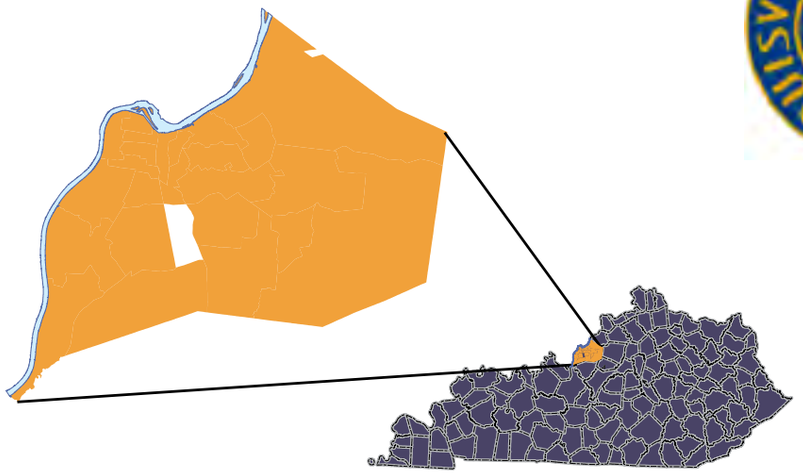
LOUISVILLE METRO HEALTH EQUITY REPORT

The Social Determinants of Health in Louisville Metro Neighborhoods

CENTER FOR HEALTH EQUITY
A Division of Public Health and Wellness



2014

LOUISVILLE METRO HEALTH EQUITY REPORT 2014

The Social Determinants of Health in Louisville Metro Neighborhoods

This report was written and produced by the Louisville Metro Department of Public Health & Wellness' Center for Health Equity. The Center for Health Equity works to address the root causes of health disparities by supporting projects, policies and research working to change the correlation between health and longevity and socioeconomic status. The primary sources of data analyzed and used to create this report came from the 2006-2010 Death Records, 2010 Census, and 2007-2011 American Community Survey estimates.

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DEPARTMENT OF
PUBLIC HEALTH AND WELLNESS

GREG FISCHER
MAYOR

LaQuandra Nesbitt, MD, MPH
Director

Dear Reader;

I am especially pleased to share with you the Louisville Metro Health Equity Report 2014, with new and dynamic features. This year's report is intended to update and improve not only the quality of data and information, but also its utility, accessibility and reach, especially via use of digital and interactive media. This report includes:

- ✓ New and updated data
- ✓ Neighborhood, sub-neighborhood, and trend analysis
- ✓ Digital interactive medium designed for computer, smart phone, tablet and other mobile devices
- ✓ Built-in tracking and feedback opportunities, with potential for future development

If Louisville is to be a world-class city, thinking globally while acting locally is an essential ingredient for our success. We firmly embrace the World Health Organization's (WHO) definition -- "**Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.**" With this as the starting point, it is clear that each of us, as individuals and together with our neighbors and neighborhoods, has a stake in ensuring increased opportunities for improving health for all of us, regardless of where we live, learn, work and play.

When our inaugural Health Equity Report was published in early 2012, it served as a major milestone for our community. It underscored the commitment to document and measure differential opportunities for health as well as proactively engage the entire community in solution-driven recognition of what it takes to effect change; that health equity is **everybody's** work!

Promoting a shared understanding with the potential for a catalytic effect continues to be important. The Greater Louisville Project's "Building a Healthier Louisville" Special Report 2013, for example, utilized our original report's "Place Matters" analysis, including measurements of life expectancy by neighborhood, as a critical part of their demonstration of the impact of health in Louisville's competitiveness.

My hope is that this Health Equity Report serves as a useful "tool" that engages and informs all sectors of Louisville - business, education, faith, government, nonprofits and more – and that all embrace a health-in-all-policies approach essential to driving towards innovative, equity-enhancing strategic solutions.

Together, let's make Louisville a healthy place for everyone!

Sincerely,

Anneta

C. Anneta Arno, PhD, MPH
Director, Center for Health Equity

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Background & Technical Information

In Context

Although health and quality of life have been improving for the American population as a whole on a national scale,[2] this generalization often hides many underling differences in opportunities for health and health outcomes within the population. When you examine health by different sub-population classifications (gender, race, ethnicity, income, etc.) there are differences defined as health inequities/disparities. Even with national and international public health attention, health inequities are increasing.[3] This report seeks to highlight the socially-based disparities and inequities evident within and across Louisville Metro.

