SES [8]. The association between individual and neighborhood level SES and poor health extends across multiple health outcomes with differing causes and associated risk factors. As a result, social determinants of health (SDOH) have been termed “fundamental causes of disease” [25]. Recent evidence suggests that approximately 245,000 deaths per year in the U.S. are attributable to low levels of education, 176,000 to racial segregation, 162,000 to low social support, 133,000 to individual-level poverty, 119,000 to income inequality, and 39,000 to area-level poverty [12]. These numbers are comparable to estimates of the number attributable to disease-specific causes of death (e.g. heart disease and cancer) and individual behaviors (e.g. smoking and physical activity).

The effects of unequal opportunities to be healthy in Virginia can be seen in the disparities/inequities in life expectancy, HIV rates, birth outcomes and other health indicators in the Commonwealth among racial/ethnic minority, low income, inner city and rural populations. Lower educational attainment is correlated with higher rates of mortality across every one of the major causes of death in Virginia, and with total mortality. In addition, Blacks have a higher overall mortality rate than Whites. Hispanics, who on average experience greater socioeconomic disadvantage than Whites, experience lower mortality rates. This may be due in part to the Latino-paradox. Research suggests this phenomenon is partially related to stronger social networks among Latino immigrants [10]. Other factors related to the Latino paradox may include the migration of healthier individuals to the U.S., the return of older and ill individuals to their native born country, and misclassification of Latinos at death. However, published studies have found that as Latinos and other immigrants become acculturated to the United States by acquiring American norms and behaviors, losing their traditional social networks and hopefulness that brought them to the U.S., experiencing racism and socioeconomic disadvantage, their health outcomes worsen [20].

In addition to a shortened life span, inequities in health are also seen in higher morbidity among lower SES groups, racial/ethnic minorities, and rural population in the Commonwealth of Virginia. **These health disadvantages lead to a significant economic cost to the Commonwealth.** Our analysis indicates that this amounts to a cost equivalent to 1.9% of Virginia's GDP for education related disparities/inequities in health, whether through health care costs, lost productivity, or premature death. Localities with poor health status face higher costs in general in relation to those that are healthier. In fact, the opportunity costs of health disparities/inequities to localities and the Commonwealth as a whole are significant. Funds that could be spent on creating opportunities to be healthy are instead spent on treating disease. It is estimated that health inequities account for the equivalent of 10% of all health care costs for the Commonwealth.

The HOI helps to identify some of the life situations through which socioeconomic disadvantage may affect health. In addition, the HOI shows the association between these social determinants and life expectancy across different geographic areas of the state. In fact, there is a **26 year difference in life expectancy across census tracts in Virginia**. Greater access to the positive conditions defined within the HOI is associated with longer life expectancy. Access to these conditions is strongly patterned by race, ethnicity, and place of residence. Many of the geographic areas with limited opportunities to be healthy are located in the urban inner city including Richmond, Petersburg, Norfolk; rural Southside, southwest and far southwest Virginia; and smaller urban/mixed urban areas in predominantly rural Virginia such as Danville, Martinsville, and Lynchburg.

Life expectancy incorporates the impact of all causes of death at each age group. While the specific causes of disparities in deaths may vary across Virginia, focusing on how life expectancy relates to the HOI demonstrates the impact of social, economic, and environmental factors across the range of causes. Many of the health outcomes with the greatest inequities have differing risk factors associated with them (e.g. heart disease, infant mortality, unintentional injuries), thus supporting the notion that adverse SDOH act as fundamental causes of disease. Using this lens reinforces the importance of addressing SDOH and their distribution across demographic and geographic groups in Virginia as critical strategies to promote health equity.

The additional analyses on birth outcomes and HIV using the HOI provide specific information on the association between the HOI and those outcomes; and which HOI indicators should be addressed to promote health equity. By studying the HOI indicators of a community, responses can go beyond the "one size fits all" approach and lead to interventions and policies that are responsive to true community conditions.

In addition, those communities that have *high* life expectancy, *low* rates of HIV, and/or *low* rates of LBW birth despite having *low* health opportunity are very informative as well. In essence, they may be success stories. Such successes may identify other factors within a community that buffer the impact of low health opportunity, thus producing better outcomes than expected. This information can benefit other communities with similar or lower levels of health opportunity.

Health Equity Report Recommendations

"If we don't change our direction we're likely to end up where we're headed."

