

# PLACE MATTERS FOR HEALTH IN BALTIMORE:

Ensuring Opportunities for Good Health for All

*A Report on Health Inequities in Baltimore, Maryland*





# **PLACE MATTERS FOR HEALTH IN BALTIMORE:**

## **Ensuring Opportunities for Good Health for All**

### **A Report on Health Inequities in Baltimore, Maryland**

**Prepared by the  
Joint Center for Political and Economic Studies**

**In Conjunction With  
The Center on Human Needs, Virginia Commonwealth University  
and The Virginia Network for Geospatial Health Research  
and The Baltimore PLACE MATTERS Team— housed at Equity Matters, Inc  
a Collaborative, Community Based 501-c-3**

**JOINT CENTER FOR POLITICAL AND ECONOMIC STUDIES  
NOVEMBER 2012**

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This research was supported by Award Number 1RC2MD004795-01 from the National Institute on Minority Health And Health Disparities. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center on Minority Health And Health Disparities or the National Institutes of Health.

The Joint Center for Political and Economic Studies and the PLACE MATTERS initiative are supported by a generous grant from the W.K. Kellogg Foundation.

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Printed in the United States.

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## FOREWORD

Place matters for health in important ways, according to a growing body of research. Differences in neighborhood conditions powerfully predict who is healthy, who is sick, and who lives longer. And because of patterns of residential segregation, these differences are the fundamental causes of health inequities among different racial, ethnic, and socioeconomic groups.

The Joint Center for Political and Economic Studies and the Baltimore, MD, PLACE MATTERS Team are pleased to add to the existing knowledge base with this report, *PLACE MATTERS for Health in Baltimore: Ensuring Opportunities for Good Health for All, A Report on Health Inequities in Baltimore, MD*. The report, supported by a grant from the National Institute on Minority Health and Health Disparities (NIMHD) of the National Institutes of Health, provides a comprehensive analysis of the range of social, economic, and environmental conditions in Bernalillo County and documents their relationship to the health status of the county's residents.

The study finds that social, economic, and environmental conditions in low-income and non-white neighborhoods make it more difficult for people in these neighborhoods to live healthy lives.

The overall pattern in this report – and those of others that the Joint Center has conducted with other PLACE MATTERS communities – suggests that we need to tackle the structures and systems that create and perpetuate inequality to fully close racial and ethnic health gaps. Accordingly, because the Joint Center seeks not only to document these inequities, we are committed to helping remedy them.

Through our PLACE MATTERS initiative, which is generously supported by the W.K. Kellogg Foundation, we are working with leaders in 24 communities around the country to identify and address social, economic, and environmental conditions that shape health. We look forward to continuing to work with leaders in Baltimore and other communities to ensure that every child, regardless of their race, ethnicity, or place of residence, can enjoy the opportunity to live a healthy, safe, and productive life.

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*Ralph B. Everett*  
*President and CEO*  
*Joint Center for Political and Economic Studies*





## EXECUTIVE SUMMARY

*[I]nequities in health [and] avoidable health inequalities arise because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces.*

World Health Organization Commission on the Social Determinants of Health (2008)

Place matters for health in important ways. Neighborhood conditions—such as the quality of public schools; the age, density, and size of housing; availability of medical care and healthy foods; availability of good jobs; levels of exposure to environmental degradation and violence; and availability of exercise options—powerfully predict who is healthy, who is sick, and who lives longer. This study examined the relationships between place, race/ethnicity, and health in Baltimore, MD and attempted to address specific questions raised by the Baltimore PLACE MATTERS Team:

- What is the relationship between the racial/ethnic and socioeconomic composition of Baltimore communities and access to healthy and unhealthy food sources?
- What is the relationship between the racial/ethnic and socioeconomic composition of Baltimore communities and the housing conditions in which residents live?
- What is the relationship between neighborhood access to healthy and unhealthy foods and health outcomes?
- What is the relationship between neighborhood housing conditions and health outcomes?

The study found that:

- In 2009 more than one-fifth of Baltimore households had annual incomes below the federal poverty level (FPL).
- Within every income group in Baltimore, black residents were much more likely to be denied home loans than white residents. At the highest income levels studied (those with annual incomes higher than \$38,000), black applicants were nearly three times more likely to be denied a mortgage loan than white applicants.
- In 2007 the premature death rate in Baltimore for blacks was 1.8 times higher than it was for whites. The comparable statistic for the United States was 1.7 times.

- The variation in life expectancy between the healthiest and unhealthiest census tracts in Baltimore between 2005 and 2009 was 29.6 years. Low life expectancy was highly correlated with low rates of educational attainment and home ownership and high rates of poverty, crime, and housing and neighborhood stresses.

To be sure, these findings indicate only a correlation between neighborhood conditions and health; researchers cannot say with certainty that these neighborhood conditions caused poor health. But the overall pattern suggests that the clustering of social and economic distress in low-income and nonwhite neighborhoods constrains opportunities for people in these communities to live healthy lives.

Because African Americans and Latinos are far more likely than whites to be consigned to neighborhoods of concentrated poverty, the significance of place in health outcomes is tied to patterns of racial segregation and to racial inequities in health outcomes. Although the scope of this report does not permit us to examine in detail the reasons for and consequences of residential racial segregation, it must be noted that such segregation is largely a product of our history of racial discrimination and of intentional and targeted government policies that have institutionalized and perpetuated residential segregation. The triple burden of the stress of racism, low income, and residence in neighborhoods of concentrated poverty takes a huge toll on the health of individuals.

Among strategies that can address this triple burden are:

- Increase understanding of the social determinants of health among elected policy makers, community leaders, and health, social service, education, and community/economic development professionals through professional education and other tools;
- Monitor on an ongoing basis environmentally challenged and socioeconomically vulnerable communities and increase public sector efforts to engage with—and invest in—these communities;
- Aggressively tackle poverty by fully funding programs that focus on early childhood development and economic development (including job training incentives and enterprise and empowerment zones);
- Adopt land use policies that reflect an emphasis on smart and equitable growth, facilitate access to affordable housing for vulnerable populations, and promote housing mobility to help reduce the clustering of people in neighborhoods of concentrated poverty and in areas where exposure to environmental risks is highest;

- Keep youth in school and reduce risks for involvement in juvenile justice and criminal justice systems by reducing school expulsions and suspensions, and offering alternatives to incarceration including school-based teen courts, peer mediation programming, and restorative justice programming;
- Implement a public financing program to provide financial seed money to stimulate healthy food retail in neighborhoods with low food access;
- Increase the capacity of communities to hold decision makers accountable through building the capacity of grassroots/community leaders and through encouraging support for collaborative decision making and advocacy to address regional challenges;
- Require public decision makers and program implementers to consider the impacts of proposed actions on racial/ethnic equity in life opportunities, health, and well-being, and to adjust actions to maximize this goal. This *equity in all policies* approach should also be adopted by philanthropic and religious groups and other organizations serving the region.

Clearly, there is a strong moral imperative to enact policies to redress the inequalities of the past, as well as current inequities, in ways that will improve health for all. It should be unacceptable in the world's wealthiest society that a person's life can be cut short by nearly 30 years simply because of where one lives. But there also is a powerful economic incentive. A study released by the Joint Center for Political and Economic Studies in 2009 (*The Economic Burden of Health Inequalities in the United States*, by T.A. LaVeist, D.J. Gaskin, and P. Richard) found that direct medical costs associated with health inequities among African Americans, Hispanics, and Asian Americans approached \$230 billion between 2003 and 2006. When indirect costs, such as lowered productivity and lost tax revenue resulting from illness and premature death, were included, the total cost of health inequities exceeded \$1.24 trillion. Thus, for both moral and economic reasons, we must address health inequities and their root causes now.

## INTRODUCTION

*[I]nequities in health [and] avoidable health inequalities arise because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces.*

World Health Organization Commission on the Social Determinants of Health (2008)

Place matters for health. Where one lives is an important factor in determining health outcomes. And because of our history of racial oppression and the legacy of that oppression in residential patterns today, the intersection of place and race in the persistence of health disparities looms large.

Health outcomes are influenced by several factors—the quality and extent of medical care one receives, personal choices one makes with regard to behaviors such as healthy eating and exercise, and institutional policies and practices that are beyond the control of individuals. To a significant degree, all of these factors are a function of where one lives, works, and plays. In poor neighborhoods the availability of medical care, healthy foods, and exercise options are scarce and the levels of exposure to environmental degradation and violence are high. These conditions are powerful predictors of more sickness and shorter lives.

Thus, in neighborhoods of concentrated poverty, defined as neighborhoods in which 30% of the households live at or below the poverty level (approximately \$22,000 per year for a family of four), family physicians and medical specialists are in shorter supply, hospitals are likely to be less well-equipped, and clinics and emergency rooms are likely to be more crowded and to be served by overworked and often less-experienced personnel. Furthermore, because families are poor, they are less likely to have health insurance or own a car or have the transportation necessary to access better medical care. Therefore, illnesses are left untreated for too long, leading to more serious conditions; the quality of care for serious conditions such as cardiovascular problems and cancer often is inadequate and reflective of a lack of cultural understanding; and dental and sight problems may be ignored, leading to more serious problems and, in the case of children, affecting their ability to learn in school.

While people make personal choices with regard to behaviors that influence health, such as healthy eating and exercise, these choices are often severely limited for those living in neighborhoods of concentrated poverty. Adopting a healthier diet requires access to supermarkets or farmers' markets that sell fresh produce. These are sorely lacking in poor neighborhoods, and lack of transportation is a limiting factor in accessing such establishments in other neighborhoods. Regular physical

activity requires a conducive, built environment and access to safe parks, pedestrian routes, and green space for residents to walk, bicycle, and play. These facilities are far less likely to be available in poor, densely populated neighborhoods. Thus, conditions such as obesity and diabetes, often the products of poor diets and lack of exercise, are more frequent among residents of poor neighborhoods.

Institutional policies and practices beyond the control of individuals also play a significant role in health outcomes. Environmental pollutants from aging and unhealthy housing (often with peeling, lead-based paint), nearby factories and smokestacks, and toxic waste dumps are far more prevalent in poor neighborhoods, largely because the residents of these neighborhoods do not have the political or economic clout to resist them. Thus, children growing up in these neighborhoods are more likely to ingest lead, and develop subsequent cognitive development problems, and all residents are at higher risk for asthma and other conditions that are a product of these pollutants, as well as at risk from higher levels of violence.

In addition, access to a quality education and good jobs are severely limited in neighborhoods of concentrated poverty. Thus, people living in these neighborhoods not only are at much greater risk for health problems, but the difficulties in obtaining a good education and a decent job at a living wage can create a vicious cycle that perpetuates poor health.

The impact of these factors falls far more heavily on people of color, particularly African Americans and Hispanic Americans. Because of our history of racial oppression and the resulting patterns of residential segregation, poor nonwhite families are far more likely to live in neighborhoods of concentrated poverty than poor white families. The following are among the reasons that account for this situation:

- The wealth gap between whites and nonwhites—which had its origins in slavery, was augmented by intentionally discriminatory government policies in the century that followed the end of slavery, and now actually is widening due to the disproportionate targeting of nonwhite families by predatory lenders—has made it difficult for African Americans and Hispanic Americans to become home owners and to sustain home ownership.
- Negative racial stereotypes, which arose largely as a way to justify slavery and Jim Crow racism and that tend to demonize all nonwhite Americans, have, in the minds of many white Americans, stamped nonwhites, particularly African Americans and Hispanic Americans, as undesirable neighbors.

- Blatantly discriminatory mortgage underwriting policies of the Federal Housing Administration that denied mortgages to nonwhite families during the housing boom following World War II, augmented by the policy of “redlining” in predominantly nonwhite neighborhoods (detailed in Part II below), institutionalized residential segregation by blocking nonwhite families from suburban home ownership and locking them into dilapidated rental apartments in government-created ghettos in the inner cities.
- The discriminatory implementation of the GI Bill following World War II made it far more difficult for African American veterans to obtain mortgage loans or loans for a college education or to start a small business.

Despite enactment of the Fair Housing Act of 1968 and subsequent legislation that was designed to create equal opportunity for fair and integrated housing and home ownership, patterns of residential segregation have persisted, due in large part to ongoing racially biased practices such as redlining, steering, blockbusting, and predatory lending. The migration of African American families north during the mid-20th century seeking greater job opportunities and freedom from the stifling Jim Crow practices of the South, combined with white families leaving the cities for the more spacious suburbs, encouraged both by favorable mortgage terms not available to nonwhite families and by construction of the interstate highways that have facilitated commuting, intensified these racially biased practices and more fully embedded residential segregation in society. More recently, the situation has been exacerbated by resistance to the upsurge in immigration from Latin American countries. Thus, despite the growth of the nonwhite middle class, particularly the African American middle class, nonwhite families have remained disproportionately clustered in poor inner-city neighborhoods.

In many ways the racial history of Baltimore, particularly with regard to its residential patterns, is not unique from that of other major cities, particularly in the Northeast and Midwest. Population growth in Baltimore during the latter part of 19th century nearly doubled, and the city’s black population rose from 54,000 to 79,000, or to approximately 16-17% of the total. However, as Baltimore’s more affluent African American families began to make inroads into previously all-white areas to the west and northwest, white resistance grew. In 1910 the Baltimore City Council, spurred to action by the attempt of an African American family to move into a previously all-white neighborhood in the vicinity of Madison Avenue, McCulloh Street, and Eutaw Place, adopted what would become known as the West Ordinance. This ordinance mandated that from the date of its passage, no white person would be permitted to move to a block the majority of whose occupants were black, and no black person would be permitted to move to a block the

majority of whose occupants were white. According to historian Gretchen Boger, this was “the first attempt in the United States to legally separate the living space of blacks and whites,” and it created a situation she has characterized as “residential apartheid.”

Although the West Ordinance was declared unconstitutional in 1917, it created the context for actions ensuring that segregated residential patterns persist to this day in Baltimore. Systematic, institutional disinvestment and racism led to the serious degradation of primarily black neighborhoods. These efforts included redlining, blockbusting, and racial covenants restricting black ownership. In 1950, when the population of Baltimore reached its peak of 950,000, the population was approximately 25% black. However, during the next 30 years white flight became endemic, fueled by suburban growth and improved highways, while public housing and urban renewal projects concentrated black populations in dense and increasingly poor environments. This was accompanied by a decline in Baltimore’s public transportation system during the decade following World War II, thus making escape from poor neighborhoods even more difficult for poor families. By 1980 Baltimore’s population had declined to less than 800,000, but the African American percentage of the population had skyrocketed to 60%. Today, Baltimore is the 13th most segregated metropolitan area in the country.

Efforts in recent years to grow Baltimore economically have concentrated primarily on “big bang” economic development projects such as the Inner Harbor, which have generated increased tourism but have done little to improve conditions in the poor, predominantly African American neighborhoods of the city. In fact, within every income group in Baltimore, African American residents are much more likely to be denied home loans than white residents. At the highest income levels we studied—those with annual incomes higher than \$38,000—African American applicants were nearly three times more likely to be denied a mortgage loan than white applicants.

It is in this context that the Joint Center undertook to study the relationships between place, race, and health in Baltimore and to address the following specific questions raised by Equity Matters, the Baltimore PLACE MATTERS Team:

- What is the relationship between the racial/ethnic and socioeconomic composition of Baltimore communities and access to healthy and unhealthy food sources?
- What is the relationship between the racial/ethnic and socioeconomic composition of Baltimore communities and the housing conditions in which residents live?
- What is the relationship between neighborhood access to healthy and unhealthy foods and health outcomes?



- What is the relationship between neighborhood housing conditions and health outcomes?

The study found that:

- From 2005 to 2009 people residing in the census tract with the highest life expectancy lived an average of 29.6 years longer than those residing in the census tract with the lowest life expectancy.
- There was a statistically significant relationship between the housing quality of neighborhoods and life expectancy by census tract as well as rates of violent crime in census tracts.
- Life expectancy was significantly correlated with educational opportunity by community statistical area (CSA, a grouping of contiguous census tracts). Also by CSA, mortality attributable to drug use, homicide, and HIV/AIDS also correlated significantly with educational opportunity.
- Census tracts and CSAs with low-income residents and poor housing quality, poor educational opportunity, and poor health outcomes were moderately likely to cluster together, and such clustering was especially prevalent in particular stretches of East and West Baltimore.
- These clusters map onto areas of Baltimore that have experienced high levels of racial discrimination and segregation and systematic disinvestment over the last century, and that have faced persistent levels of poverty, racial segregation, and poor educational performance over the past four decades.