Numerous public health researchers have shown how health status follows a social gradient.[4-7] Not only do those at the top fare better than those at the bottom of the socioeconomic ladder; as you move up the socioeconomic ladder, health improves at each rung. When we look at differences in social and physical environments across the community, we start to uncover possible reasons for the disparities, the starting point on where to focus efforts to address them. Many studies have shown the connection between an individual's social and physical environment[8-11] and his/her health. Our surrounding environment (who and what we come into contact with) shapes our thoughts, behaviors, and subsequently our health. The various environments in which we are raised and live can determine our access to healthy foods and activities, quality of education, exposure to crime, safety, transportation challenges, and several other factors. This report examines these factors from the perspective of neighborhoods. The maps and analyses will help paint a picture of how the neighborhoods compare in terms of social determinants and to what extent those determinants impact an individual's health.

The data and information provided in this document will help inform the public of critical population and geographical health-related trends. It will inform residents of the health risks of the surrounding community from the perspective of health equity and health disparities. Recent research shows that a majority of the population is unaware of health disparities. In fact, only 59% of Americans even know that African Americans and Hispanics have poorer health outcomes than whites.[12] Before we can create change and reduce inequities while improving physical and social structures, we need to understand the current conditions. Similar to how a patient cannot know how to improve his/her health status without some type of medical evaluation, there is a need for evaluating communities to determine where health-related gaps persist.

Health Disparity

Is "a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion." [13]

Health Equity

Is the "attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities." [13]

Health Inequity

Is a health difference that is neither natural nor inevitable. They are avoidable inequalities which are unfair and unjust; they are the result of historical and contemporary injustices.