- *Chinese Proverb*

Chapter Overview

- Recommendations geared at creating health equity are targeted to the collaborative efforts of individuals, families, communities, neighborhood associations, advocacy groups, local health districts, health care professionals, schools, employers, community planners, legislators, departments of housing, transportation, and economic development, elected officials, law enforcement, and others at the local and state levels.
- The report asserts that we must raise awareness of the importance of the social determinants of health and their distribution as root causes of health disparities/inequities. Guided by recommendations from the National Office of Minority Health and Virginia's Health Opportunity Index, the report promotes community involvement, improved educational attainment, affordability of transportation and housing, access to health care, social equality, improved food security, and other strategies.
- In short, integrating a health equity lens into all polices is necessary in order to achieve our goal of **Health Equity for All Virginians.**

Health Equity Report Recomendations

To provide national leadership in promoting health equity, in 2011 the National Office of Minority Health (NOMH) within the U.S. Department of Health and Human Services released their National Stakeholder Strategy for Achieving Health Equity (NOMH, 2011). This plan identifies five (5) primary goals that are necessary to promote health equity:

1. **Awareness**—*Increase awareness of the significance of health disparities, their impact on the nation, and the actions necessary to improve health outcomes for racial, ethnic, and underserved populations.*

2. **Leadership**—*Strengthen and broaden leadership for addressing health disparities at all levels.*

3. **Health System and Life Experience**—*Improve health and healthcare outcomes for racial, ethnic, and underserved populations.*

4. **Cultural and Linguistic Competency**—*Improve cultural and linguistic competency and the diversity of the health related workforce.*

5. **Data, Research, and Evaluation**—*Improve data availability and coordination, utilization, and diffusion of research and evaluation outcomes.*

Four (4) cross-cutting principles that are central to these goals are 1) community engagement; 2) partnership development; 3) cultural and linguistic competency; and 4) non-discrimination in healthcare access and delivery. Finally, within the five (5) primary goals, NOMH has developed twenty (20) key strategies. See **figure 11A** for the listing of key strategies.

SUMMARY OF NPA GOALS AND STRATEGIES		
GOAL #	**GOAL DESCRIPTION**	**STRATEGIES**
1	**AWARENESS** — Increase awareness of the significance of health disparities, their impact on the nation, and the actions necessary to improve health outcomes for racial, ethnic, and underserved populations	1. **Healthcare Agenda** Ensure that ending health disparities is a priority on local, state, tribal, regional, and federal healthcare agendas
		2. **Partnerships** Develop and support partnerships among public, nonprofit, and private entities to provide a comprehensive infrastructure to increase awareness, drive action, and ensure accountability in efforts to end health disparities and achieve health equity across the lifespan
		3. **Media** Leverage local, regional, and national media outlets using traditional and new media approaches as well as information technology to reach a multi-tier audience — including racial and ethnic minority communities, youth, young adults, older persons, persons with disabilities, LGBT groups, and geographically isolated individuals — to encourage action and accountability
		4. **Communication** Create messages and use communication mechanisms tailored for specific audiences across their lifespan, and present varied views of the consequences of health disparities that will encourage individuals and organizations to act and to reinvest in public health
2	**LEADERSHIP** — Strengthen and broaden leadership for addressing health disparities at all levels	5. **Capacity Building** Build capacity at all levels of decision making to promote community solutions for ending health disparities
		6. **Funding Priorities** Improve coordination, collaboration, and opportunities for soliciting community input on funding priorities and involvement in research and services
		7. **Youth** Invest in young people to prepare them to be future leaders and practitioners by actively engaging and including them in the planning and execution of health, wellness, and safety initiatives
3	**HEALTH SYSTEM AND LIFE EXPERIENCE** — Improve health and healthcare outcomes for racial, ethnic, and underserved populations	8. **Access to Care** Ensure access to quality health care for all
		9. **Children** Ensure the provision of needed services (e.g., mental, oral, vision, hearing, and physical health; nutrition; and those related to the social and physical environments) for at-risk children, including children in out-of-home care
		10. **Older Adults** Enable the provision of needed services and programs to foster healthy aging
		11. **Health Communication** Enhance and improve health service experience through improved health literacy, communications, and interactions
		12. **Education** Substantially increase, with a goal of 100%, high school graduation rates by working with schools, early childhood programs, community organizations, public health agencies, health plan providers, and businesses to promote the connection between educational attainment and long-term health benefits
		13. **Social and Economic Conditions** Support and implement policies that create the social, environmental, and economic conditions required to realize healthy outcomes
4	**CULTURAL AND LINGUISTIC COMPETENCY** — Improve cultural and linguistic competency and the diversity of the health-related workforce	14. **Workforce** Develop and support the health workforce and related industry workforces to promote the availability of cultural and linguistic competency training that is sensitive to the cultural and language variations of diverse communities
		15. **Diversity** Increase diversity and competency of the health workforce and related industry workforces through recruitment, retention, and training of racially, ethnically, and culturally diverse individuals and through leadership action by healthcare organizations and systems
		16. **Ethics and Standards, and Financing for Interpreting and Translation Services** Encourage interpreters, translators, and bilingual staff providing services in languages other than English to follow codes of ethics and standards of practice for interpreting and translation; encourage financing and reimbursement for health interpreting services
5	**DATA, RESEARCH, AND EVALUATION** — Improve data availability, and coordination, utilization, and diffusion of research and evaluation outcomes	17. **Data** Ensure the availability of health data on all racial, ethnic, and underserved populations
		18. **Community-Based Research and Action, and Community-Originated Intervention Strategies** Invest in community-based participatory research and evaluation of community-originated intervention strategies in order to build capacity at the local level for ending health disparitie
		19. **Coordination of Research** Support and improve coordination of research that enhances understanding about, and proposes methodology for, ending health and healthcare disparities
		20. **Knowledge Transfer** Expand and enhance transfer of knowledge generated by research and evaluation for decision making about policies, programs, and grant making related to health disparities and health equity