While we cannot say with certainty that the neighborhood conditions we have studied have caused poor health, the associations we document strongly suggest that the historical and contemporary clustering of social and economic distress in predominantly African American low-income areas of Baltimore highly constrains their residents' capacities to lead long and healthy lives. These place-based patterns are neither arbitrary nor benign. They reflect the deathly serious consequences of Baltimore's past and present racial and class discrimination, and they represent serious challenges to health and equity in Baltimore now and in the future.

This report focuses on the characteristics of the city of Baltimore and its communities, including education, housing quality, and neighborhood conditions, that may impact health outcomes. These characteristics are considered in relation to crime and life expectancy. Special consideration is given to the influence of residential segregation and the long-term legacy of historic redlining practices.

Part I of this report provides background information about the city of Baltimore, including population data, socioeconomic conditions, and health outcomes. Part II examines the relationship between the historic practice of redlining and its correlation with longitudinal measures of distress throughout the city of Baltimore. Part III examines the relationship between education and the quality of housing and neighborhood characteristics and how they relate to crime and health at the neighborhood level. Part IV presents conclusions from the analysis. Appendix A describes the data and methods used in preparing this report.

## I. Background: Population, Community Characteristics, and Health in Baltimore City

### *Population*

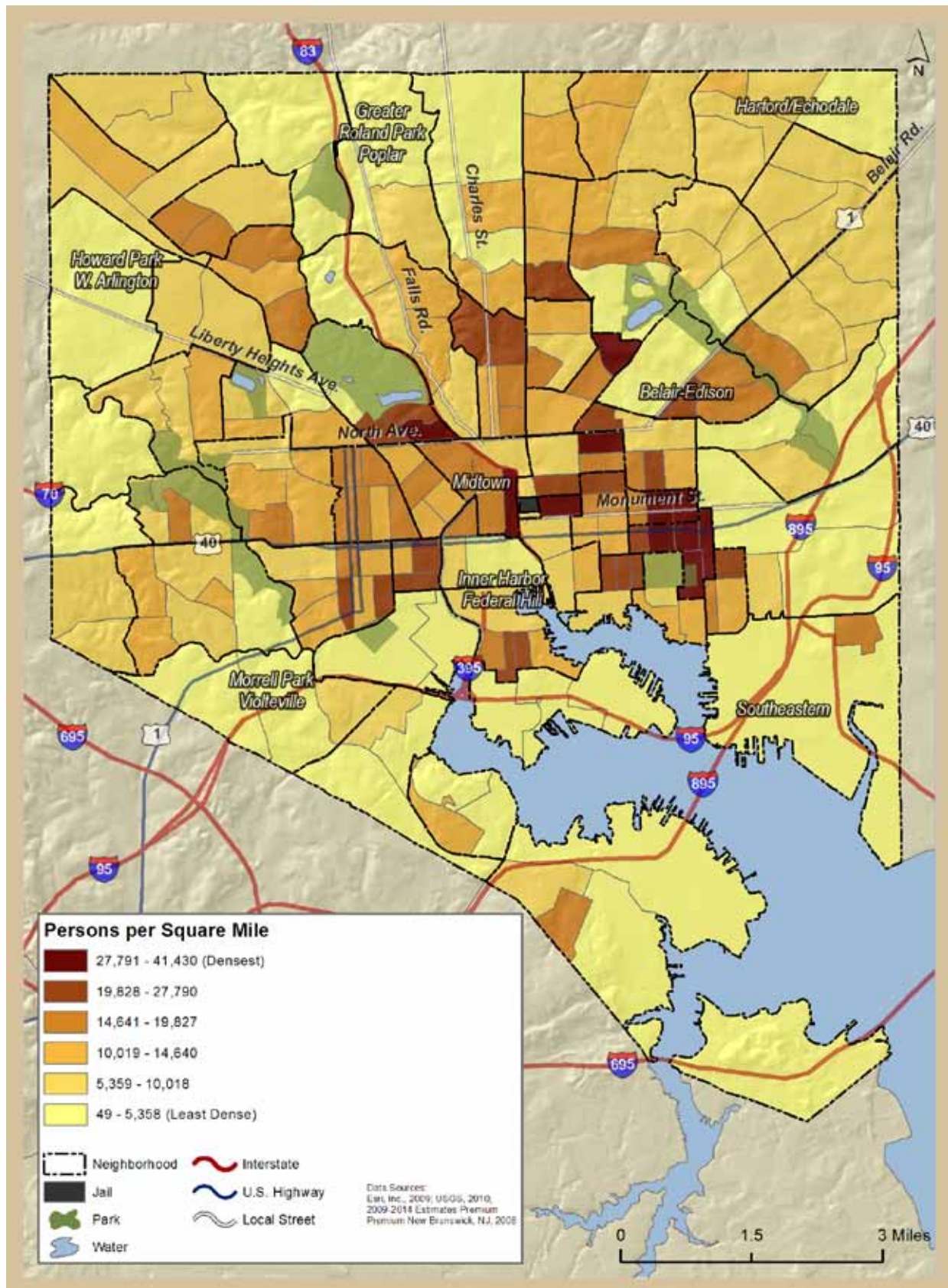
Baltimore is located roughly 30 miles north of Washington DC, off the coast of the Chesapeake Bay in the eastern portion of Maryland. With a population of 637,418 in 2009,<sup>31</sup> it is Maryland's most populous city and, due in part to its location on the Chesapeake Bay, a major seaport in the mid-Atlantic region. The overall population density in Baltimore was 7,973.3 persons per square mile in 2009, but by census tract it ranged from 48.6 persons per square mile in the Brooklyn/Curtis Bay/Hawkins Point area to over 41,400 in the Madison/East End area (see Map 1).<sup>32</sup> Baltimore is characterized by dense population in its central downtown area just north of the harbor, somewhat densely populated areas extending to the northeast and northwest, and sparsely populated tracts east and south of the harbor and along the city boundary lines.

In 2009, Baltimore's population was 62.1% black, 30.7% white, and 3.0% Hispanic. The comparative statistics for Maryland were 28.7% black, 56.7% white, and 7.2% Hispanic. For the United States the comparative statistics were 12.1% black, 64.9% white, and 15.8% Hispanic (see Table 1 and Figure 1).

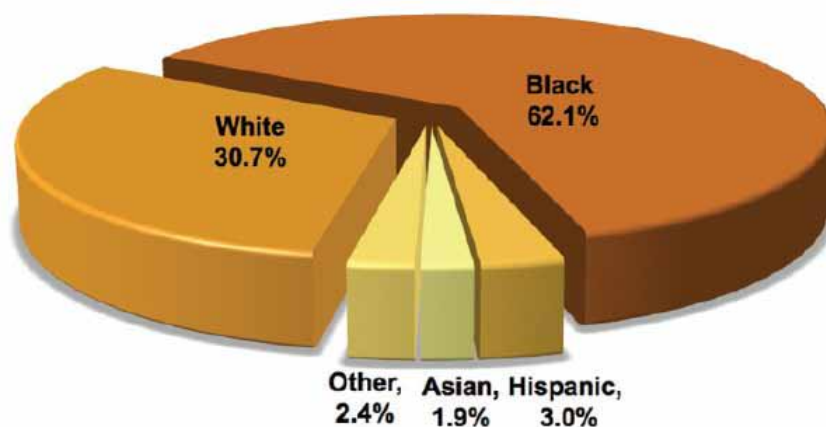
Historically, people of color have been relegated to isolated and segregated communities that perpetuate cycles of hardship through poor schools, limited employment and housing opportunities, and lack of access to capital. Because of this, the extent to which an area is racially segregated can impact the health outcomes of its residents.<sup>14, 33, 34</sup>

Racial and ethnic groups are concentrated differently in specific areas of Baltimore.<sup>14, 33, 34</sup> The Index of Dissimilarity is a measure of residential segregation that quantifies the percent of the population that would have to move in order to produce a completely integrated community. The higher the value, the more segregated the area. In 2009, the Index of Dissimilarity for the white and black populations of Baltimore was 69.8%.<sup>35</sup> This ranks Baltimore as the 13th most segregated area among the 100 largest metropolitan statistical areas in the U.S. Milwaukee, Detroit, metropolitan New York City, Chicago, and Cleveland occupy the top 5 spots, with an Index of Dissimilarity ranging

Map 1: Population Density by Census Tract, City of Baltimore (2009)



**Figure 1: Race/Ethnicity in City of Baltimore, MD (2009)**



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

Note: "Other" includes American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, and those who identify themselves as some other race or two or more races. Racial groups include the non-Hispanic population only; Hispanic can include any racial group.

**Table 1. Demographic Characteristics of the City of Baltimore, State of Maryland, and the United States**

	Baltimore	Maryland	United States
<b>Population (2009)<sub>(a)</sub></b>	637,418	5,699,478	307,006,556
<b>Population Density (2000)<sub>(b)</sub></b>	7,973.3	586.3	86.7
<b>Race/Ethnicity (2009)<sub>(a)</sub></b>			
White	30.7%	56.6%	64.9%
Black	62.1%	28.7%	12.1%
Hispanic	3.0%	7.2%	15.8%
Asian	1.9%	5.1%	4.4%
Other	2.4%	2.4%	2.8%

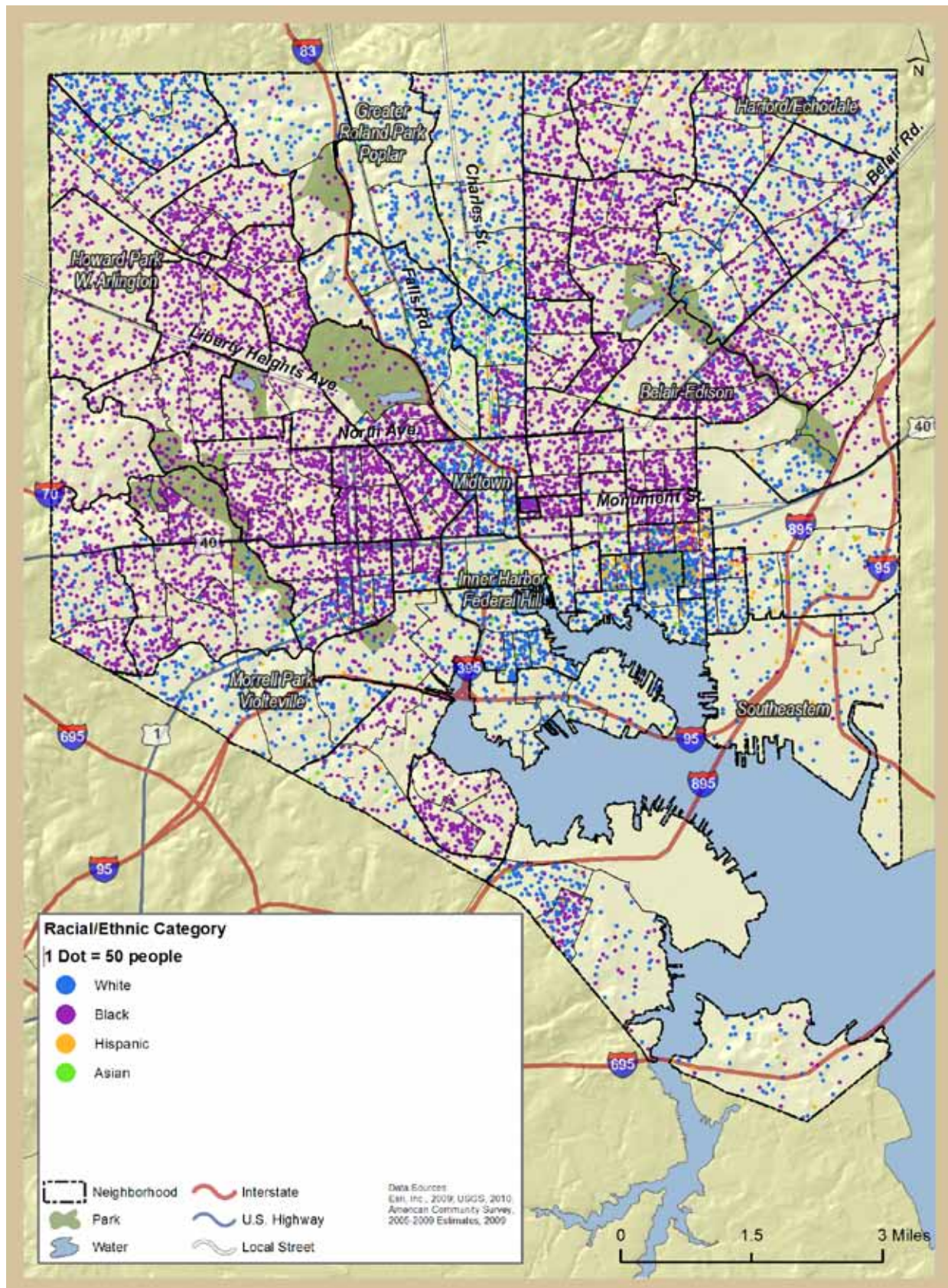
(a) Source: U.S. Census Bureau, 2009 American Community Survey

(b) Source: 2009 Geolytics Premium Estimates

Note: "Other" includes American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, and those who identified themselves as some other race or two or more races. Racial groups include the non-Hispanic population only; Hispanic can include any racial group.

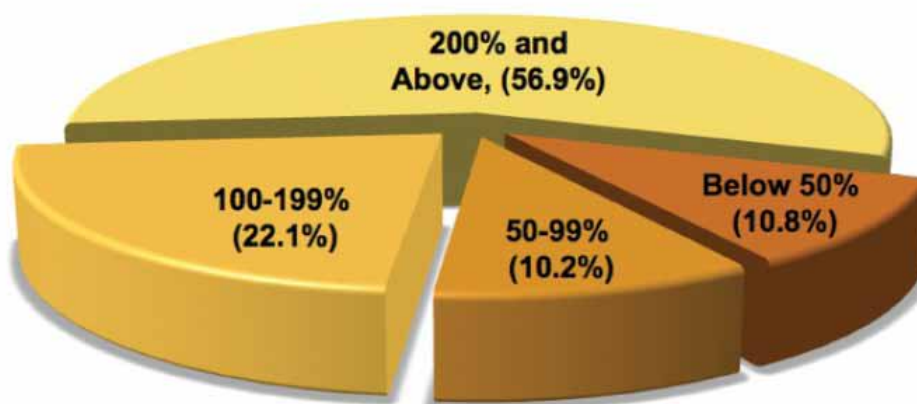


Map 2: Racial and Ethnic Distribution, City of Baltimore (2005–2009)





**Figure 2: Income-to-Poverty Ratio in City of Baltimore (2009)**



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

from 75.6% to 80.9%.<sup>36</sup> By comparison, the state of Maryland had an index of 65.0% in 2009.<sup>35</sup>

The Diversity Index is used to compare racial segregation at smaller geographic levels, such as the census tract. It measures the likelihood that two people randomly chosen from an area will be of a different race or ethnicity. The higher the value, the less segregated the area. While the index for Baltimore as a whole is 50.8%, the index ranges by census tract from 0% (no diversity) in tracts found in Sandtown-Winchester/Harlem Park, Greater Mondawmin, Greater Rosemont, and Brooklyn/Curtis Bay/Hawkins Point to 70.4% (high diversity) in Patterson Park North and East (between South Highland Avenue and Southeast Avenue and East Monument Street and Bank Street).