Louisville's

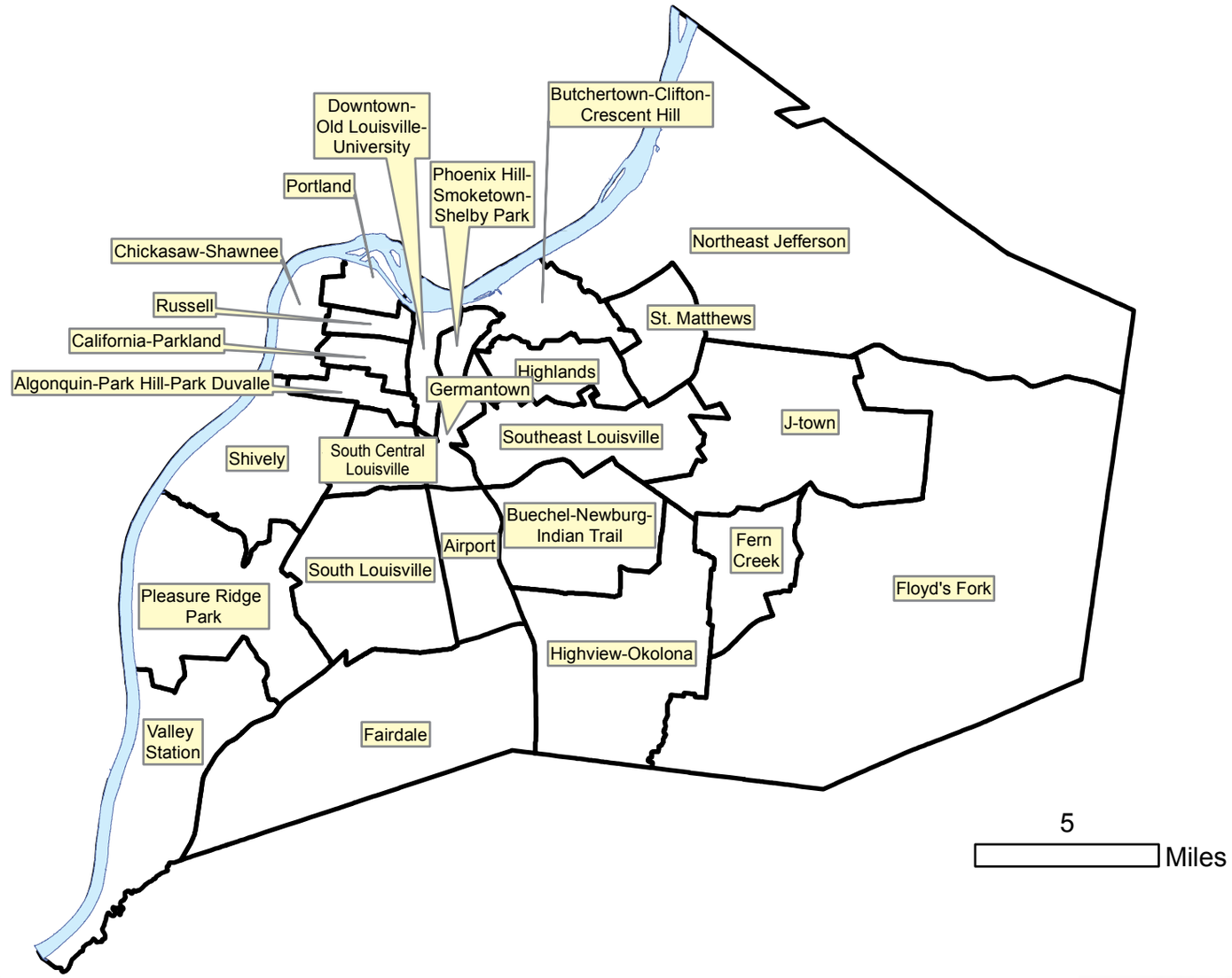
Neighborhoods

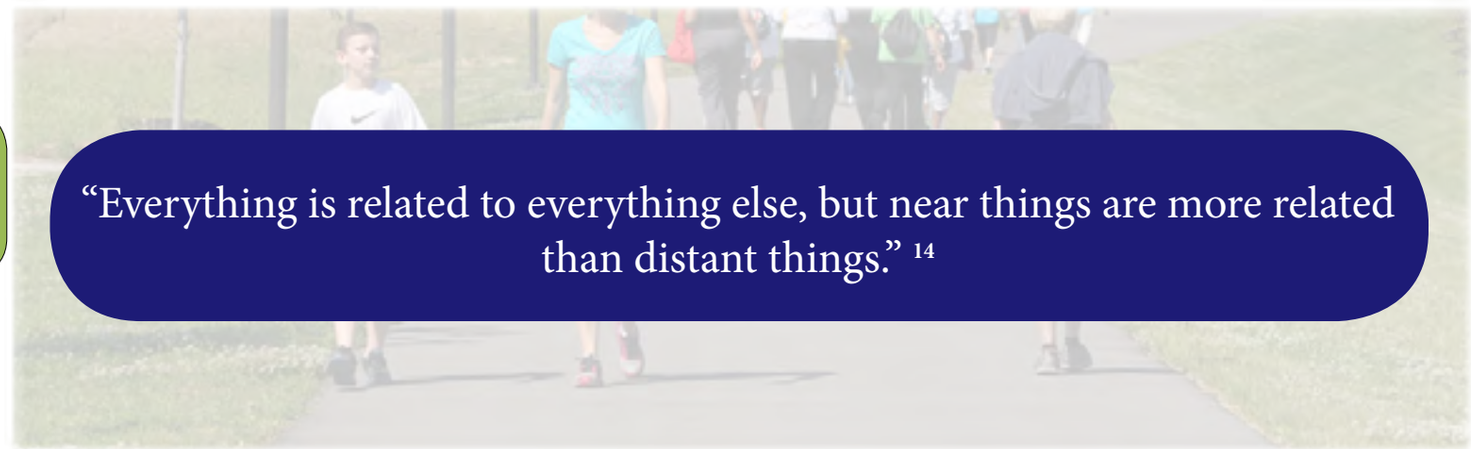
Louisville is an increasingly diverse community, rich in history and culture and a storied tradition of neighborhood-centric identity. Within Louisville Metro are several neighborhoods of varying vintage going back to its founding; on these are stacked historical events including population growth, migration, segregation, and other social and economic changes that have led to the current community composition. For functional analytical purposes the map to the right indicates the proximate 24 neighborhood boundaries which were established with the inaugural 2011 Louisville Health Equity Report (detailed neighborhood area maps available here). As stated within the 2011 report, these boundaries allow for sub-county comparisons attempting to capture traditional neighborhoods and provide information on the differences between them.

Comparing neighborhoods allows us to see not only the data specific to each sub-county area, but also how each area compares to the others. By standardizing the population size, we can see visual trends and geographic clustering. Standardized rates allow for comparison between and within neighborhoods and give a visual account of the status across Louisville, including in many cases, the undue burden experienced within specific neighborhoods.

The 2014 Health Equity Report builds on the inaugural report with new and updated data on health outcomes, as well as social and economic determinants. This report utilizes the same geographic methods as the early report to assess and communicate neighborhood level differences. However, the current report does not replicate the same data sets as its predecessor and should be viewed in conjunction with the 2011 Health Equity Report.

Primay Data Sources. Data analyzed and used to create this report came from the 2006-2010 Death Records, 2010 Census, and 2007-2011 American Community Survey estimates.