Figure 11A

The NOMH presents a comprehensive approach to achieving health equity and provides strategies that can be implemented at all levels. As described in this report, a growing body of evidence supports the importance of social determinants of health (SDOH) and their distribution among populations and neighborhoods as fundamental causes of disease. Health disparities/inequities are rooted in the reality that socioeconomically, racially/ethnically, and geographically diverse populations do not have the same opportunities to live long, healthy lives. As such, it is critical that efforts to promote health equity also have a major focus on these factors that shape opportunities to be healthy (i.e. SDOH).

Conceptual frameworks for promoting health equity, such as that depicted in **figure 11B**, recognize the importance of a multilevel approach.

Health Equity and Social Determinants of Health Framework

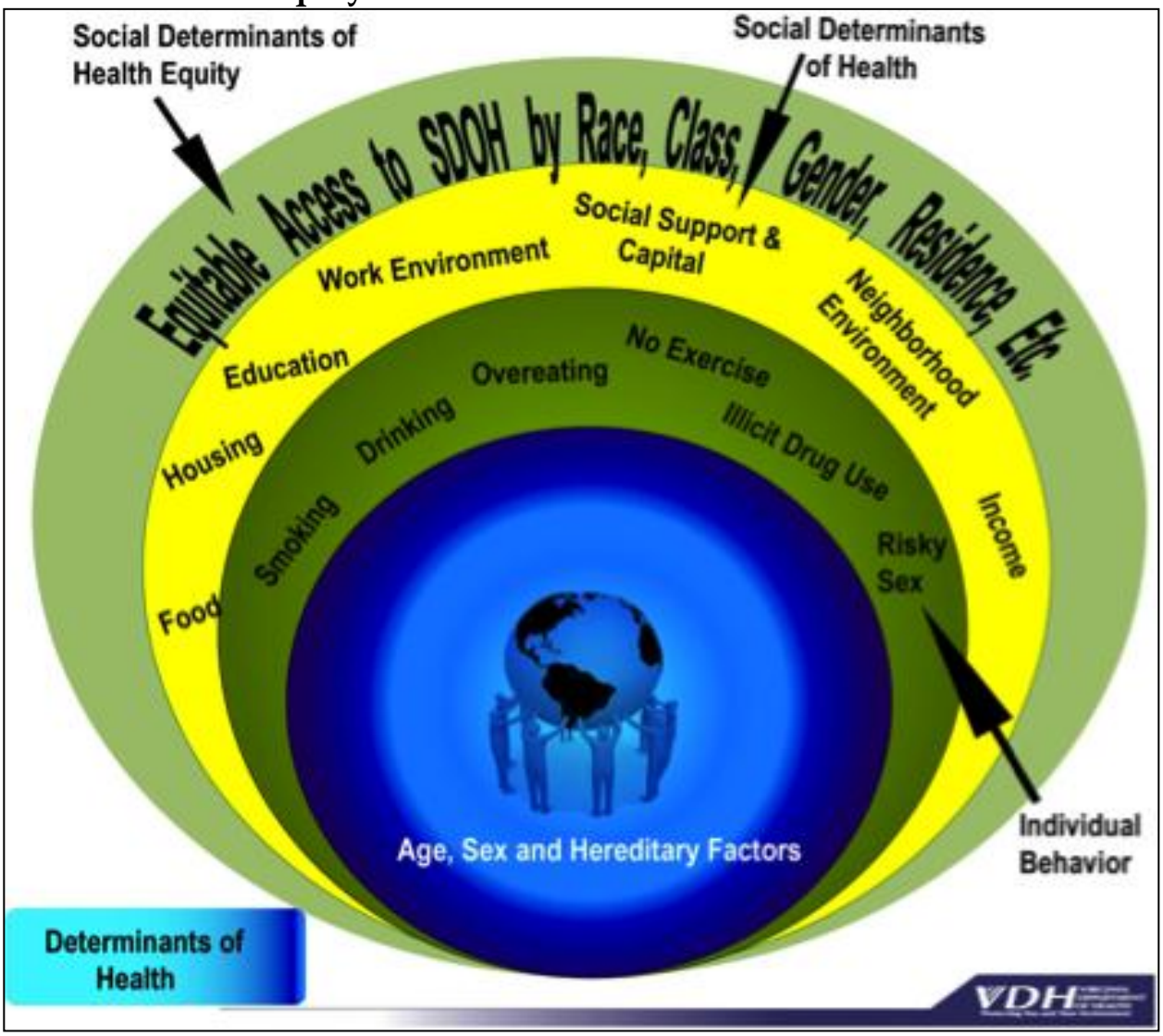


Figure 11B

In **figure 11B**:

The **inner circle** represents individual determinants as age, sex, and hereditary factors.

The **next circle** represents individual behaviors such as eating habits, physical activity, use of tobacco and other substances, and sexual behaviors. Strategies to change behaviors typically focus on individual level factors such as knowledge, attitudes, beliefs, self-efficacy, and motivation. Yet we know that the behavioral choices people make are also influenced by the choices they have. So the outer two circles create opportunities for behavior change.

The **outer circle** represents the social determinants of health that influence behaviors, exposure to toxins in the living and neighborhood environment, and levels of stress. These factors are influenced by health and non-health sectors. Therefore, collaboration across multiple sectors is necessary to assure that all policies are developed with an understanding of their influence on health outcomes, known as **"health in all policies."**

The **outer most circle** represents the social determinants of health equity. These include policy decisions and their influence on economic conditions and social structures that shape the distribution of SDOH by socioeconomic status, race and ethnicity, residence (urban-rural), etc. This level requires an awareness of how policies affect populations differently, and a conscious commitment to creating policies that provide broad based benefits with a particular focus on disadvantaged and marginalized populations and communities. This concept is known as **"health equity in all policies."**