Map 2 illustrates the racial and ethnic distribution throughout Baltimore. Areas with a concentration of purple dots are predominantly black, while areas with a concentration of blue dots are predominantly white. The most diverse census tracts are in Patterson Park North and East. Half of the tracts in Highlandtown, Medfield/Hampden/Woodberry/Remington, and Morrell Park/Violetville are more than 90% white, while all of the tracts in Cherry Hill, Clifton-Berea, Dorchester/Ashburton, Edmonson Village, Forest Park/Walbrook,

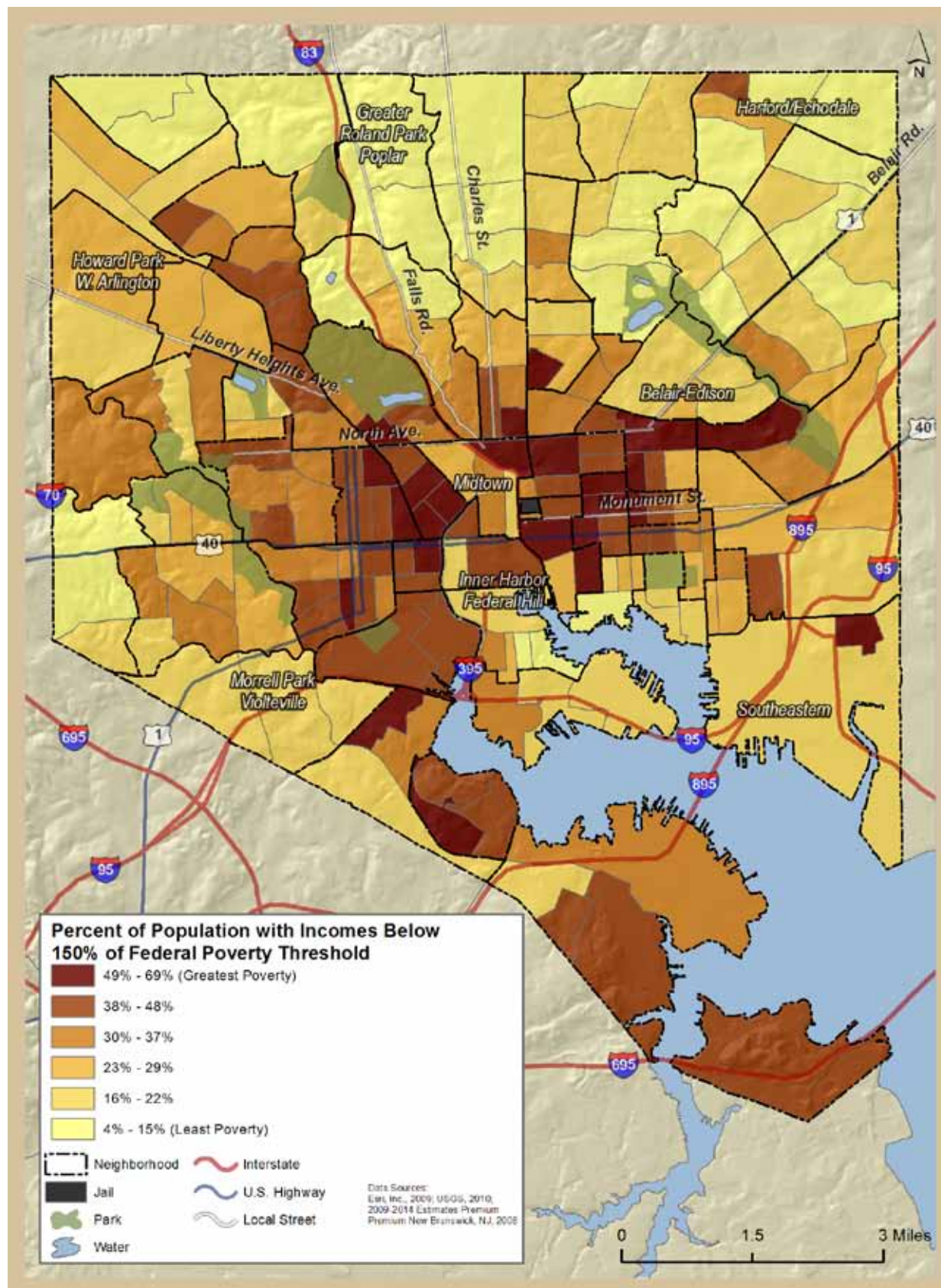
Greater Mondawmin, Greater Rosemont, Howard Park/West Arlington, Midway/Coldstream, Pimlico/Arlington/Hilltop, Sandtown-Winchester/Harlem Park, Southern Park Heights, and Upton/Druid Heights are more than 95% black.

### *Socioeconomic Characteristics*

As is true of other communities, socioeconomic conditions in Baltimore exert an important, and often unrecognized, influence on health status. Nationally, families living below the federal poverty level (FPL), meaning that they have an annual income of \$22,000 or less for a family of four, are 3.6 times more likely to report fair or poor health than those with incomes of at least twice the poverty level.<sup>37</sup>

As of 2009, more than one-fifth (21.0%) of households in Baltimore had incomes below the FPL.<sup>31</sup> The income-to-poverty ratio expresses household income as a percentage of the FPL. Figure 2 shows that in 2009, 10.8% of households in Baltimore earned less than half the FPL (a 0.5 income-to-poverty ratio), 21% of households earned less than the FPL, and 43.1% earned less than twice the FPL,<sup>31</sup> or less than \$44,100 for a family of four in 2009.

Map 3: Poverty by Census Tract, City of Baltimore (2009)



**Table 2. Socioeconomic Characteristics of the City of Baltimore, the State of Maryland and the United States**

	Baltimore	Maryland	United States
<b>Educational Attainment</b>			
Less than High School (K-12)	19.7%	11.8%	14.7%
High School Only	30.8%	26.7%	28.5%
Some College	23.4%	25.8%	28.9%
Bachelor's Degree or Higher	26.1%	35.7%	27.9%
<b>Poverty Rate</b>			
Below 50%	10.8%	4.2%	6.3%
50%-99%	10.2%	4.9%	8.1%
100-199%	22.1%	12.4%	18.4%
200% and Above	56.9%	78.5%	67.3%

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

The United States Census Bureau estimates that 23.6% of United States households had incomes below 150% of the FPL in 2009.<sup>31</sup> In Baltimore, 32.8% of the population had income less than 150% of the FPL, and 40.2% of Baltimore census tracts—representing 80 tracts—met or exceeded this level of poverty.<sup>32</sup> Map 3 illustrates the spatial distribution of this population in Baltimore. At least half of the population earned less than 150% of the FPL in at least half of the census tracts in Jonestown/Oldtown, Perkins/Middle East, Southeastern, and Upton/Druid Heights.

## Education

Education is a pathway to higher income and net worth, and it also can have a strong influence on health status and access to health care. In 2009, American adults (age 25 and older) with less than a high school education or equivalent had less than half the earnings (\$18,432 versus \$47,510)<sup>31</sup> of those with a college education and were three times more likely to die before age 65 than were those with a college education.<sup>38</sup> They were also more likely to engage in unhealthy behaviors such as cigarette smoking.<sup>39</sup>

In 2009, the percentage of the adult population with at least a bachelor's degree was lower in Baltimore than in either Maryland or the United States<sup>31</sup> (see Table 2). However, this varies greatly by neighborhood. In at least half of the census tracts of Cherry Hill, Claremont/Armistead, Clifton-Berea, Greenmount East, Midway/Coldstream, Sandtown-

Winchester/Harlem Park, Southern Park Heights, Southwest Baltimore, and Washington Village less than 5% of adults possessed a bachelor's degree in 2009 (see Map 4).

In 2009, white adults in Baltimore were 3.5 times more likely to have earned a bachelor's degree than black adults (see Figure 3).<sup>31</sup> Black adults in Baltimore were also significantly more likely to lack a high school diploma than non-Hispanic white adults.<sup>31</sup>

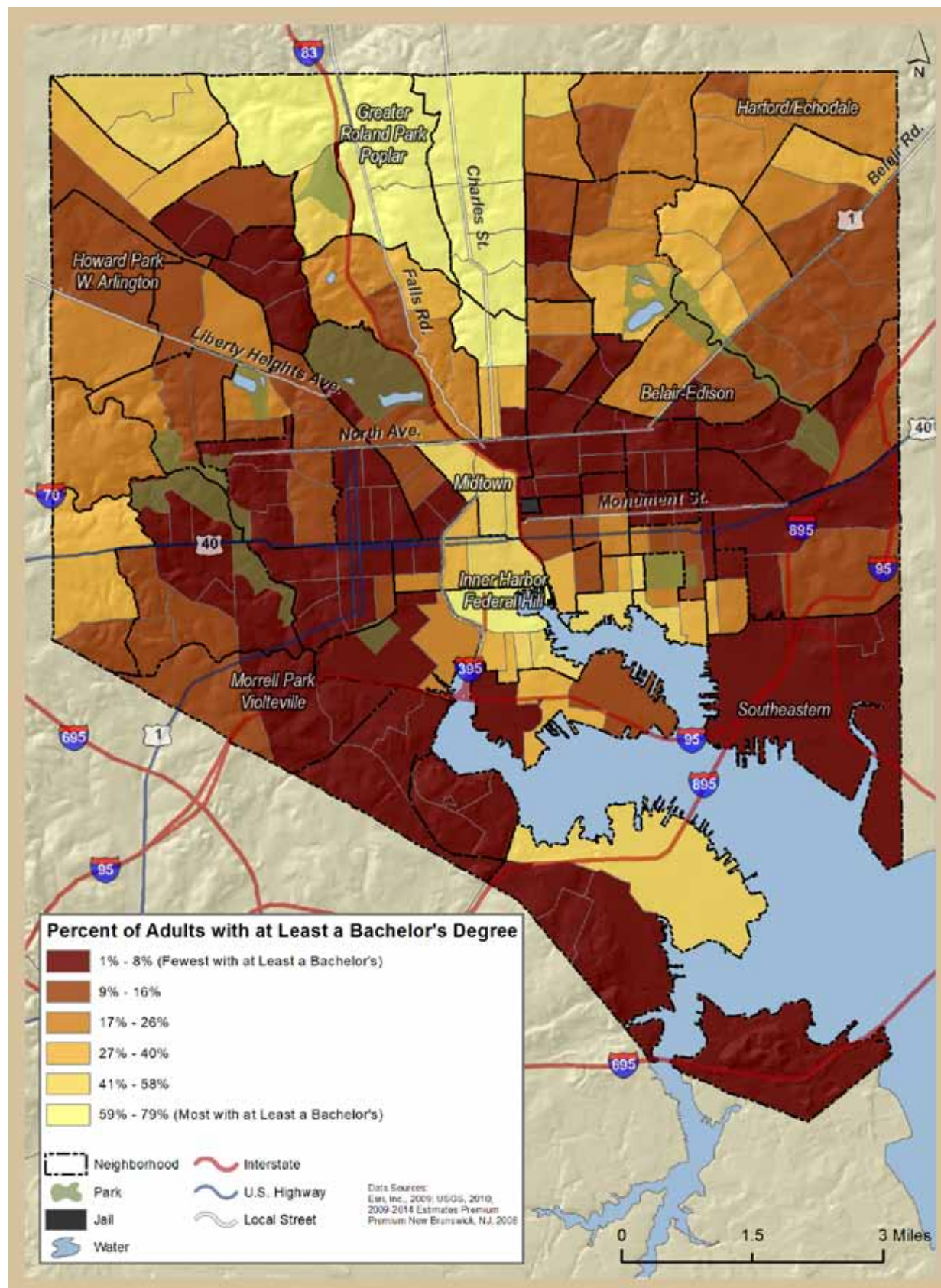
Besides educational attainment, measures of educational proficiency also vary by place. The National Assessment of Educational Progress (NAEP) draws samples of students in the 4th, 8th, and 12th grades to gauge the level of proficiency in various subjects. In 2009, the percentages of Baltimore 4th and 8th graders who scored below basic proficiency in reading, mathematics, and science were higher than the rates for the state of Maryland.<sup>40</sup> In most grades and subjects, the percentages that were below basic proficiency in Baltimore were twice the rates seen in Maryland.<sup>40</sup>

## Health Outcomes

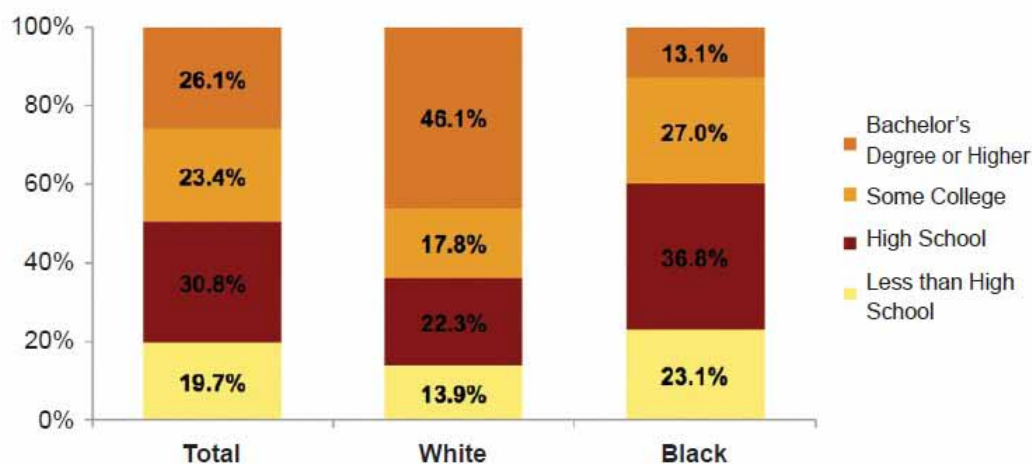
Disparities in health outcomes based on demographic factors are well established. In 2007, life expectancy at birth for the U.S. was 77.9 years. For blacks it was 73.6 years compared to 78.4 years for whites.<sup>41</sup> Nationally, blacks had the highest age-adjusted premature mortality rate (death prior to age 65) among racial or ethnic groups in 2007. The black rate for premature mortality was 384.7 premature deaths per 100,000 persons, or 163.2 per 100,000 higher than the white rate. Thus,



Map 4: Adults With a Bachelor's Degree, by Census Tract, City of Baltimore (2009)



**Figure 3: Educational Attainment in Baltimore City, MD (2009)**



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

for every white premature death, there were 1.7 black premature deaths. In Baltimore City, the premature death rate for blacks was 590.7 compared to 331.6 for whites, or a ratio of 1.8 black premature deaths for every white premature death.

The infant mortality rate in the U.S. for 2007 was 6.8 deaths per 1,000 live births, but again outcomes differed significantly by race.<sup>42</sup> For white mothers the infant mortality rate was 5.7 per 1,000; for black mothers it was 12.5 per 1,000, or more than double.<sup>42</sup> Infant mortality is more than 24 times greater for infants with a birth weight of less than 2,500 grams than it is for infants at or above this weight.<sup>41</sup> In the U.S., black mothers are almost twice as likely to deliver a child with a low birth weight compared to white mothers (13.7% to 7.2%, respectively).<sup>41</sup> Black mothers in Baltimore and Maryland are also at significantly higher risk of low birth weight (see Table 3) than are white mothers (15.1% vs. 8.8%).

Given the geographic variation in socioeconomic and environmental factors that affect health in Baltimore, it follows that health outcomes—including life expectancy—vary sharply by neighborhood within Baltimore as well (see Map 5). Between 2005 and 2009, life expectancy varied by 29.6 years between census tracts in Baltimore. The longest life expectancy (86.3 years) was found in Greater Roland Park/

Poplar between Falls Road and North Charles Street, north of Wyndhurst Avenue. The lowest life expectancy (56.7 years) was found in Upton/Druid Heights between North Freemont and Pennsylvania Avenue, north of West Franklin Street.

Other health outcomes, including heart disease mortality and homicides, vary sharply by place as well. The distribution of adverse outcomes is in part determined by social, economic, and demographic factors, all of which may be influenced by local, state, and federal policies seemingly unrelated to health. Part II of this report will investigate the long-term impact of redlining policy on distress in Baltimore neighborhoods.