"Everything is related to everything else, but near things are more related than distant things." [14]

Viewing the Report

Our primary goal is to share social determinants and health equity data and insight with the entire community. In an effort to reach more people, this document has been constructed as a digital medium. This report is therefore, best viewed on a computer, tablet, or other mobile device. Since research shows that there is an increase in ownership of internet-capable phones, laptops, and desktops by all income and racial/ethnic groups,[1] a digital medium is increasingly effective and a better fit for informing everyone of the health and social inequities of Louisville.

To ensure you can view the document properly, please check that you have the most recent version of Adobe for computer, Apple (OSX), Android, or iPad/iPhone.

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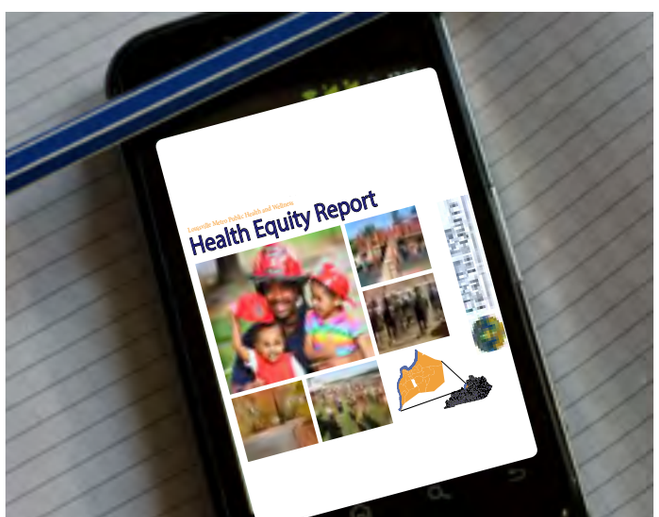
(Click here to check your Adobe version)



Side Note:
All words highlighted in BLUE are links to other pages in the document or websites. These links provide more information to the topic being presented.

In order to ensure our effectiveness and efficiency in informing the public, a short survey questionnaire is included. At the bottom of each page you will see:

Tell us what you think?

This is a link that will take you to the survey page. Simply fill out the few demographic questions, comments and suggestions, then click the "submit" button. As long as you are connected to the internet, the information will be received. We appreciate any and all feedback. If you prefer, you can find a printable survey here and either scan and e-mail, fax, or mail to:

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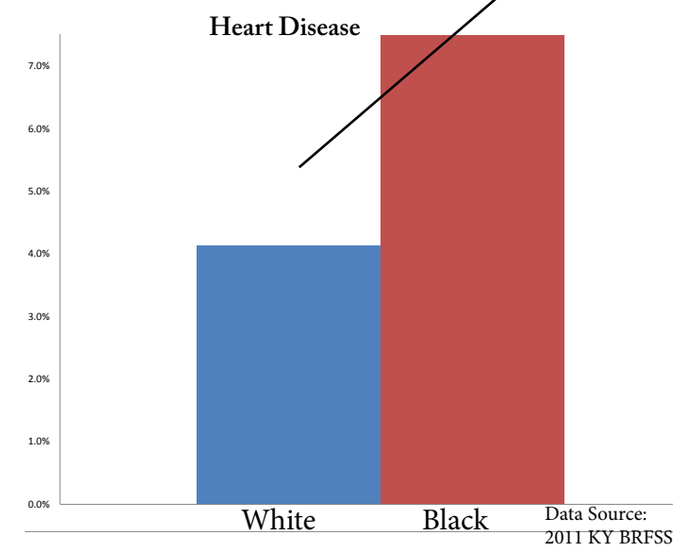
How to Read the Maps

This page is intended to show how the following maps should be read. Included is a brief description of the different components of the typical maps presented.