Efforts to reduce health inequities usually focus on promoting access to quality health care or the individual behavior ring of the diagram. These factors are important. Yet, as discussed previously, the outer two rings (social determinants of health and health equity) must be focused on as well to effectively promote health equity throughout the Commonwealth.

The HOI provides a broad range of SDOH (outer circle of the framework) to consider in relation to health. The HOI includes factors related to the segregation of socioeconomic or racial/ethnic populations (Income Diversity and Racial Diversity); socioeconomic status and employment opportunities (Education Attainment, Job Participation, Townsend Index Material Deprivation; Affordability; Local Commuting Patterns); environmental hazards (EPA); rurality (Population Density); and population stability (Churning), which may influence social capital and social networks. The report also demonstrates that all racial, ethnic and socioeconomic populations and geographic areas do not have access to the same opportunities for health (outer most circle of the framework).

The analyses using the HOI occurred at two levels: statewide and census tract. The results support a multi-level approach to policy decisions because there is a significant association between the HOI and statewide life expectancy, HIV rate, and birth outcomes; and differing combinations of HOI are associated with outcomes in different regions of the state. This suggests that the development of state level policies that influence the quality of

HOI variables across all populations in Virginia should be part of strategies to improve health, life expectancy, birth outcomes, and HIV rates in the long term. In addition, local policy decisions focused on the HOI variables most closely associated with these outcomes in specific areas should be part of strategies to improve health locally. The combination of state and local level policy decisions that address disparities in access to HOI across populations and geographic regions could create a more comprehensive structure of health opportunity for all Virginians.