**Table 3. Health Characteristics of City of Baltimore, the State of Maryland, and the United States**

	Baltimore City	Maryland	United States
<b>Life Expectancy</b>	72.7 <sup>(a)</sup>	78.7 <sup>(b)</sup>	77.9 <sup>(c)</sup>
<b>Premature Mortality* (2007)<sup>(d)</sup></b>	490.5	239.5	231.1
Non-Hispanic	496.8	246.2	238.4
Hispanic	N/A	103.1	173.0
White	331.6	205.5	221.5
Black	590.7	358.5	384.7
<b>All Cause Mortality Rate* (2007)<sup>(c)</sup></b>	1,078.1	783.1	760.2
Non-Hispanic	1,089.0	796.5	776.3
Hispanic	298.9	299.7	546.1
White	935.9	761.4	763.3
Black	1,181.3	935.0	978.6
<b>Low-Birth-Weight Rate (2008)<sup>(e)</sup></b>	12.8%	9.2%	8.2%
Non-Hispanic	13.2%	9.6%	8.6%
Hispanic	6.6%	7.0%	7.0%
White	8.8%	7.2%	7.2%
Black	15.1%	13.1%	13.7%

(a) Calculations performed by the VCU Center on Human Needs from 2005-2009 death data from the Baltimore City Health Department and population data from the 2009 Geolytics Premium Estimates and 2001-2008 Geolytics Premium Estimates datafiles.

(b) Calculations performed by the VCU Center on Human Needs from 2007 death data provided by the Centers for Disease Control and Prevention CDC WONDER Online Data Tool and population estimates from 2001-2008 Geolytics Annual Premium Estimates Database.

(c) Health, United States 2010: With Special Features on Death and Dying; the Centers for Disease Control and Prevention, 2007.

(d) 2007 Centers for Disease Control and Prevention CDC WONDER Online Data Tool.

\* Mortality statistics are per 100,000 population.

## II. Racial Segregation, Redlining, and Community Distress

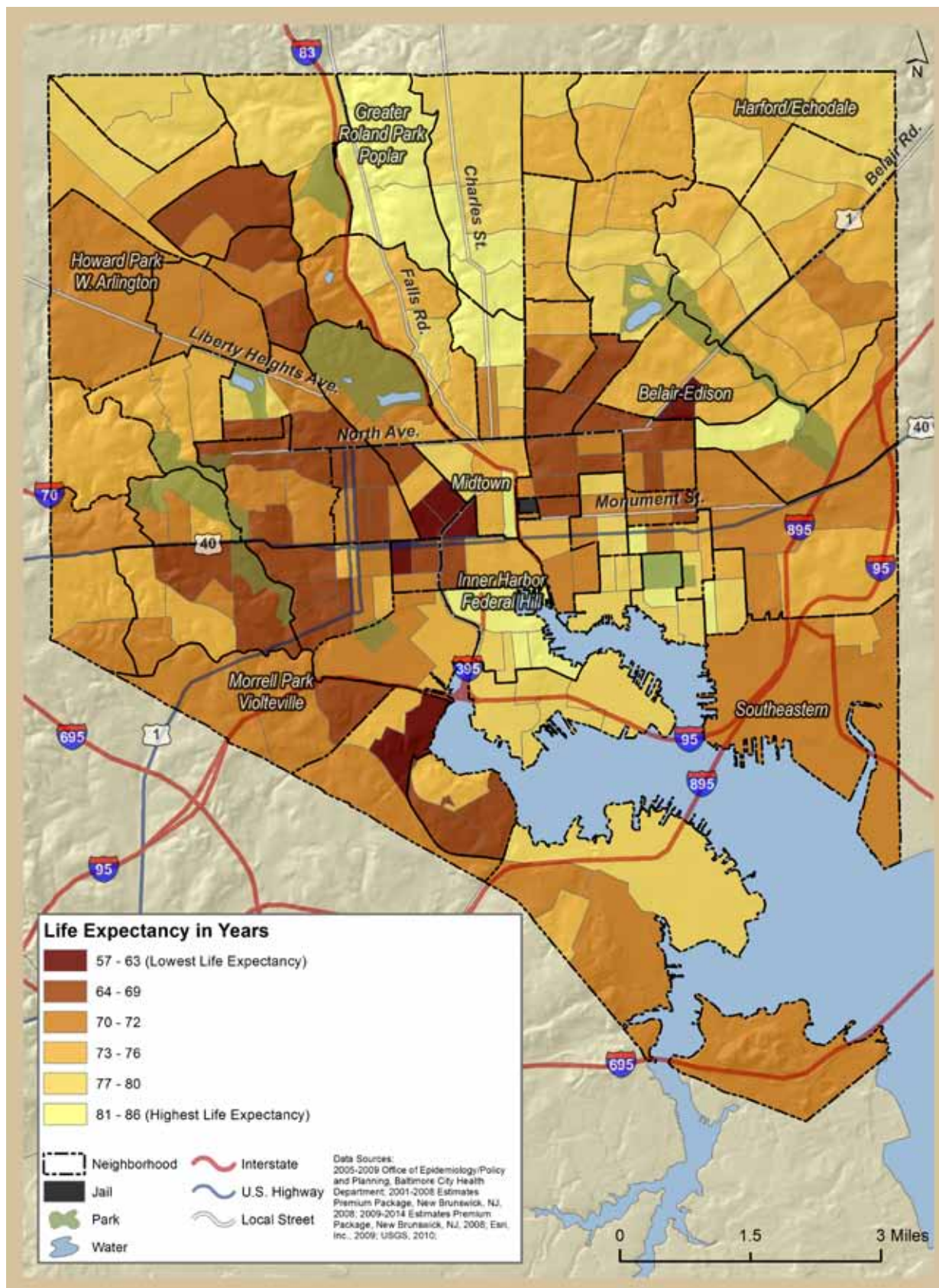
As noted earlier, and in a strong body of literature, health outcomes are dependent upon far more than health care.<sup>4-8</sup> Policies and community conditions that affect the well-being of a population (e.g., distribution of wealth, educational opportunity, employment opportunities, safe communities, adequate food sources, well-maintained and reliable housing, and lack of exposure to environmental pollutants) also play a significant role in determining health outcomes. For example, people living in areas with high home ownership tend to have enhanced social bonds, improved psychosocial and physical health, and positive outcomes for youth.<sup>43</sup> Conversely, communities with high per capita rates of liquor stores and

vacant buildings/lots tend to have higher rates of crime.<sup>44-46</sup> High crime rates can not only directly affect the health of those who are victims or perpetrators of crime, but they also can indirectly affect the health of neighborhood residents due to increased levels of stress.

Because of the association between health and social factors, policy decisions that impact other sectors of daily living may, irrespective of the intentions of decision makers, adversely impact health outcomes. During the early to mid-1930s, the housing market of the United States was still recovering from the Great Depression. In an effort to stimulate both home ownership and employment in the construction sector, the federal government enacted the National Housing Act of 1934, which established the Federal Housing Administration



**Map 5: Life Expectancy by Census Tract, City of Baltimore (2005–2009)**



**Table 4. Present-Day Baltimore Neighborhoods Redlined by the Home Owners' Loan Corporation (HOLC) in the 1930s**

Canton	Clifton-Berea	Downtown/Seton Hill
Fells Point	Greater Charles Village/Barclay	Greater Mondawmin
Greenmount East	Highlandtown	Inner Harbor/Federal Hill
Jonestown/Oldtown	Madison/East End	Medfield/Hampden/Woodberry/Remington
Midtown	Midway/Coldstream	Orangeville/East Highlandtown
Patterson Park North & East	Penn North/Reservoir Hill	Perkins/Middle East
Poppleton/The Terraces/Hollins Market	Sandtown-Winchester/Harlem Park	South Baltimore
Southeastern	Southwest Baltimore	The Waverlies
Upton/Druid Heights	Washington Village	

Source: HOLC residential security maps in HOLC City Survey Files, Record Group 195, National Archives, Washington, DC  
Note: Census tracts denoted as 'Redlined Tracts' may have been only partially included in high-risk areas of HOLC's Residential Security Maps.

(FHA).<sup>26</sup> As part of its operations, the FHA created the Home Owners' Loan Corporation (HOLC) to purchase mortgages that had already defaulted from smaller lenders<sup>47</sup> and sell them back to the original owners at lower interest rates and more generous financial terms.<sup>26</sup>

HOLC created a series of neighborhood-specific risk appraisals of mortgage markets for all United States cities with populations exceeding 40,000.<sup>26, 47</sup> The appraisals took the form of residential security maps<sup>47</sup> (known as redlining maps) that were color-coded to signify the level of investment risk assumed to exist in particular neighborhoods. Map 6 illustrates the risk investment categories used to designate Baltimore neighborhoods, with blue indicating the lowest risk and red indicating the highest. The areas of the city primarily affected by this risk classification system were in and around the present-day Inner Harbor and Downtown areas. Table 4 lists specific neighborhoods that were "redlined."

HOLC classified risk based on the age and condition of buildings, as well as the presence of an established or even a nascent nonwhite population.<sup>26, 48, 49</sup> New suburban developments that were home almost exclusively to white residents were considered the safest areas in which to invest.<sup>26, 49</sup> Those areas with predominantly black populations were considered the highest-risk areas, and those areas with even

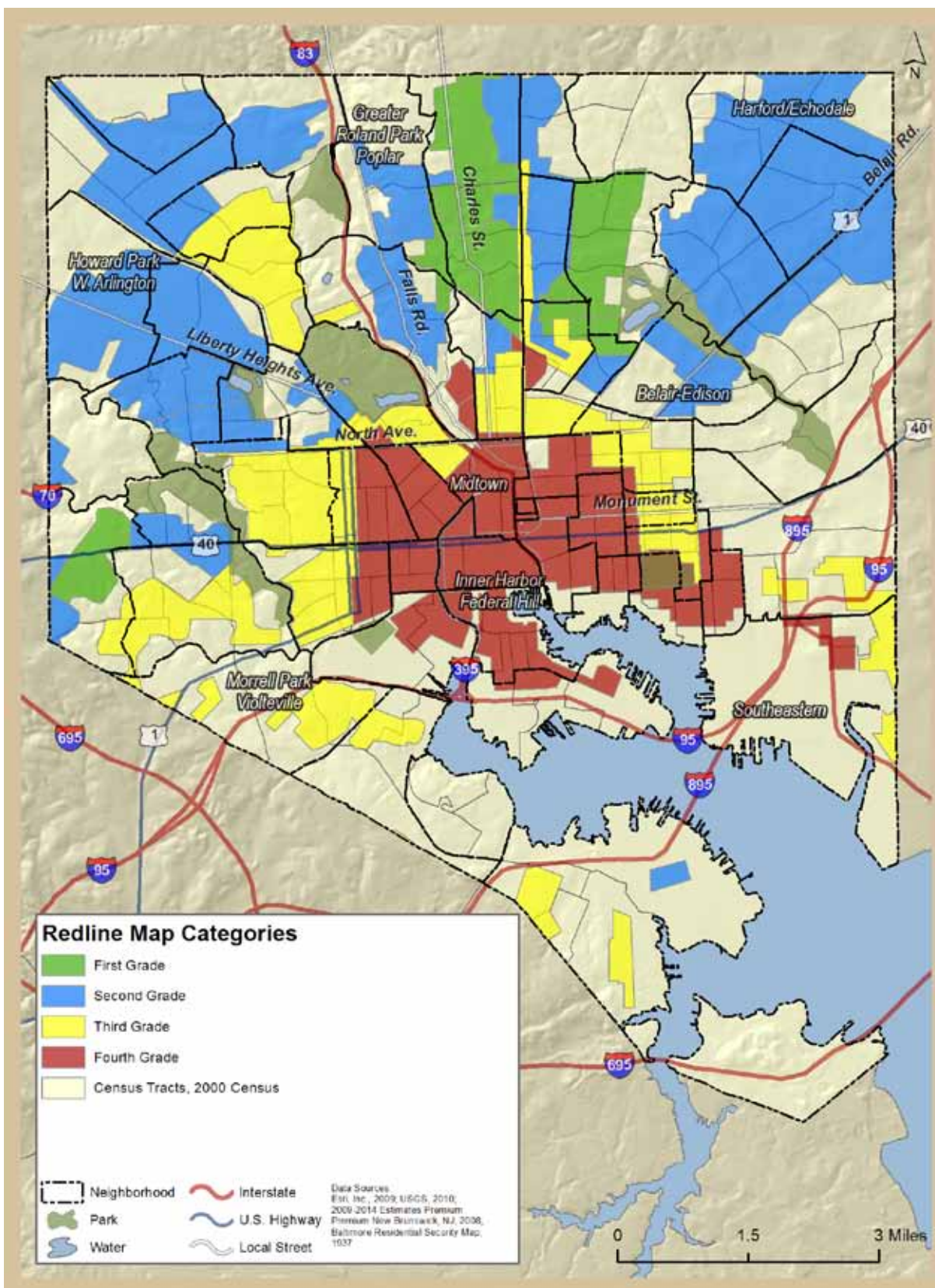
just a few black residents were considered to be at significantly increased risk. Thus, these classifications made it far more difficult for black residents to purchase homes than for white residents,<sup>26</sup> and this has had significant long-term negative effects on the ability of black residents to accumulate wealth in the form of home equity.

At the same time, the FHA restructured home loans from the previously restrictive terms regarding the required downpayment and the length of loans to today's more modern and easier terms. However, in order to qualify for a loan, homes had to meet FHA loan eligibility standards, including minimum lot size and separation from other structures.<sup>26, 47, 49</sup> Therefore, in addition to making it nearly impossible for black families to purchase homes in the suburbs, FHA practices precluded inner-city homes such as row houses from eligibility while increasing the availability of credit in the suburbs.<sup>49</sup>

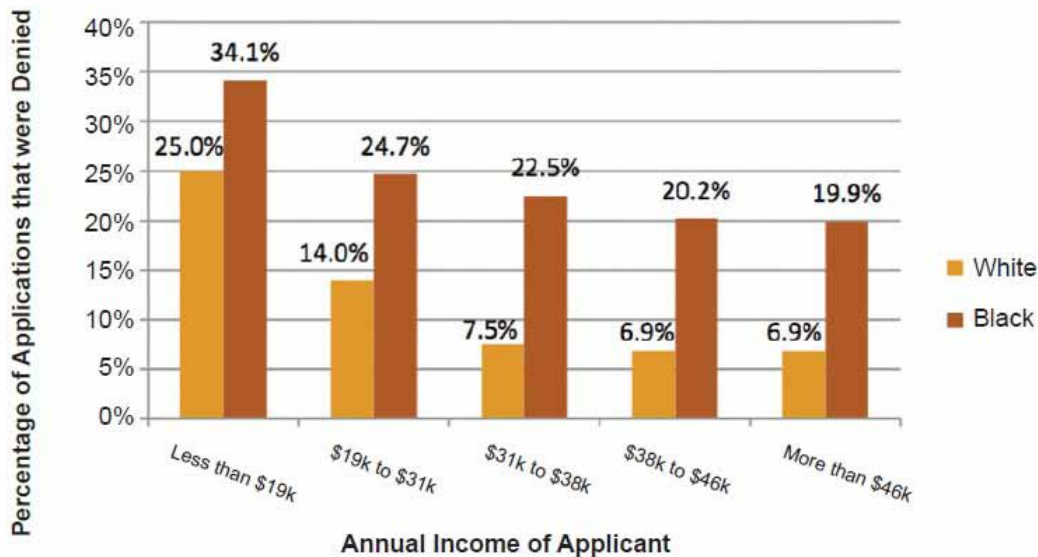
Although the impacts of these mortgage lending practices have varied among cities,<sup>49, 50</sup> practices such as those used by the HOLC, as well as by the private sector, not only made loans in inner-city areas far more difficult to obtain, they also encouraged white flight to the suburbs, increasing segregation and concentration of poverty in cities such as Baltimore.<sup>26, 49</sup> Federal legislation prohibiting discrimination in lending practices was not enacted until 1968.<sup>51-53</sup>



**Map 6: Home Owners' Loan Corporation Residential Security Map for Baltimore Circa 1930s (reproduced)**



**Figure 4: Percent of Home Loans Denied by Race and Income, Baltimore-Towson (2009)**



Source: 2009 Federal Financial Institutions Examination Council.

The assessment practices used by the HOLC and perpetuated by FHA loans from the 1940s to the 1960s substantially reduced the availability of credit for members of racial or ethnic minority groups. While such practices are no longer permissible by federal law, there remain major discrepancies between the availability of home loans for black Baltimore residents compared to white Baltimore residents. Figure 4 shows the percentage by race of home loan applications that were denied in Baltimore in 2009. Even within income groups, black Baltimore residents were much more likely to be denied home loans than white residents. For example, among those with annual incomes higher than \$38,000, black applicants were nearly three times as likely to be denied a mortgage loan than white applicants.