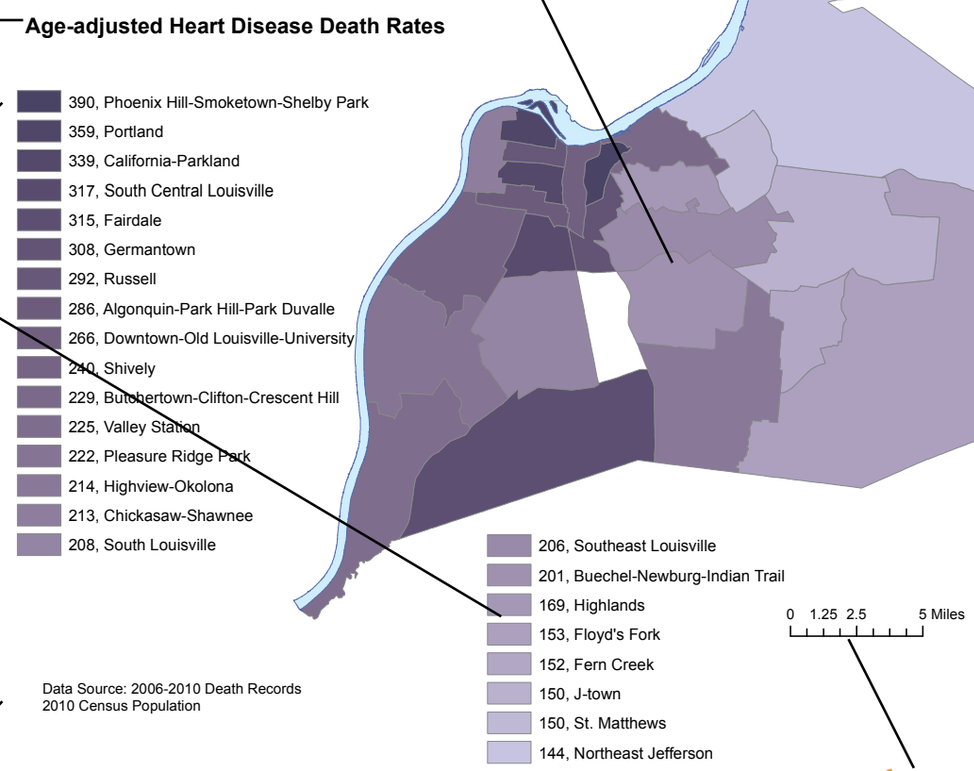
Maps provide geographical representation (map) of the data. These maps are produced to show the gradation of specific health topics. The "regions" are pre-defined neighborhoods.

In some topics, there may be additional information that support the topic's theme. Along with maps are graphs. These graphs may explain current proportions of a disease, trends, or other related key information



The title of the map details the specific topic being shown.

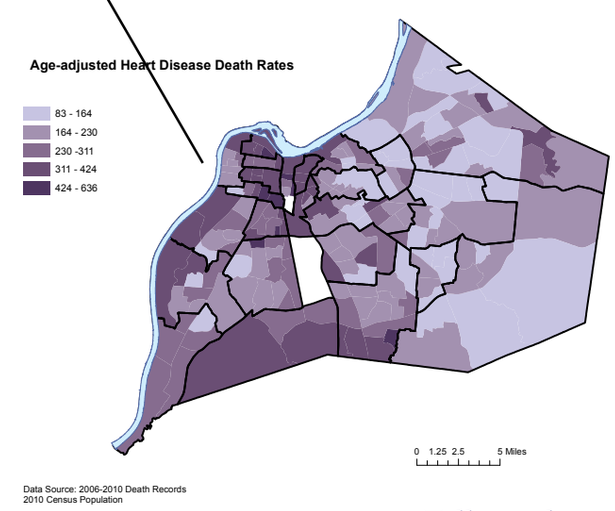
The legend shows the numeric values graphed on the map. In this case, the age-adjusted rates, names of neighborhoods, and corresponding color code.



The data source for the map is detailed here.

The scale provides a comparable measure of the size of the image.

Most maps will be paired with additional maps. These smaller maps give a more detailed sub-neighborhood display of adjusted death rates.