Future policy development must consciously strive to assure that opportunities to be healthy are equitably accessible to all Virginians. Focusing on the policy issues suggested by the HOI and related SDOH is supported by multiple national and international organizations and expert panels including Healthy People 2020; the MacArthur Foundation; the Robert Wood Johnson Commission to Build a Healthier America; World Health Organization's (WHO) Commission on the Social Determinants of Health; Policy Link; and the makers of the PBS documentary series "Unnatural Causes: Is Inequality Making us Sick?".

Based on the HOI and these organizations, the following policies are recommended to promote equitable opportunities for all Virginians to be healthy:

1. **Raise awareness of the importance of SDOH and their distribution as root causes of health disparities/inequities**

   - Raising awareness of the importance of SDOH and their distribution as root causes of health disparities starts with educating decision-makers, the media, and the general public about how patterns of inequity in our home, work, and educational environments, influence inequities in health. Recently, the Robert Wood Johnson Foundation released evidence-based recommendations on effective messaging to gain support for addressing SDOH [39].

For more information on these recommendations and more please visit:
A New Way to Talk About the Social Determinants of Health, Robert Wood Johnson Foundation : http://www.rwjf.org/vulnerablepopulations/product.jsp?id=66428
Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Robert Wood Johnson Foundation Commission for a Healthier America: www.commissionhealth.org
World Health Organization Commission on the Social Determinants of Health: www.who.int/social_determiants/en/

2. **Promote community involvement, build social capital, and empower marginalized communities using community-based participatory approaches (CBPA) to support health equity**

CBPA is based on the principles of community-based participatory research, which recognize the community as a unit of identity, build on strengths and resources within the community, promote learning and empowerment, equalize power among participants, facilitate collaborative partnerships, address health disparities, and promote social change [16, 41, 12]. These strategies build the collective ability of residents of disadvantaged communities to actively engage in determining the presence of health opportunities in their living environments. CBPA also builds on the resources, knowledge, and skills of organizations and agencies that serve or represent residents in order to create systems that equally involve service providers and recipients. CBPA is believed to be an important component of promoting health equity because it responds to the evidence that social inclusion, social support, social networks, and social capital strongly influence health; and the development of interventions and policies that respond to the needs, life experiences, and assets of at-risk communities are more likely to be successful [41, 47, 51].

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Policy Link: www.policylink.org
Partnership for Working Families: www.communitybenefits.org
Community-Campus Partnership for Health: http://depts.washington.edu/ccph/index.html
The Community Toolbox: http://ctb.ku.edu/en/default.aspx

3. Conduct health impact assessment to inform policy makers about the impacts of their decisions on health and health equity

HIA is commonly defined as "a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population" [13]. The benefits of HIA are that it brings together decision-makers from a variety of sectors that influence the SDOH (e.g. economic development, land use planning, education, health, and environment) to collaborate on policy development. HIA encourages a deliberate focus on developing, evaluating, and implementing policies that equitably promote health opportunities (outer most circle) across socioeconomic, racial, ethnic, and geographic populations and communities so that policies actively create opportunities for all Virginians to be healthy, to achieve their potential, and to contribute to the Commonwealth's wellbeing. Examples of policy arenas in which HIA can be valuable are wage policies, transportation policies, and housing policies.

The use of HIA is encouraged by the World Health Organization, CDC, and others organizations in the U.S. and around the world.

For more information on these recommendations and more please visit:

Unnatural Causes Policy Guide: www.unnaturalcauses.org
Bay Area Regional Health Inequities Initiative: www.barhii.org
CDC: http://www.cdc.gov/healthyplaces/hia.htm;
World Health Organization: http://www.who.int/hia/en
Human Impact Partners: http://www.humanimpact.org/

4. Promote access to health opportunity neighborhoods for low income and racial/ethnic minority families and children in Virginia

Promoting access to health opportunity environments involves investing in the infrastructure in such communities. In addition, new and revitalized neighborhoods that promote mixed income housing and policies that assist low income families to "move to opportunity" are showing evidence of early success in promoting health. Many of the remaining recommendations in this report (recommendations 5-12) are components of the healthy neighborhoods all Virginians should be able to choose to live in.