Table 5 presents data on the relationship between historical redlining and persistent “distress” from 1970 to 2009 in terms of home ownership, poverty, segregation, and education. We define distress in each of these categories as follows:

- **Home Ownership** – Census tracts in the bottom quartile for the percentage of housing units that are owner-occupied.
- **Poverty** – Census tracts in which greater than 20% of the population have annual incomes below the FPL.

- **Segregation** – Census tracts in which at least 90% of the population are of one race.
- **Education** – Census tracts in the bottom quartile for the percentage of adults with a bachelor’s degree.

Any tract that meets these definitions and has done so since at least the year 2000 is considered to be in persistent distress. We investigated tracts at five points: 1970, 1980, 1990, 2000, and 2009.

The findings in Table 5 show that previously redlined census tracts were significantly more likely to have distress spanning several decades in terms of home ownership and poverty. Census tracts that were at least partially redlined in the 1930s were almost five times more likely to be in the lowest quartile for home ownership in at least two census periods and more than six times more likely to be so for at least five census periods than were those census tracts that were not redlined. Redlined tracts were twice as likely to experience persistent poverty and more than three times as likely to do so for at least five census periods. Differences were not significant between redlined and non-redlined census tracts for the proportion of adults with a bachelor’s degree or the proportion of tracts composed of 90% or more of one race/ethnicity.

**Table 5. Persistent Distress by Redline Status, City of Baltimore (1970-2009)**

	Redline Census Tract by HOLC in 1930s	Non-Redlined Census Tract
<b>Home ownership (census tracts in the lowest quartile for home ownership rate)</b>		
Distressed Since At Least 2000	46.8%*	9.8%*
Distressed Since At Least 1970	35.1%*	5.7%*
<b>Poverty (poverty rate &gt; 20%)</b>		
Distressed Since At Least 2000	53.2%*	26.8%*
Distressed Since At Least 1970	44.2%*	13.8%*
<b>Segregation (tracts with 90% or more one race)</b>		
Distressed Since At Least 2000	48.1%	47.2%
Distressed Since At Least 1970	42.9%	30.1%
<b>Education (census tracts in the lowest quartile for adults with a bachelor's degree)</b>		
Distressed Since At Least 2000	20.8%	15.4%
Distressed Since At Least 1970	7.8%	4.9%

Source: 2009 Geolytics Premium Estimates; Geolytics Neighborhood Change Database.

Note: Census tracts denoted as "Redlined Tracts" may have been only partially included in high-risk areas of HOLC's Residential Security Maps.

\* Statistically significant at  $p < .05$ .

We produced a series of longitudinal maps to further investigate the relationship between historically redlined areas and persistent distress in Baltimore over the last five decades (1970 – 2009). Map 7 illustrates the census tracts of Baltimore that have persistently been in the lowest quartile for home ownership— an indicator of a lack of wealth.<sup>54</sup> The area framed by Kirby Lane, Route 1, and North Washington Street (north of the harbor) that was redlined in the residential security map has many census tracts that have had low owner occupancy rates over the past five decades. The previously redlined neighborhoods of Downtown/Seton Hill, Midtown, and Upton/Druid Hill have been in the lowest quartile over this period. It should be noted, however, that not all areas with persistently low home ownership were historically redlined (e.g., Dickeyville/Franklintown).

Most of the tracts that were redlined have lower home ownership rates, but some redlined areas have benefitted from significant redevelopment since the 1930s. The most significant redevelopment activity has occurred in Baltimore's Inner Harbor. As Map 6 shows, this area was almost entirely redlined by HOLC in the 1930s. At the time, it was mainly an

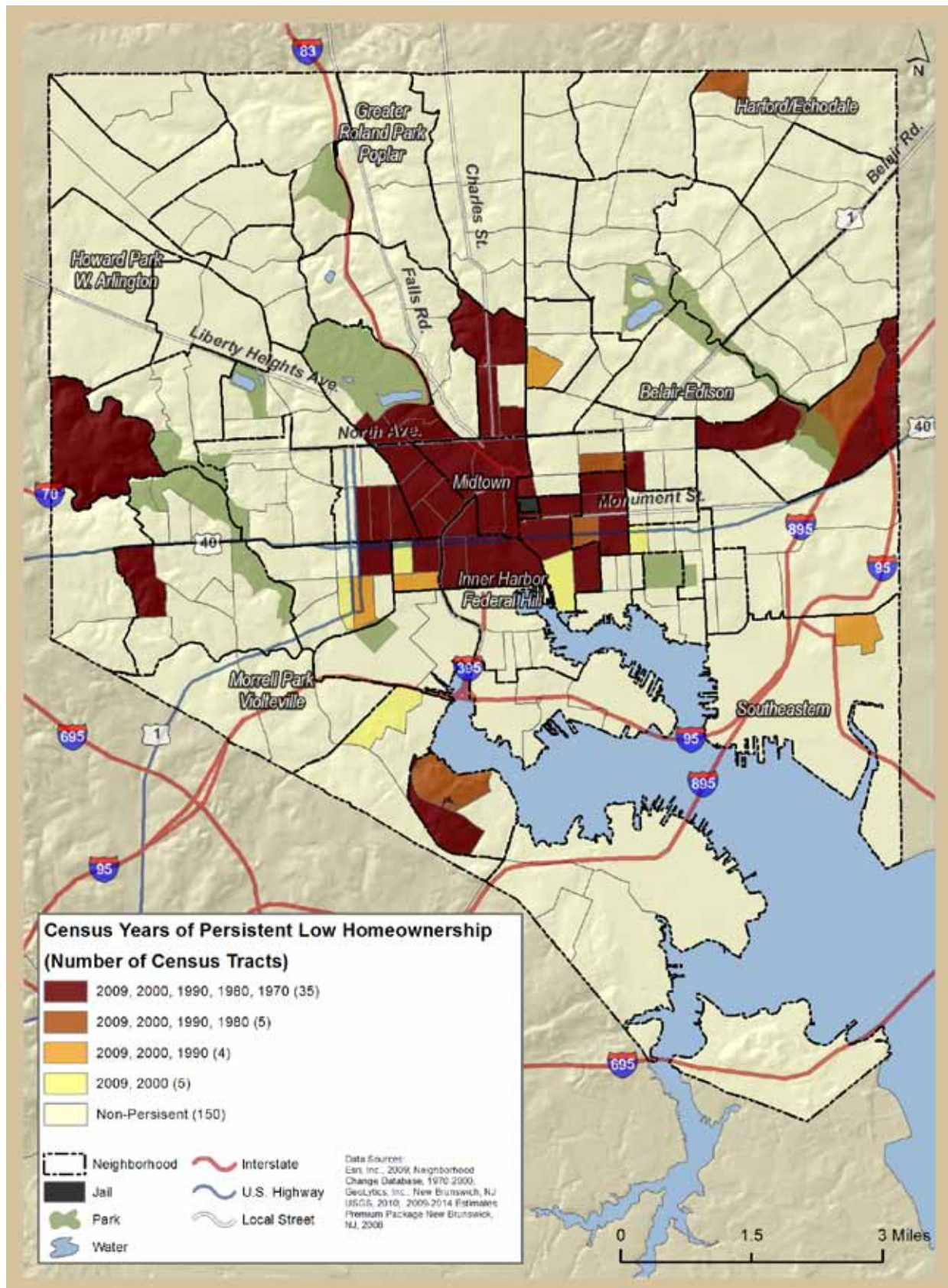
industrial port, but from as early as the late 1950s, when the 33-acre Charles Center was built,<sup>55</sup> significant investment has been made in transforming the neighborhood to a high-tourism area. A more recent development project is the East Baltimore Development, Inc. (EBDI). Starting in 2004, the initiative acquired properties, relocated households, and rehabilitated areas.<sup>56</sup> These properties have been predominantly between East Federal Street and East Monument Street, east of Broadway Boulevard.

Map 8 shows census tracts that have been in persistent poverty for up to five decades. Here too, previously redlined tracts tend to have experienced persistent poverty, with the exception of redeveloped areas. Between 1970 and 2009 in Baltimore, the entire neighborhoods of Penn North/Reservoir Hill, Perkins/Middle East, Sandtown-Winchester/Harlem Park, and Upton/Druid Hill have met the definition for persistent poverty.

Persistent segregation is displayed in Map 9. The current racial/ethnic population is also shown as a dot density overlay in order to highlight which census tracts are currently majority white and which are majority black. All the census tracts that comprise South Baltimore have been at least 90% white since

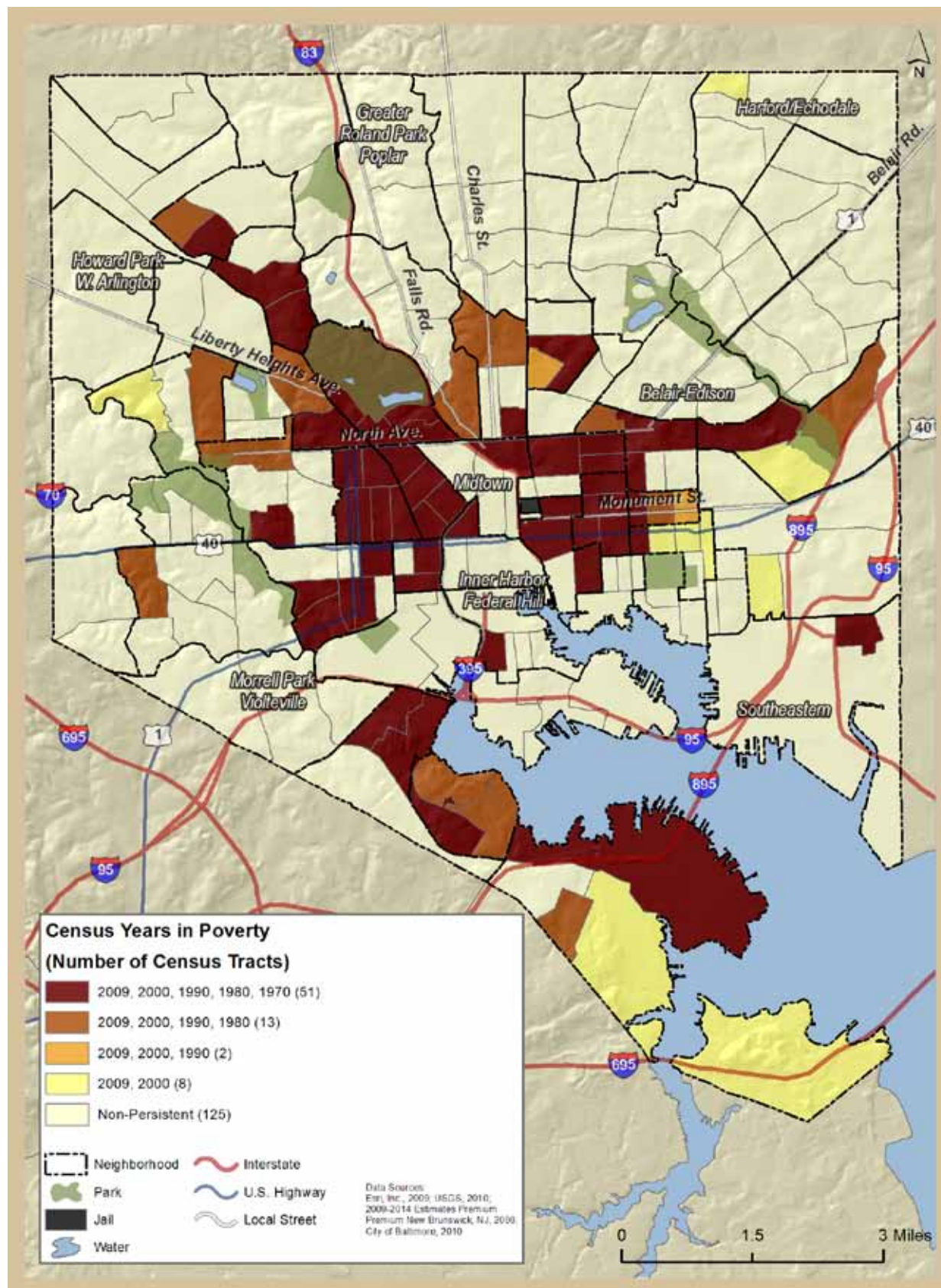


Map 7: Persistent Lack of Home Ownership, Baltimore (1970–2009)





**Map 8: Persistent Poverty by Census Tract, City of Baltimore (1970–2009)**



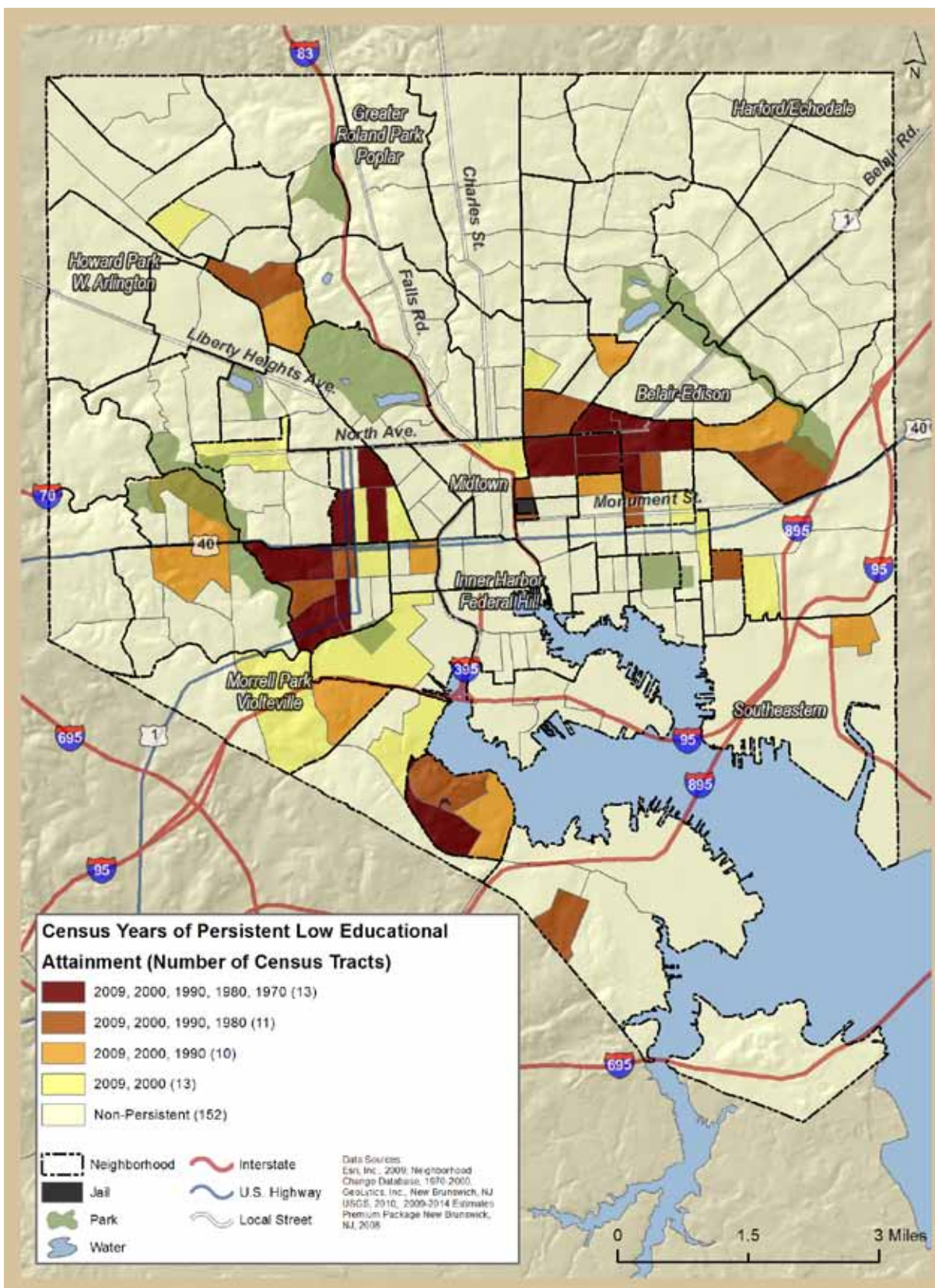


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**Map 10: Census Tracts Persistently in the Lowest Quartile for Adults With a Bachelor's Degree, City of Baltimore (1970-2009)**



1970; all the tracts in Cherry Hill, Clifton-Berea, Dorchester/Ashburton, Forest Park/Walbrook, Greater Mondawmin, Greater Rosemont, Sandtown-Winchester/Harlem Park, and Upton/Druid Hill have been at least 90% black for the past five census periods.