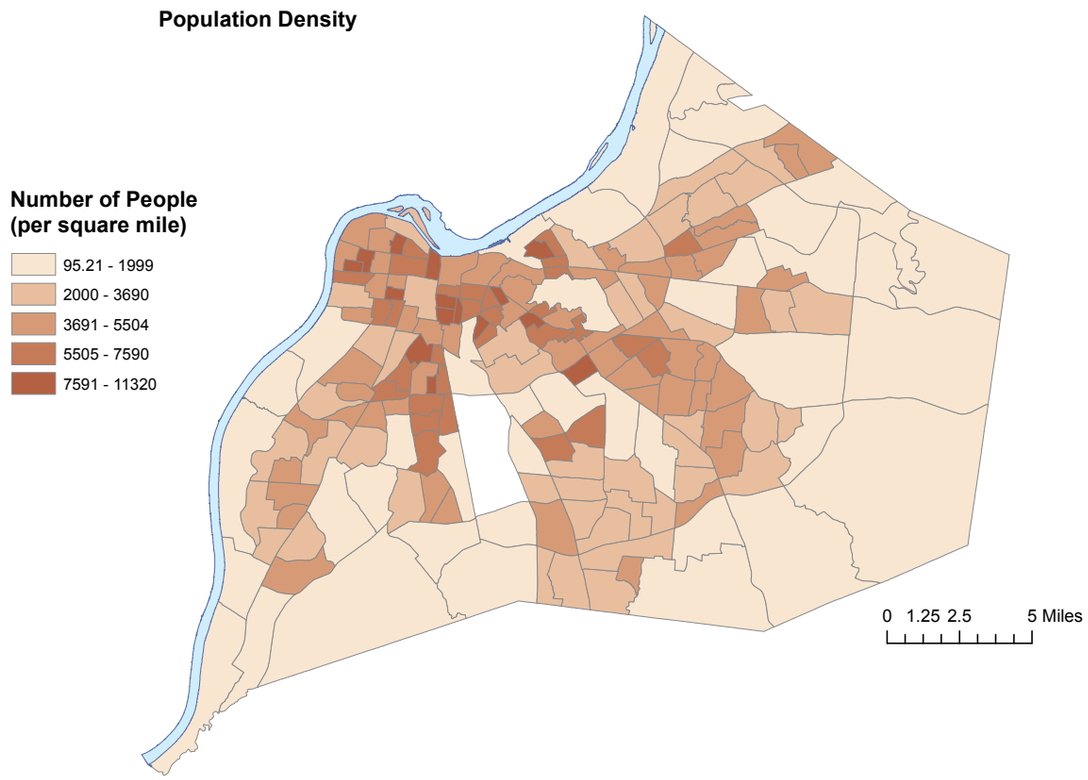
There is a link at the bottom of every page that will take you to a brief survey. Please provide us with feedback.

Tell us what you think?

Demographics & Population Health

Louisville's Demographics:

Who We Are and How We Are Changing



Data Source:
2010 Census

The number of people living in an area (population density) can determine our interactions, social connections, and quality of life.[15] However, while regions containing large populations (such as urban areas) fare better on average compared to sparse populations (such as rural communities), there are frequently stark differences within highly populated areas. While Louisville as a whole fares better than rural portions of Kentucky, there are sub-county neighborhoods suffering higher burdens of all types of health outcomes within our metro.

Louisville Metro is currently home to more than 740,000 people within its borders, which is almost one-fifth of the entire population of Kentucky. The map above shows where people live based on the density of the population (the number of people divided by the size of the census tract). The overall population density for Louisville-Jefferson County Metro is 1,924 persons per square mile, but as the map above shows, some areas contain five times that density while others are less than one-tenth. The most dense portions of the city cluster towards the main arterial roads that feed into the center of Louisville. This density map is based on the most recent account of population from the 2010 census.

There have been large changes in the population over the last decade and our diversity has grown. Louisville Metro's total population has increased by 6.8% since 2000. While there was almost no growth in the white population, there was comparatively more growth in all other racial/ethnic

Characteristics	2000	2010	Percent Increase
Total Population	**693,604**	**741,096**	**6.8%**
Gender			
Male	**331,599**(47.8%)	**357,699**(48.3%)	**7.9%**
Female	**362,005**(52.2%)	**383,397**(51.7%)	**5.9%**
Race			
White Alone	**536,721**(77.4%)	**538,714**(72.7%)	**0.4%**
Black or African American Alone	**130,928**(18.9%)	**154,246**(20.8%)	**17.8%**
American Indian and Alaska Native Alone	**1,523**(0.2%)	**1,788**(0.2%)	**17.4%**
Asian Alone	**9,640**(1.4%)	**16,338**(2.2%)	**69.5%**
Native Hawaiian and Other Pacific Islander Alone	**255**(0.0%)	**460**(0.1%)	**80.4%**
Other Race	**4,695**(0.7%)	**12,895**(1.7%)	**174.7%**
Two or More Races	**9,842**(1.4%)	**16,655**(2.3%)	**69.2%**
Ethnicity			
Hispanic or Latino	**12,370**(1.8%)	**32,542**(4.4%)	**163.1%**