Recommendation on promoting access to health opportunities for low income and racial/ethnic minority families and children in Virginia include policies that promote:

- Economic development
- Affordable housing
- Access to healthy and affordable foods
- Availability of safe and affordable places to be physically active
- Safe and inviting parks and green spaces
- Restrict noise and pollution
- Eliminate targeted marketing of tobacco and alcohol
- Minimize liquor, fast food and cigarette outlets

For more information on these recommendations and more please visit:

Move to Opportunity:
http://portal.hud.gov/hudportal/HUD?src=/programdescription/mto
Joint Center for Political and Economic Development:
http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Robert Wood Johnson Foundation, Commission for a Healthier America:
www.commissionhealth.org
Kirwan Institute for the Study of Race and Ethnicity: www.kirwaninstitute.org
Healthy Development Measurement Tool: http://thehdmt.org/
Design for Health: http://www.designforhealth.net/index.html

5. Improve educational attainment for all Virginians

Recommendations on educational policies include:

- Reduce class sizes;
- Reform school financing to equalize school spending and
- Access to quality K-12 education;
- Improve teacher compensation, training and support, and accountability;
- Increase resources for special needs children;
- Provide quality universal preschool; increase after-school programs and open facilities for community use; and
- Reduce financial barriers to college.

For more information on these recommendations and more please visit:

MacArthur Foundation: www.macses.ucsf.edu
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Center for Education Reform: www.edreform.org
Robert Wood Johnson Foundation, Commission for a Healthier America: www.commissionhealth.org

6. Address affordability of transportation and

a. Assure equitable access to multiple transit options

It is critical to refocus growth around public transportation and existing development so that all residents can participate in the local economy, while also protecting current residents from the potential for displacement. Transportation opportunities to link rural communities with major employment centers and other resources are also important. Other recommendations for improving access to multiple transit options include:

- Create opportunities for safe cycling and walking to work, grocery stores, etc.
- Create more accessible public transit for isolated rural and urban areas;
- Expand light rail transportation systems where appropriate;
- Promote "green" sources of energy for mass transit;
- Establish dedicated bus lanes.

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development:
http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Transportation Equity Network: http://www.transportationequity.org/
Smart Growth Online: www.smartgrowth.org
Healthy Development Measurement Tool: http://thehdmt.org/

b. Assure affordable and quality housing

- Create mixed income housing;
- Require affordable housing in local comprehensive plans;
- Enforce housing and rental codes to assure quality housing for low income residents.

For more information on these recommendations and more please visit:

Housing Opportunities Made Equal-
http://www.phonehome.org/Home/tabid/36/Default.aspx
U.S. Department of Housing and Urban Development-
http://www.hud.gov/offices/cpd/affordablehousing
Unnatural Causes Policy Guide: www.unnaturalcauses.org

7. Reduce exposure to environmental air toxins in all neighborhoods and disproportionate exposure in low income and minority communities

Air toxins are released in the environment in many forms including mobile sources; stationary sources such as factories, refineries, and power plants; as well as indoor sources like some building materials and cleaning solvents. Strategies to reduce air toxins in neighborhoods include:

- Provide appropriate clean-up and removal of toxic materials, "brownfields" and other environmental hazards;
- Avoid disproportionate sitting of landfills, industries that produce air pollutants, bus depots,

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Environmental Protection Agency: http://www.epa.gov/oar/toxicair/newtoxics.html
http://www.epa.gov/environmentaljustice/

8. Increase access to jobs that match skill levels of community residents

- Promote economic development in under resourced communities;
- Focus on job opportunities that match residents' skills;
- Provide job training so residents have the necessary skills for available jobs;
- Enhance transportation options so residents can access job opportunities.

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Jobs With Justice: www.jwj.org
United for a Fair Economy: www.faireconomy.org
Partnership for Working Families: www.communitybenefits.org
New York City Center for Economic Opportunity: http://www.nyc.gov/html/ceo/html/home/home.shtml

9. Reduce income inequality; provide sufficient wages and benefits

Reducing income inequality starts with assuring that workers have sufficient wages. Currently, the average cost of living in Virginia is roughly $28,000.00. Virginia's minimal wage is $7.25 per hour, averaging to about $16,240.00, approximately $12,000.00 below the estimated cost of living in Virginia.