Map 10 illustrates the census tracts of Baltimore that have been in persistent educational distress. This measure of distress seems to conform less with the redlined areas than do the previous measures, but the most affected tracts still surround the center city. The neighborhoods with low levels of college education were Clifton-Berea, Greenmount East, and Sandtown-Winchester/Harlem Park, where more than half of the tracts that comprise the neighborhood have occupied the lowest quartile every decade since 1970.

In this section we have explored the legacy of redlining on socioeconomic conditions over time and on persistent racial segregation. Because redlining has played a substantial role in institutionalizing racial segregation since the 1930s, and because segregation and societal distress continue to be highly correlated, certain neighborhoods and census tracts in Baltimore have suffered from high levels of distress for many decades. The impact of redlining is perhaps most apparent in the relatively low levels of home ownership in previously redlined census tracts. In the next section we look at contemporary housing and neighborhood conditions in Baltimore and the relationship of these conditions to crime and life expectancy.

### III. Neighborhood Quality and the Educational Environment and Their Relationship to Health

#### *Housing and Neighborhood Characteristics*

Previous studies have documented the relationship between the quality of housing stock and health outcomes. Housing units that expose residents to mold, pests, lead, or dangerous environmental conditions such as extreme cold or heat have detrimental effects on health.<sup>57-63</sup>

The co-occurrence of several less desirable community characteristics may compound the detrimental impact on well-being and health. To sum up the risks associated with housing and neighborhood conditions, we developed a risk index to estimate the comparative level of risk in Baltimore neighborhoods. We statistically combined the risk measures listed below to create a risk score for each census tract (see Appendix A for details):

- The rate of electricity shutoff due to a failure to pay per housing unit.
- The rate of pest complaints (rodents or insects) per housing unit.

- The rate of lead violations per housing unit.
- The rate of vacant buildings and lots per square mile.
- The rate of liquor stores per person.
- The percentage of households that do not own their home.

The analysis resulted in the creation of two risk indices: the first index includes electricity shutoffs, pest complaints, and lead violations, and the second includes the vacancy rate, liquor stores per capita, and home ownership. We will refer to the first index as the Housing Risk Index (HRI) and the second as the Neighborhood Risk Index (NRI). Higher scores indicate greater levels of distress (i.e., a higher HRI indicates higher rates of electricity shutoffs, pest complaints, and lead violations; a higher NRI indicates higher rates of vacant buildings/lots and liquor stores and percentages of households that do not own their home).

Baltimore neighborhoods with the highest levels of housing distress, as measured by the HRI, were located in Clifton-Berea, Greater Rosemont, Greenmount East, Madison/East End, Patterson Park North and East, Pimlico/Arlington/Hilltop, and Southwest Baltimore. In each of these neighborhoods, more than half the census tracts had an HRI score that was in the highest quintile for Baltimore.

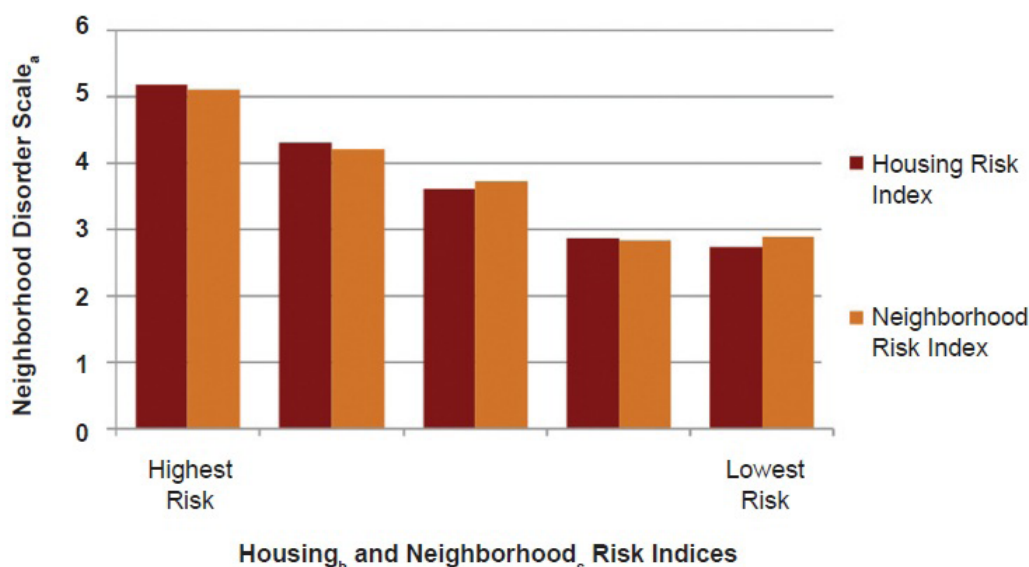
The neighborhoods of Downtown/Seton Hill, Greater Charles Village/Barclay, Greenmount East, Perkins/Middle East, Sandtown-Winchester/Harlem Park, Southeastern, Southwest Baltimore, and Upton/Druid Hill exhibited the highest amount of neighborhood distress as measured by the NRI. More than half of the tracts in these areas had scores that were in the highest quintile for Baltimore.

We examined how the NRI and HRI correlated with data from the Neighborhood Inventory for Environmental Typology (NifETY).<sup>64</sup> The NifETY data, representing all residential neighborhoods in the city of Baltimore, are gathered using visual surveys of blocks to quantify the presence or absence of undesirable community characteristics. Areas that have a higher prevalence of undesirable neighborhood conditions (e.g., broken windows, loitering, graffiti) have higher NifETY scores. The following scores are produced from the NifETY data:

- Alcohol score – presence of alcoholic beverage bottles, broken bottles, persons consuming alcohol, and intoxicated persons.
- Drug score – presence of syringes, baggies, vials, blunt guns/wrappers, pot roaches, and persons using and/or selling drugs.
- Alcohol and Drug score – the sum of the Alcohol and Drug scores.



**Figure 5: Neighborhood Disorder by Housing and Neighborhood Risk, City of Baltimore (2000-2010)**



<sup>(a)</sup> **Source:** Neighborhood Inventory for Environmental Typology, 2010.

<sup>(b)</sup> **Source:** Baltimore City 311 Customer Service Request, geocoded by BCHD, 2007-2010; Mayor's Office of Information Technology, 2000-2008; Baltimore Gas and Electric, counts generated by BCHD, 2009-2001.

<sup>(c)</sup> **Source:** Baltimore City Liquor Board, 2009; Mayor's Office of Information Technology, 2009; Geolytics Projections, 2009.

- Violence score – presence of blood, shell casings, police tape/outlines, memorials, people yelling, swearing, and fights.
- Disorder score – presence of structures with broken windows, unboarded abandoned buildings, unmaintained property, trash in open spaces, broken bottles, graffiti, noise, people yelling, public alcohol consumption, drug paraphernalia, and discarded alcoholic beverage bottles.<sup>65</sup>

Analysis of the relationship between NifETY values and the HRI and NRI without controlling for any other variables demonstrated a statistically significant relationship with all NifETY measures.

- The NifETY Disorder score had the strongest relationship to both the HRI and NRI.
- Both the HRI and NRI indices were more correlated with the Alcohol score than with the Drug score.
- The Violence score had the lowest correlation with the HRI and NRI indices, but the association was still moderately strong.

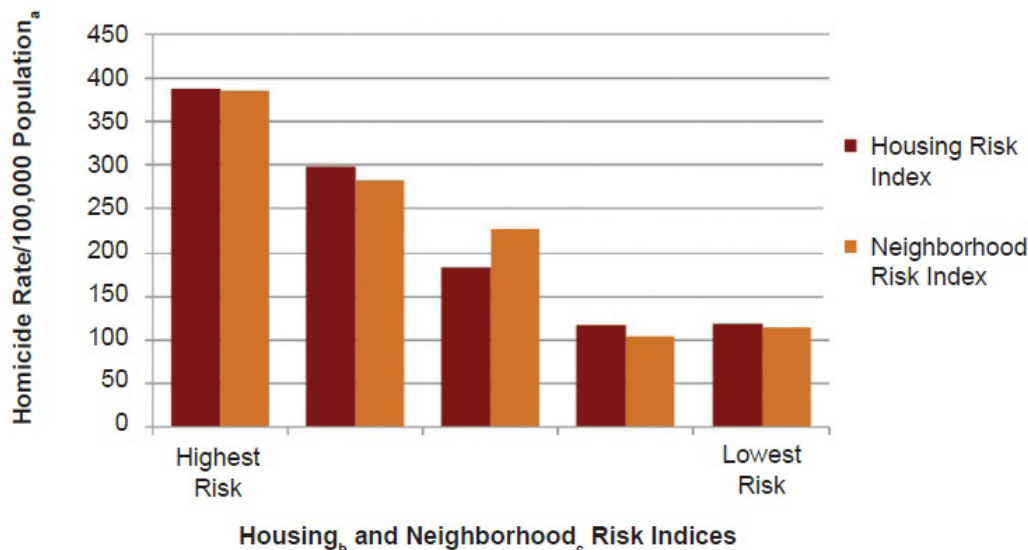
Figure 5 illustrates the relationship between the HRI/NRI scores and the NifETY Disorder score. Census tracts with the highest HRI (housing risk) score had an average Disorder score that was 89.2% higher than in tracts with the lowest HRI score. The average Disorder score was 77.3% higher for tracts with the highest NRI (neighborhood risk) score compared to tracts with the lowest NRI score. These correlations provide support for the validity of the HRI and NRI as measures of community risk.

### *Housing and Neighborhood Characteristics and Crime*

Previous studies have suggested that the level of housing and neighborhood risk in a community is predictive of the crime rate. For example, neighborhoods with high concentrations of vacant buildings<sup>66</sup> and liquor stores<sup>67</sup> tend to have higher crime rates, while childhood exposure to lead is associated with higher arrest rates in early adulthood.<sup>68</sup>

In Baltimore, we found that neighborhood or housing risk correlated with homicide and nonfatal shooting rates. Our research indicates that homicide and nonfatal shooting rates at the census tract level were significantly correlated with both the HRI and NRI. Figure 6 illustrates this relationship: grouping

**Figure 6: Homicide Rate by Housing and Neighborhood Risk (2000-2010)**



(a) **Source:** Baltimore Police Department; census tract counts generated by Baltimore City Health Department, 2005-2009.

(b) **Source:** Baltimore City 311 Customer Service Request, geocoded by BCHD, 2007-2010; Mayor's Office of Information Technology, 2000-2008; Baltimore Gas and Electric, counts generated by BCHD, 2009-2001.

(c) **Source:** Baltimore City Liquor Board, 2009; Mayor's Office of Information Technology, 2009; Geolytics Projections, 2009.

Baltimore census tracts into quintiles (five equally sized groups) based on their HRI and NRI scores reveals that the highest homicide rates are in the census tracts with the highest risk index scores. Homicides in census tracts with the highest HRI were more than three times as common as in tracts with the lowest HRI. The same homicide ratio was observed in tracts with the highest NRI.

Our research also shows that both the HRI and the NRI have a statistically significant relationship with the violent crime rate by census tract, even after controlling for the composition of the census tract population by gender, race, ethnicity, educational attainment, median income, and age. Taken together, all of these characteristics are highly predictive of the violent crime rate in Baltimore (see Appendix A for details).

While these results suggest that high HRI and NRI scores tend to occur in neighborhoods with high violent crime rates, the spatial distribution of these distressed tracts is also an important consideration. Distressed tracts that are clustered together into one large enclave isolate these tracts from nondistressed tracts and, therefore, limit opportunities for interaction.<sup>26</sup> Our research revealed a moderately strong tendency for clustering among census tracts with high crime rates and both high HRI and high NRI scores. Map 11 displays the tracts that appear to cluster in this fashion—high risk with high crime.

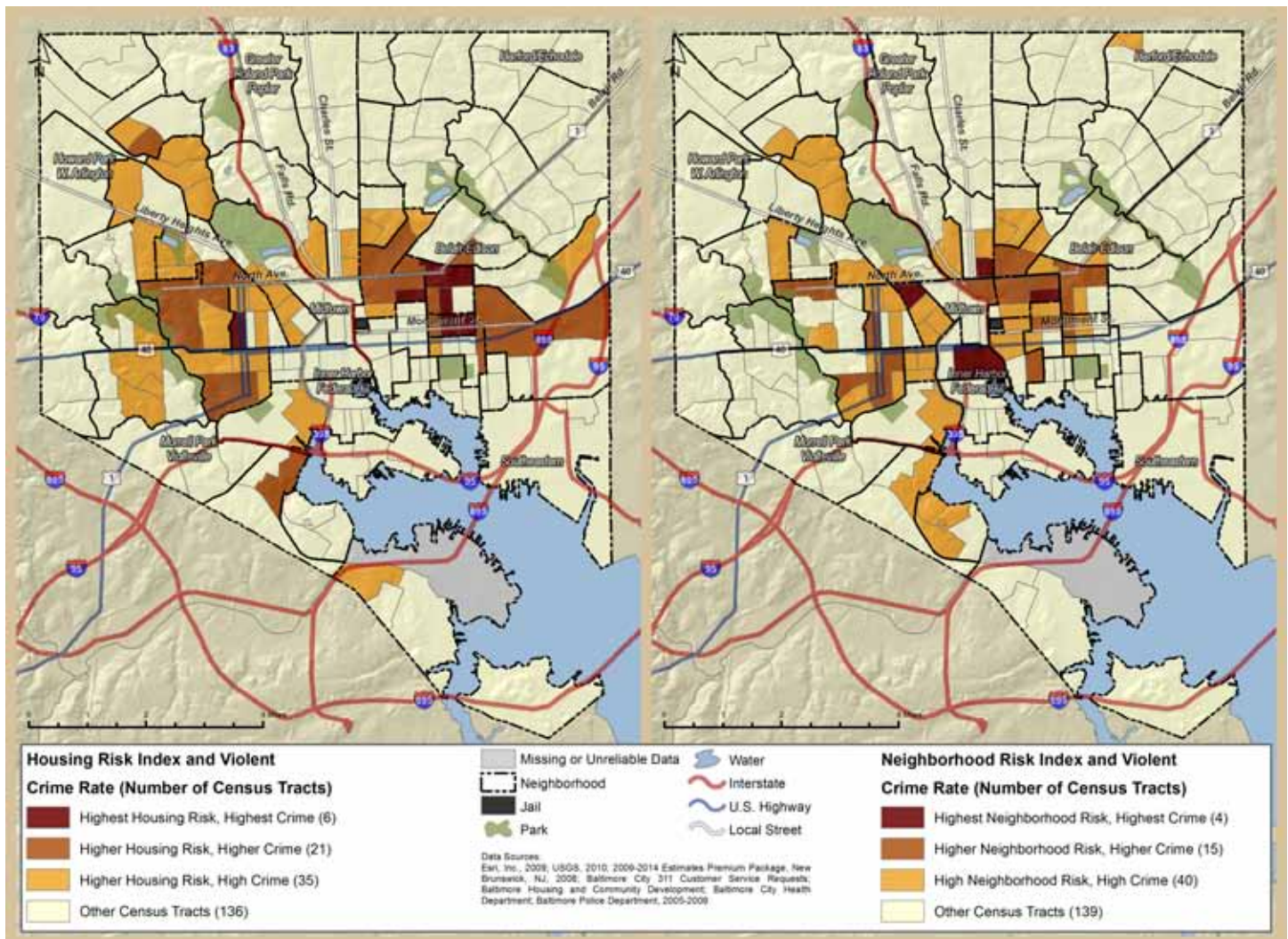
The areas with the highest co-occurrence of the HRI and homicides/nonfatal shootings are Greater Rosemont, Clifton-Berea, Madison/East End, and Perkins/Middle East. Downtown/Seton Hill, Perkins/Middle East, Upton/Druid Heights, and Greater Charles Village/Barclay have the highest co-occurrence of homicide/nonfatal shootings rate and neighborhood risk.