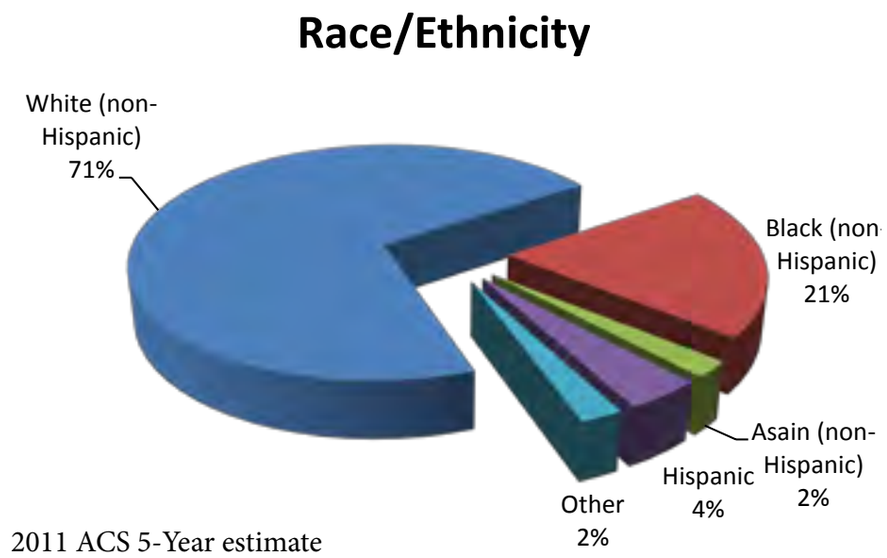
Data Source: 2000, 2010 Census

categories. For example, the Hispanic population has more than doubled in the last decade. Minority populations now make up over a quarter of the population. This current distribution is very different compared to the rest of Kentucky (87.8% white) yet more similar to the US as a whole (72.4% white). Population density has also increased over the decade by over 100 people per square mile (in 2000 - 1,801 persons/square mile), and likely more so within the central areas of Louisville.

Louisville's Demographics: Continued

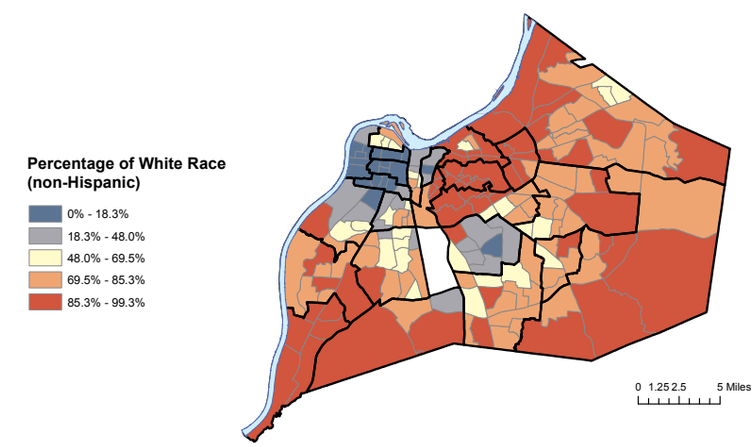
There are ways to consider diversity other than just looking at proportions of racial or ethnic groups. One way to measure the diversity of Louisville is to use the Simpson's Index of Diversity. This index calculates a value between 0 and 1 that is equal to the probability that two people selected at random will be of a different race or ethnicity. Using 2012 American Community Survey data, Louisville Metro has an index of 0.46, or a 46% chance that two randomly-selected people will be of different racial or ethnic backgrounds. In comparison, Louisville falls in the middle between Kentucky's index (26.9%) and the United States as a whole (60.6%).

Although Louisville Metro's diversity has increased and is well above the state average, there is still considerable geographic separation, with racial and ethnic groups typically concentrated in certain regions of Louisville. The maps below show this geographical distribution by race and ethnicity for the Louisville Metro population. These maps show the proportion of population that are of a given race or ethnicity (white, black, or Hispanic). In some of these census tracts, the composition approaches 100% of one race or ethnicity. This would be the equivalent of nearly a 0 for the Simpson's Index. The metro-wide Simpson's Index of 0.46 is based on aggregate population group totals and misses these sub-county differences.