Other recommendations for reducing income inequality include:

- Promoting unemployment insurance and the earned income tax credit; improve protections against layoffs;
- Training for the unemployed and job placement assistance;
- Provide sufficient insurance coverage to reduce health care costs for those with low income.

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Jobs With Justice: www.jwj.org
United for a Fair Economy: www.faireconomy.org
Partnership for Working Families: www.communitybenefits.org
New York City Center for Economic Opportunity: http://www.nyc.gov/html/ceo/html/home/home.shtml

10. Promote racial, economic, and gender equality

Equality can be achieved by addressing the underlying systems that reinforce inequitable opportunities. These systems can be described through an analysis of racism, which is one of the primary systems of oppression. Classism, sexism, as well as other forms of oppression (e.g. xenophobia, homophobia) Camara Jones, MD, PhD, with the CDC, defines three forms of racism: institutionalized, personal mediated and internalized racism. [20a]

Institutional racism is the differential access to the goods, services, and opportunities of society. When the differential access becomes integral to institutions, it becomes common practice, making it difficult to rectify. Institutionalized racism can be addressed in the structures of society, such as in law and their enforcement, the way organizations are run, and interventions designed. Laws and regulations should be developed to avoid disproportionately burdening disadvantaged populations. Organizations and agencies must critically evaluate their organizational policies, practices, and procedures to ensure their services and the manner in which they are provided do not inadvertently burden, exclude, or create unintended negative outcomes among the clients and communities they serve. For example, service providers should be culturally-diverse, -competent, and –humble; and services should be provided at times and in locations accessible by their clients, especially those who have limited access to transportation or are unable to access services during the normal workday. The media should proactively and be encouraged to present accurate and positive images of racial and ethnic minorities. Local jurisdictions and communities should actively acknowledge the history of racism and its present day impact; and engage residents, communities, and organizations in actions and policies to undo the impact of past actions and develop strategies to create healing and inclusion.

Personally-mediated racism includes the specific social attitudes inherent to racially-prejudiced discrimination, stereotyping, acts of commission, and acts of omission. In order to address personal mediated racism, organizations should establish clear and consistent policies regarding interpersonal interactions. Local jurisdictions and communities should actively acknowledge the history of racism and its present day impact; and facilitate discussions among residents to promote multi-racial/cultural awareness and respect. Individuals should proactive address racially discriminatory language and actions among family, friends, neighbors, co-workers, and community leaders.

Internalized racism is the acceptance, by members of the racially-stigmatized group, of negative perceptions about their own abilities and intrinsic worth, characterized by low self-esteem, and devaluing of others like them. This racism can be manifested through embracing “whiteness”, self-devaluation, helplessness, hopelessness, and disrespect and violence towards individuals from the same racial/ethnic background.

In order to address this type of racism, programs should be developed to build self-esteem and self-respect within stigmatized groups. Reducing internalized racism also requires concerted efforts to address the other two forms of racism to reduce the external cues, experiences, and structures arising from society, organizations, and individuals that serve to create internalized racism in the first place.

Again, while the forms of oppression and strategies cited relate to racism, they can also be applied to discrimination based on gender, class, and other social classifications.

For more information on these recommendations and more please visit:

Unnatural Causes Policy Guide: www.unnaturalcauses.org
Policy Link: www.policylink.org
Kirwan Institute for the Study of Race and Ethnicity: www.kirwaninstitute.org
Poverty and Race Research Action Council: www.prrac.org
The Praxis Project: www.thepraxisproject.org
King County Equity Initiative: http://www.kingcounty.gov/exec/equity.aspx

11. Improve food security

A household is considered food-secure when its occupants do not live in hunger or fear of starvation. In order to improve food security, families require access to healthy foods at reasonable prices. Currently, it is cheaper to eat unhealthy foods and more expensive to eat healthy foods. Lowering prices and expanding availability of foods in disadvantaged neighborhoods increases food security.

Other recommendations for improving food security include:

- Enforce regulation and monitoring of food safety standards;
- Reform the subsidy program that rewards producers of processed foods;
- Implement food programs that target low income families (e.g. WIC and SNAP program) in a culturally and linguistically competent and inclusive manner;
- Create and implement sustainable organic agriculture and local food production
- Create community and school gardens in food insecure communities;
- Promote work and commuting patterns that give families the time and energy to prepare meals and eat together;
- Limit access to unhealthy foods in schools;
- Regulate advertising and targeted marketing;
- Create public-private partnerships to open and sustain full-service grocery stores in communities without access to healthful foods;
- Provide incentives for corner stores to stock healthy and affordable foods.