### *Housing and Neighborhood Characteristics and Life Expectancy*

As noted earlier, there are important health consequences associated with unhealthy housing and neighborhood characteristics.<sup>57-60, 62</sup> Risks exist not only because of exposure to lead, rodents, or allergens in the home, but also because of exposure to unhealthy conditions in the neighborhood. These conditions range from inadequate sources of nutritious foods and limited physical activity options to overexposure to liquor stores, tobacco, and crime. Crime, in particular, exposes residents not only to the risk of violent injuries or death, but also to the stress exerted on social cohesion and public safety. In Baltimore, we also found a striking association between the housing and neighborhood indices and life expectancy. The higher these indices are for a particular neighborhood, the



**Map 11: Co-Occurrence of High-Risk Score and Homicide/Nonfatal Shooting Rate, Baltimore (2009)**



Violent crime is defined as homicides and non-fatal shootings per capita

- Highest HRI  $\geq 2.0$
- Higher HRI  $\geq 0.9$
- High HRI  $\geq 0.0$
- Highest NRI  $\geq 2.4$
- Higher NRI  $\geq 1.0$
- High NRI  $\geq 0.0$
- Highest Crime  $\geq 1,800$  per 100,000 persons
- Higher Crime  $\geq 1,00$  per 100,000 persons
- High Crime  $\geq 1,800$  per 100,000 persons

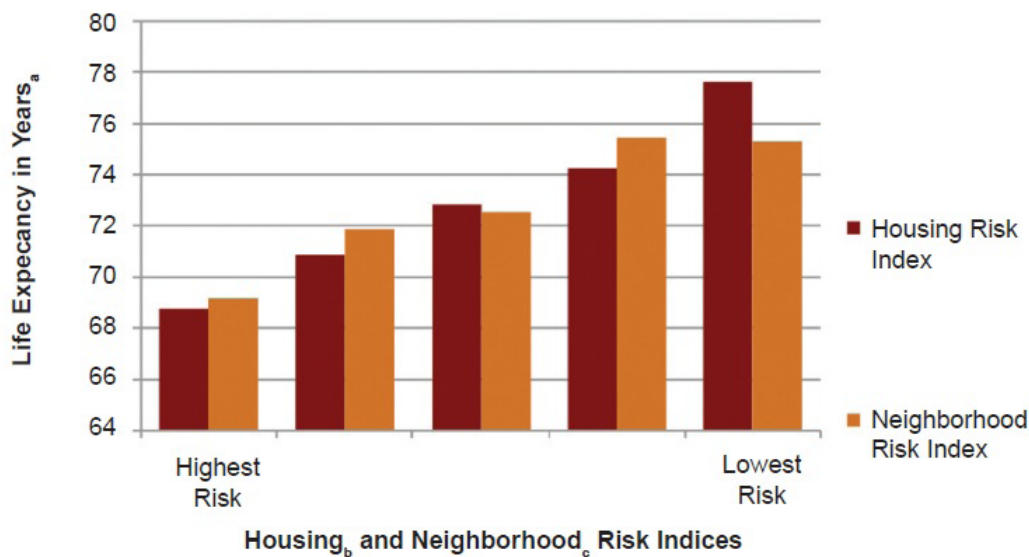
lower the life expectancy is for residents of that neighborhood. Grouping census tracts by quintile (five equal size groups; see Figure 7) based on HRI and NRI scores, we found that the average life expectancy in census tracts in the lowest HRI quintile was 8.9 years longer than the average life expectancy in census tracts in the highest HRI quintile. Life expectancy in the quintile with the lowest NRI scores was 6.1 years longer than that in the quintile with the highest NRI scores. Even after controlling for other variables, such as the composition of the census tract in terms of gender, race, ethnicity, educational attainment, median income, and age, we found that the HRI and NRI scores were highly predictive of life expectancy. (See Appendix A for details.)

### *Educational Opportunity*

Low educational attainment or achievement can impact well-being in a variety of ways. For example, in 2010, the national unemployment rate for adults without a high school diploma was nearly three times higher than for those with a bachelor's degree.<sup>69</sup> Similarly, the poverty rate in 2009 was more than 10 times higher for those without a high school diploma than for those with at least a bachelor's degree.<sup>31</sup>

Education is also tightly linked with health outcomes. Compared to adults with a bachelor's degree, adults in the U.S. without a high school diploma were four and half times more likely to be in fair or poor health, had more than twice the

**Figure 7: Homicide Rate by Housing and Neighborhood Risk (2000-2010)**



<sup>(a)</sup> **Source:** Maryland Vital Statistics; generated by the Baltimore City Health Department (NCHD).

<sup>(b)</sup> **Source:** Baltimore City 311 Customer Service Request, geocoded by BCHD, 2007-2010; Mayor's Office of Information Technology, 2000-2008; Baltimore Gas and Electric, counts generated by BCHD, 2009-2001.

<sup>(c)</sup> **Source:** Baltimore City Liquor Board, 2009; Mayor's Office of Information Technology, 2009; Geolytics Projections, 2009.

prevalence of diabetes, and had a higher likelihood of being hospitalized.<sup>37</sup> In addition, they were six times more likely to be uninsured, almost three times more likely to lack a usual source of care, and three times more likely to forgo medical care due to cost.<sup>70</sup>

The spatial distribution of educational attainment in Baltimore was shown in Map 4. Proficiency scores (scores on standardized tests designed to reveal the student's level of skill in a particular subject) also vary significantly by place in Baltimore. In 2009, 39.5% of Patterson Park North and East 3rd-grade students scored below basic proficiency (indicating insufficient mastery of basic skills) in reading tests, the highest of any community statistical area in Baltimore. Patterson Park North and East also had the highest percentage of 8th graders scoring below basic proficiency (49.6%) in reading tests. Conversely, in Greater Roland Park/Poplar and Mount Washington/Coldspring, zero 3rd graders scored below basic proficiency, and in North Baltimore/Guilford/Homeland only 10.3% of 8th graders scored below basic proficiency in reading, the lowest percentage of all Baltimore CSAs.

Absenteeism among students also is a significant problem. Students cited for chronic truancy are at a higher risk of more serious forms of delinquency,<sup>71</sup> such as substance abuse, gang

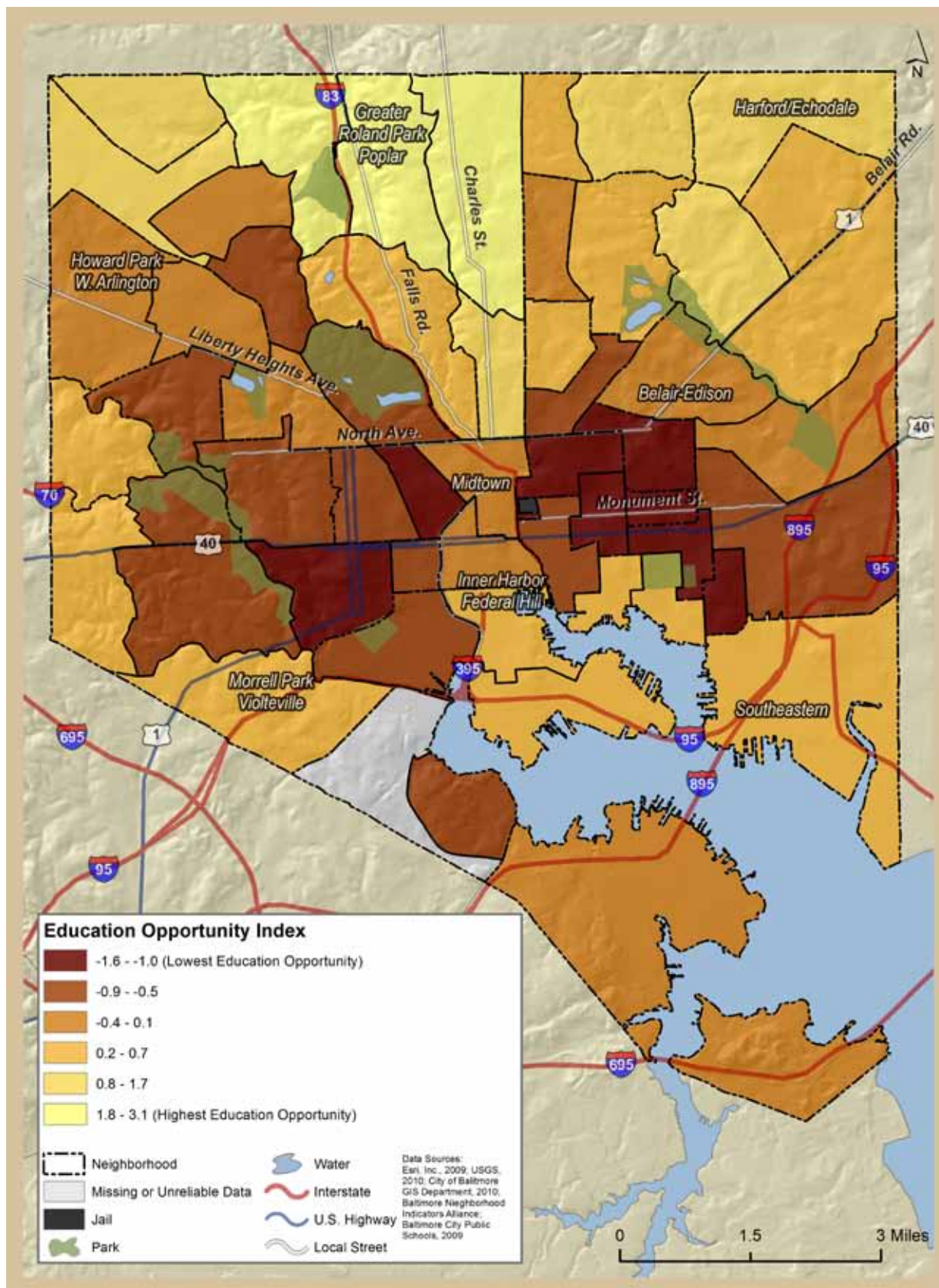
involvement, and criminal activity in adulthood.<sup>72</sup> Absenteeism also increases the likelihood of dropping out of school prior to graduation.<sup>73</sup> There is evidence that absenteeism in the early years of education is more damaging than in later years.<sup>74</sup> Based on data we obtained from the Baltimore City Public Schools, the CSA with the highest rate of absenteeism (the percent of students who have missed 20 days of school or more in 2009) among elementary school students was Perkins/Middle East, at 17.1%. Absenteeism among older students was greatest in Madison/East End, Highlandtown, and Jonestown/Oldtown, where more than half of high school students missed at least 20 days of school. Conversely, only 1.0% of Greater Roland Park/Poplar elementary students and 7.8% of high school students missed this amount of school, the lowest rates in the city.

To sum up the risks associated with educational attainment, proficiency, and absenteeism, we developed an Education Opportunity Index (EOI) and used it to estimate the comparative level of risk related to education variables in Baltimore neighborhoods. We statistically combined the risk measures listed below to create a risk score for each CSA in Baltimore (see Appendix A for details):

- Percent of the adult population (age 25 years and older) with a bachelor's degree (2009).

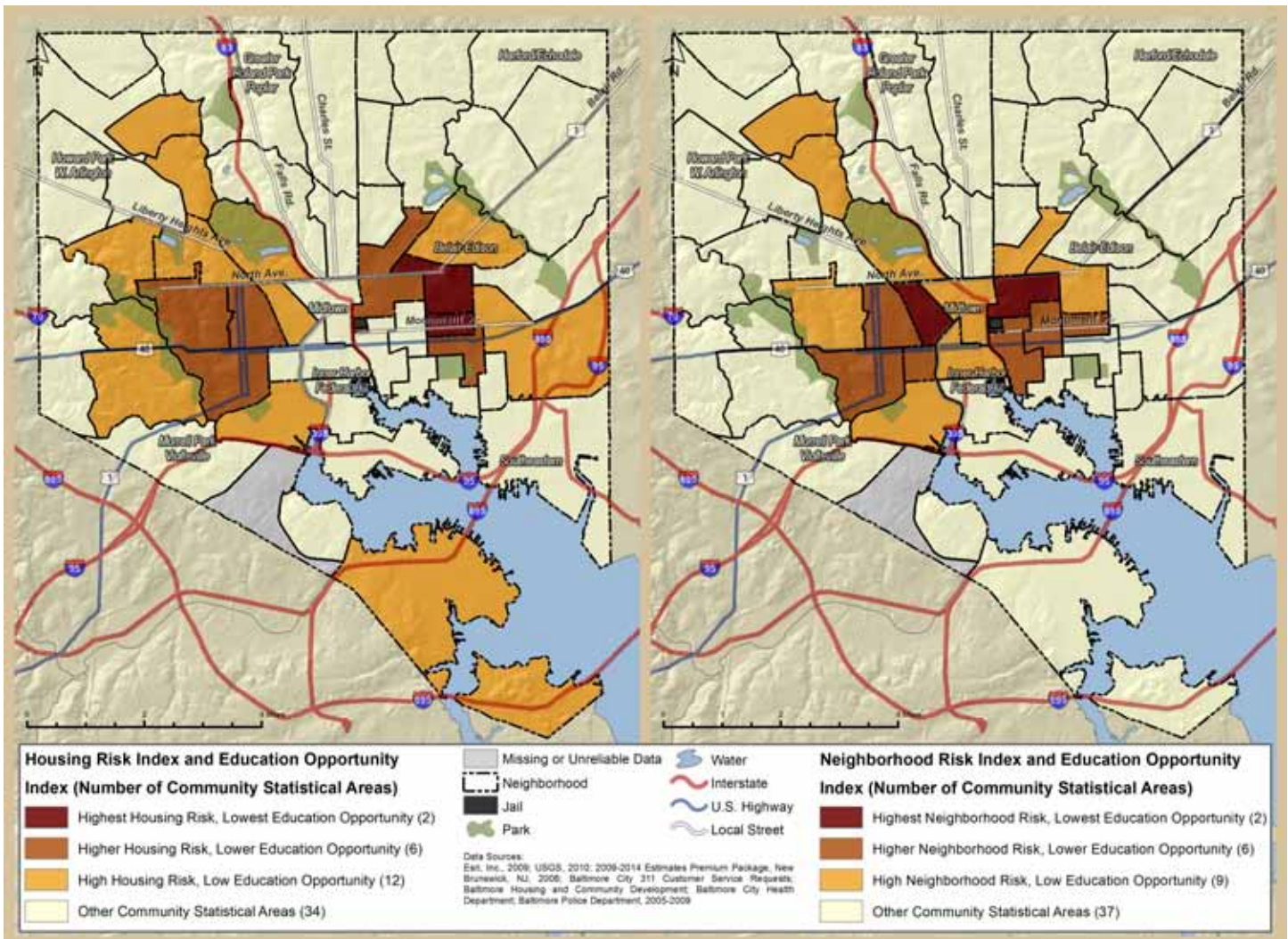


Map 12: Educational Opportunity Index by Community Statistical Area, City of Baltimore (2009)





**Map 13: Co-Occurrence of High Housing and Neighborhood Risk Factors and Low Educational Opportunity Index, Baltimore (2009)**



- Lowest HRI  $\geq 1.8$
- Lower HRI  $\geq 1.0$
- Low HRI  $\geq 0$

- Lowest NRI  $\geq 1.5$
- Lower NRI  $\geq 0.7$
- Low NRI  $\geq 0$

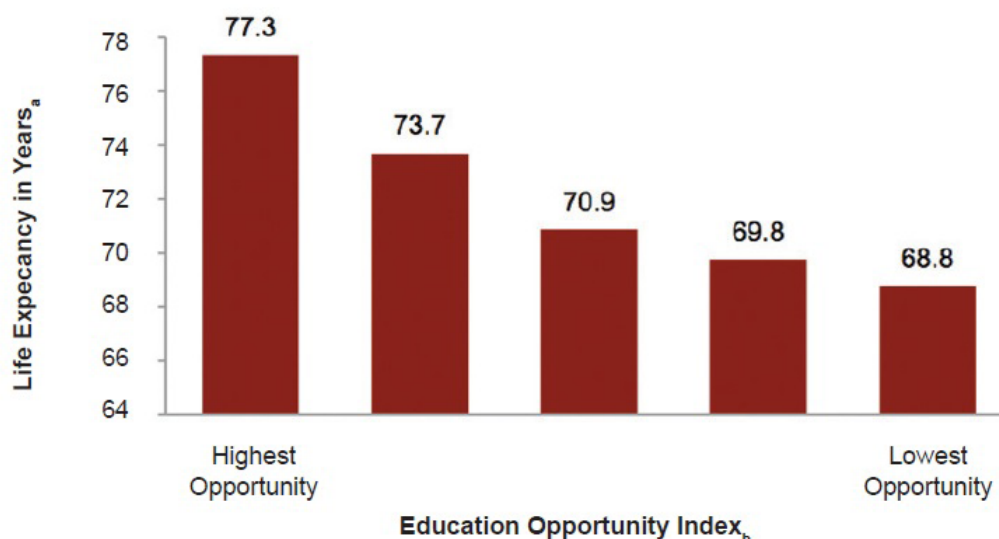
- Lowest EOI  $\geq -1.1$
- Lower EOI  $\geq -0.5$
- Low EOI  $\geq -0.1$

- Percent of elementary school students who missed less than 20 days of school (2009).
- Percent of middle school students who missed less than 20 days of school (2009).
- Percent of high school students who missed less than 20 days of school (2009).
- Percent of 3rd-grade students who achieved at least basic proficiency in reading (2009).
- Percent of 8th-grade students who achieved at least basic proficiency in reading (2009).

Higher EOI scores indicate a better educational environment—a greater percentage of adults with bachelor's degrees, lower absenteeism rates, and fewer students scoring below basic proficiency levels. The CSA with the highest EOI score was Greater Roland Park/Poplar. The lowest scores were in Madison/East End, Upton/Druid Heights, and Patterson Park North and East. Map 12 illustrates the spatial distribution of the EOI in Baltimore for 2009.

We found that the EOI is strongly correlated with both the HRI and the NRI, indicating that the same areas that exhibit unfavorable housing and neighborhood characteristics also tend to have low education measures as well. Map 13 highlights the areas of Baltimore where high HRI and NRI scores co-occur with low EOI scores.

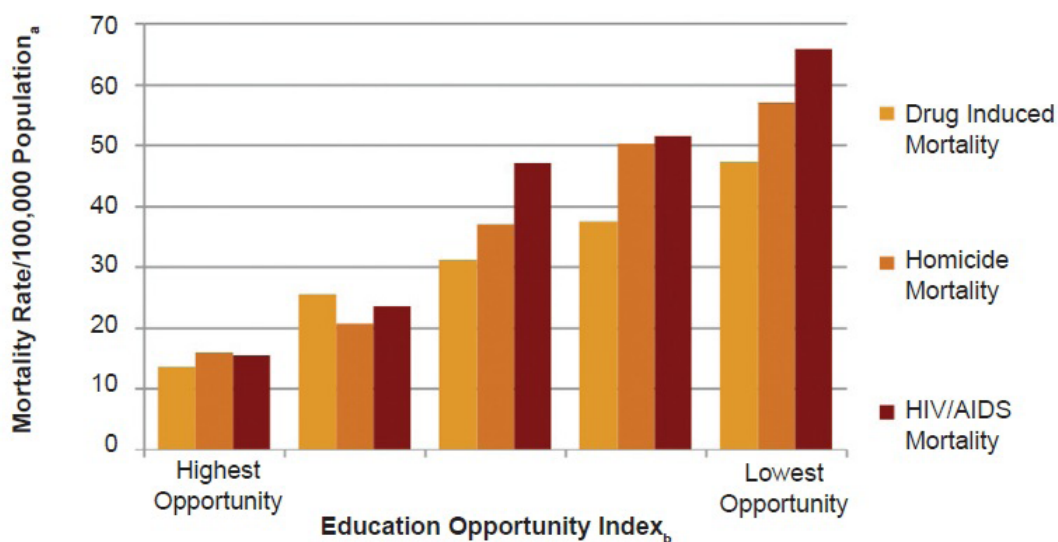
**Figure 8: Life Expectancy by Education Opportunity (2005-2010)**



<sup>(a)</sup> **Source::** Maryland Vital Statistics; generated by the Baltimore City Health Department (2005-2009).

<sup>(b)</sup> **Source:** Baltimore City Public Schools, 2009.

**Figure 9: Mortality by Education Opportunity (2005-2009)**

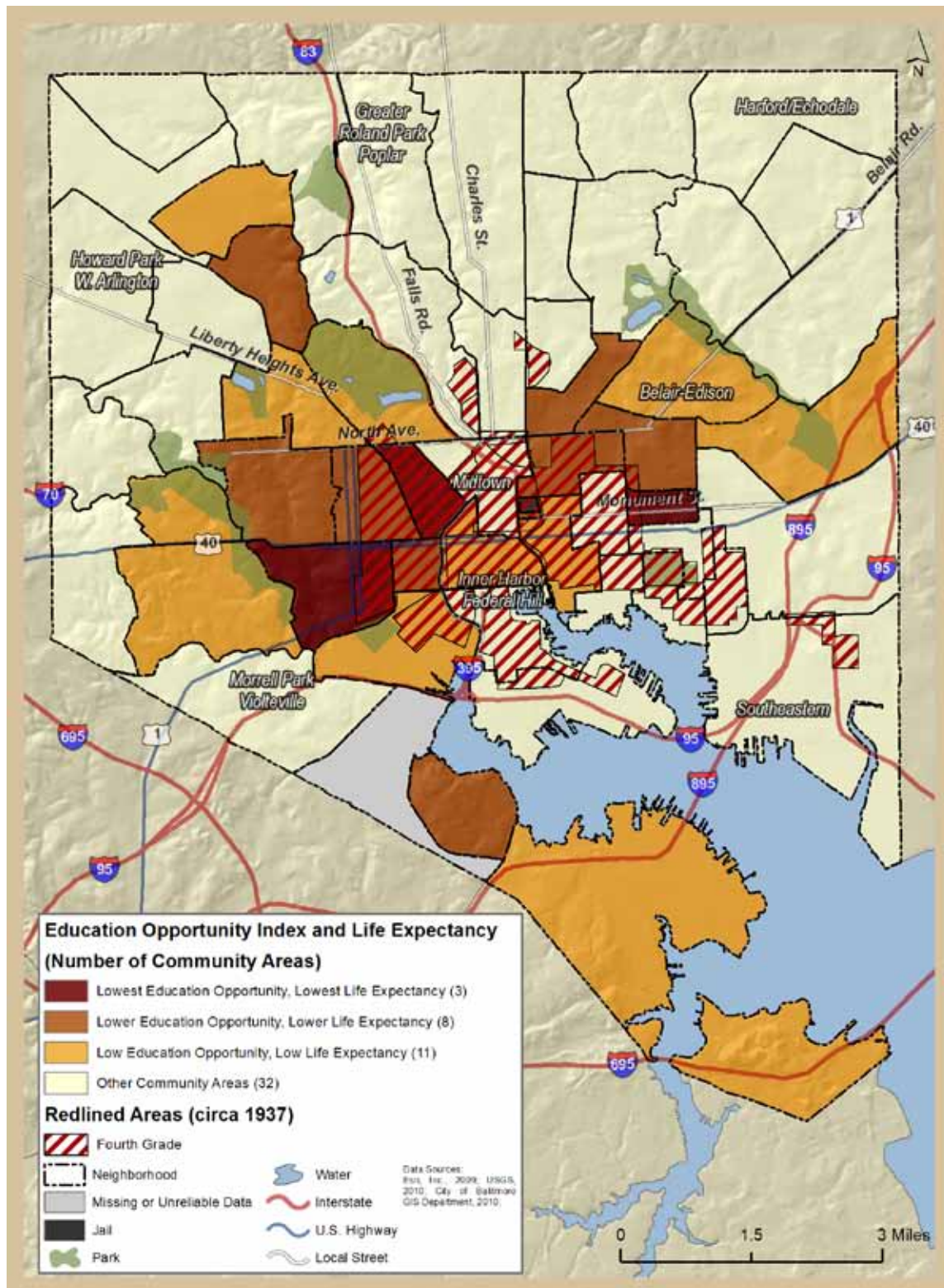


<sup>(a)</sup> **Source:** Maryland Vital Statistics; generated by the Baltimore City Health Department (2005-2009).

<sup>(b)</sup> **Source:** Baltimore City Public Schools, 2009.



**Map 14: Co-Occurrence of Low Educational Opportunity and Low Life Expectancy, City of Baltimore (2009)**



- Lowest EOI: less than or equal to -1.3
- Lower EOI: less than or equal to -0.5
- Low EOI: less than or equal to -0.1

- Lowest Life Expectancy: less than or equal to 67
- Lower Life Expectancy: less than or equal to 69
- Low Life Expectancy: less than or equal to 72



The CSAs where the highest housing risk co-occurs with the lowest education scores are in Clifton-Berea and Madison/East End. The highest neighborhood risk co-occurs with the lowest education scores in Upton/Druid Heights and Greenmount East.

The EOI was highly correlated with several health measures, the most striking being life expectancy, which had the strongest correlation with the EOI. Other health and community measures that significantly correlated with the EOI were the rate of drug-induced deaths, HIV/AIDS mortality, and homicide mortality. Figures 8 and 9 illustrate these relationships. The average life expectancy in CSAs with the highest educational opportunity is 8.5 years longer than in CSAs with the lowest EOI. The risk of death from drugs or homicide is more than three times higher and HIV/AIDS mortality is more than four times higher in CSAs with the lowest educational opportunity index than in CSAs with the highest educational opportunity index.

CSAs with low educational opportunity and lower life expectancies have a moderately strong tendency to cluster together rather than disperse randomly throughout the city. Map 14 displays the areas where low educational opportunity and low life expectancy appear to cluster in one area. The CSAs where the lowest educational opportunity and the lowest life expectancies co-occur are in Madison/East End, Southwest Baltimore, and Upton/Druid Heights.

## IV. Conclusions

To summarize, we find evidence that higher risks related to housing quality, neighborhood conditions, and educational opportunity are predictive of crime, adverse health outcomes, and shorter life expectancy in the neighborhoods of Baltimore. The Housing Risk Index and the Neighborhood Risk Index scores had statistically significant relationships with life expectancy and homicide/nonfatal shooting rates independent of other known social, economic, and demographic factors in health. Better educational opportunities tended to correlate with longer life expectancy at the CSA level. Educational opportunity and housing/neighborhood risk also demonstrated a strong relationship with each other, indicating that tracts with high levels of risk often have a low level of educational opportunity, potentially producing a compounded adverse effect on health outcomes. Due to the cross-sectional nature of the data and other important limitations (such as lack of individual-level data), we cannot estimate the extent to which these factors have a causal relationship to the outcomes studied. However, we have found that neighborhoods with high levels of housing/neighborhood risk and/or low educational opportunity along with poor health outcomes tend to cluster together rather than being randomly dispersed throughout the city. We have also found that many of these associations have

the dose-response relationship seen in causal relationships.

In 2009, Baltimore was the 13th most segregated major metropolitan area in the U.S. in terms of black/white segregation.<sup>36</sup> The historical legacy of redlining in the 1930s is likely still exerting an effect on life in Baltimore, as those exclusionary policies and current institutional policies and practices continue to shape the demographic composition of Baltimore's communities, especially patterns of home ownership and segregation. Areas with a history of protracted social and economic distress are of particular concern. The perpetuation of concentrated poverty, racial segregation, low home ownership rates, and poor educational attainment will likely foster undesirable social and health outcomes for the near and longer term.

We recommend that government, private sector, and civil society leaders:

- Increase understanding of the social determinants of health among elected policy makers, community leaders, and health, social service, education, and community/economic development professionals through professional education and other tools;
- Monitor on an ongoing basis environmentally challenged and socioeconomically vulnerable communities and increase public sector efforts to engage with—and invest in—these communities;
- Aggressively tackle poverty by fully funding programs that focus on early childhood development and economic development (including job training incentives and enterprise and empowerment zones);
- Adopt land use policies that reflect an emphasis on smart and equitable growth, facilitate access to affordable housing for vulnerable populations, and promote housing mobility to help reduce the clustering of people in neighborhoods of concentrated poverty and in areas where exposure to environmental risks is highest;
- Keep youth in school and reduce risks for involvement in juvenile justice and criminal justice systems by reducing school expulsions and suspensions, and offering alternatives to incarceration including school-based teen courts, peer mediation programming, and restorative justice programming;
- Implement a public financing program to provide financial “seed money” to stimulate healthy food retail in neighborhoods with low food access;
- Increase the capacity of communities to hold decision makers accountable through building the capacity of grassroots/community leaders and through

encouraging support for collaborative decision making and advocacy to address regional challenges;

- Require public decision makers and program implementers to consider the impacts of proposed actions on racial/ethnic equity in life opportunities, health, and well-being, and to adjust actions to maximize this goal. This *equity in all policies* approach should also be adopted by philanthropic and religious groups and other organizations serving the region.

More broadly, such strategies should align with the latest Global Commission on the Social Determinants of Health goals, declarations and policy recommendations. The Rio Political Declaration on Social Determinants of Health was adopted during the World Conference on Social Determinants of Health on October 21, 2011. The declaration expresses global political commitment for the implementation of a social determinants of health approach to reduce health inequities and to achieve other global priorities (available at <http://www.who.int/sdhconference/declaration/en/>). Some key recommendations to be highlighted for acknowledgement and implementation in Baltimore that come directly from the Global Commission's Rio Declaration include supporting policies:

### *To promote participation in policy-making and implementation*

12.1 Acknowledg[e] the importance of participatory processes in policy-making and implementation for effective governance to act on social determinants of health;

- (i) Promote and enhance inclusive and transparent decision-making, implementation and accountability for health and health governance at all levels, including through enhancing access to information, access to justice and public participation;
- (ii) Empower the role of communities and strengthen civil society contribution to policymaking and implementation by adopting measures to enable their effective participation for the public interest in decision-making;
- (iii) Promote inclusive and transparent governance approaches, which engage early with affected sectors at all levels of governments, as well as support social participation and involve civil society and the private sector, safeguarding against conflict of interests;

### *To further reorient the health sector [and non health sectors] role towards reducing health inequities*

15.1 Acknowledg[e] that monitoring of trends in health inequities and of impacts of actions to tackle them is critical to achieving meaningful progress, that information systems should facilitate the establishment of relationships between health outcomes and social stratification variables and that

accountability mechanisms to guide policy-making in all sectors are essential, taking into account different national contexts;

15.2 [Stakeholders] pledge to:

- (i) Establish, strengthen and maintain monitoring systems that provide disaggregated data to assess inequities in health outcomes as well as in allocations and use of resources;
- (ii) Develop and implement robust, evidence-based, reliable measures of societal wellbeing, building where possible on existing indicators, standards and programs and across the social gradient, that go beyond economic growth;
- (iii) Promote research on the relationships between social determinants and health equity outcomes with a particular focus on evaluation of effectiveness of interventions;
- (iv) Systematically share relevant evidence and trends among different sectors to inform policy and action;
- (v) Improve access to the results of monitoring and research for all sectors in society;
- (vi) Assess the impacts of policies on health and other societal goals, and take these into account in policy-making;
- (vii) Use intersectoral mechanisms such as a Health in All Policies approach for addressing inequities and social determinants of health; enhance access to justice and ensure accountability, which can be followed up;
- (viii) Support the leading role of the World Health Organization in its collaboration with other United Nations agencies in strengthening the monitoring of progress in the field of social determinants of health and in providing guidance and support to Member States in implementing a Health in All Policies approach to tackling inequities in health;
- (ix) Support the World Health Organization on the follow-up to the recommendations of the Commission on Information and Accountability for Women's and Children's Health;
- (x) Promote appropriate monitoring systems that take into consideration the role of all relevant stakeholders including civil society, nongovernmental organizations as well as the private sector, with appropriate safeguard against conflict of interests, in the monitoring and evaluation process;
- (xi) Promote health equity in and among countries, monitoring progress at the international level and increasing collective accountability in the field of social determinants of health, particularly through the exchange of good practices in this field; and
- (xii) Improve universal access to and use of inclusive information technologies and innovation in key social determinants of health.

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