For more information on these recommendations and more please visit:

Health Inequalities-A challenge for local authorities: http://bit.ly/mhiUpv
Joint Center for Political and Economic Development –Why Place Matters: http://www.jointcenter.org/institutes/health-policy
Unnatural Causes Policy Guide: www.unnaturalcauses.org
Edible Schoolyard: www.edibleschoolyard.org
Institute for Agriculture and Trade Policy: www.iatp.org
Community Food Security Coalition: www.foodsecurity.org
Healthy Corner Store Initiative: http://www.thefoodtrust.org/php/programs/corner.store.campaign.php
Pennsylvania Fresh Food Financing Initiative: http://www.trfund.com/resource/downloads/Fresh_Food_Financing_Initiative_Comprehensive.pdf
Kirwan Institute for the Study of Race and Ethnicity: www.kirwaninstitute.org

12. Evaluate the impact of policies, programs, and practices to promote health equity

It is important to monitor policies, programs, and practices to determine if they are successful. The monitoring should track changes in health opportunities and health outcomes across socioeconomic, racial/ethnic, and geographic/neighborhood populations to adequately assess progress towards health equity. The HOI provides a useful tool to assess how community conditions are changing over time and how they relate to changes in life expectancy and other health measures.

Ultimately, the goal should be to **incorporate health and health equity into all policies**, whether they are developed at the local, state, or federal level and whether they are developed by traditional health agencies (e.g. health departments and hospitals) or agencies not traditionally considered to be health related (e.g transportation and housing). This requires collaboration by health and medical professionals with sectors that influence the social determinants of health. Examples of the "health and health equity in all policies" approach at the federal, state, and local levels include:

- The National Office of Minority Health has established the Federal Interagency Health Equity Team (FIHET). Its function is to identify opportunities for federal collaboration, partnership, coordination, and/or action on efforts that are relevant to National Stakeholder Strategy for Achieving Health Equity. FIHET includes representatives of the Departments of Agriculture (USDA), Commerce (DOC), Education (ED), Housing and Urban Development (HUD), Labor (DOL), Transportation (DOT), and the Environmental Protection Agency (EPA), Veterans Affairs (VA), Justice (DOJ), Homeland Security (DHS), and Defense (DOD) in order to collectively address the broad range of social determinants of health (http://minorityhealth.hhs.gov/npa/).

- The Governor's Interagency Council on Health Disparities in Washington State was passed into law in 2006. It was assigned responsibility for creating an action plan for eliminating health disparities by race/ethnicity and gender. The Council includes representation from consumers; the Governor's office; Commissions on African American, Asian, and Hispanic Affairs; Departments of Agriculture, Commerce, Early Learning, Ecology, Health, and Social Services; the Governor's Office of Indian Affairs; Health Care Authority; Public Instruction; Board of Health; and Workforce Training (http://healthequity.wa.gov/).

- The Joint Center for Political and Economic Studies, Health Policy Institute's Place Matters Initiative, which is funded by the W.K. Kellogg Foundation, has built a learning and practice network of local governments and their partners who are funded to develop strategies to address SDOH at the local level. Best practices for this approach are emerging from their work. Examples include a local ordinance to require the promotion of equity within all local government policies, practices, procedures, and programs; and interdepartmental councils to incorporate health considerations into decision making among all local governmental agencies. (http://www.jointcenter.org/hpi/pages/place-matters)

Conclusion

Achieving health equity is a top priority of the Virginia Health Department. This can only occur through the collaborative efforts of individuals; families; communities; neighborhood associations; advocacy groups; local health districts; health care professionals; schools; employers; community planners; legislators; departments of housing, transportation, and economic development; elected officials; law enforcement; and others at the local and state levels. As collaborations among these partners develop and institutionalize a commitment to promoting health equity, Virginia will continue to inch closer to creating healthy opportunities and optimal health outcomes for all of our residents.

"Decisions that government and corporations make every day benefit some and burden others. Unfortunately, they often reinforce class, racial and gender inequities that contribute to unequal patterns of illness and premature death. Building a social movement that can advocate effectively for more equitable social and economic policies is critical to changing our economic, physical and social environments so that they promote rather than threaten our health"

Unnatural Causes [47]

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