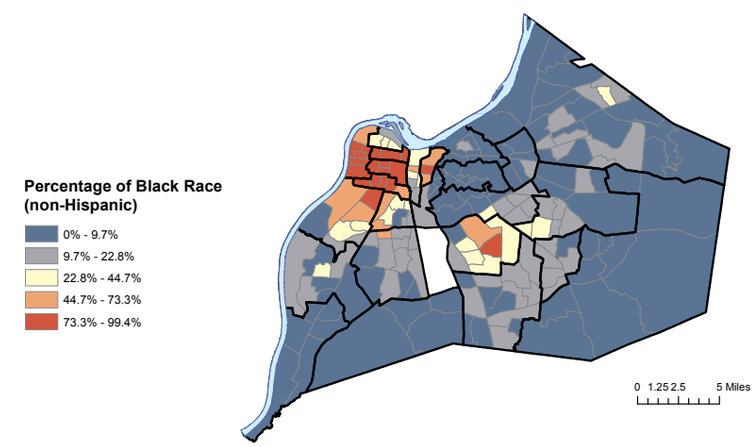


2011 ACS 5-Year estimate

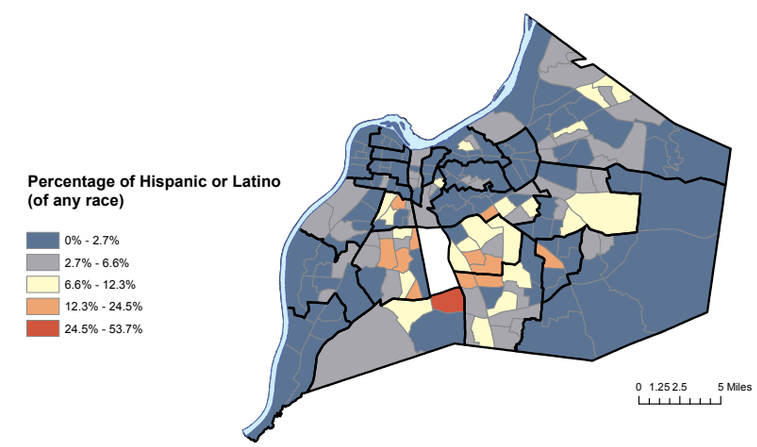
The uneven distribution of racial and ethnic groups has more meaning when overlaid with the differences in health and socioeconomic conditions explored within this report. As you read this report you may want to reference these base maps to also understand which populations are being affected most.



Data Source: 2007-2011 ACS Estimates



Data Source: 2007-2011 ACS Estimates



Data Source: 2007-2011 ACS Estimates

Health Status

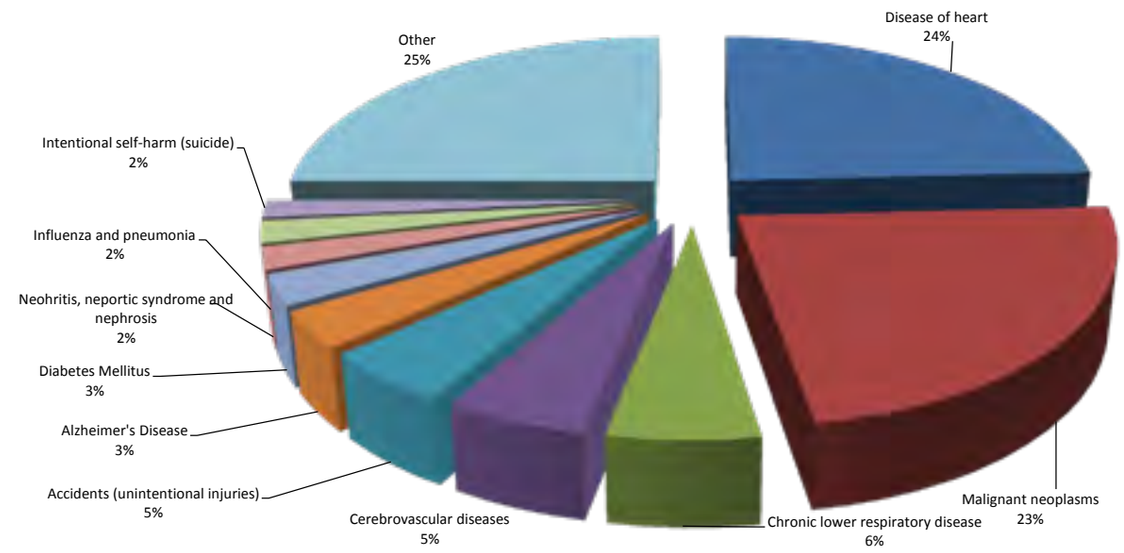
Health is a human right. Living long, complete, healthy, and productive lives has always been the goal of our society. Our first big gains in life expectancy came through major improvements in sanitation in the mid-1800s. Changes in physical environments greatly decreased morbidity and mortality for everyone, and most dramatically for those living in impoverished environments. These improvements drastically decreased the major killers of the time, namely infectious disease. Current major health epidemics are not the acute infectious diseases of the past, but rather chronic diseases, which are primarily behaviorally driven. Health concerns today stem from lifestyle and behaviors such as tobacco use, poor diet, physical inactivity, alcohol consumption, and others.

Our medical system here in the United States (US) is one of the most advanced in the world; the US spends over $100 billion[16] every year on medical research, and more per capita on health care than any other country in the world.[17] Given this level of investment, we should have the longest lives and least disease; however, we rank lowest compared to all other industrialized nations. Additionally, our life expectancy has been decreasing over the last few decades.[17] This stems from a focus on addressing health concerns and chronic diseases only after they have become very complicated and expensive to manage, rather than focusing on prevention. Secondary prevention alone is not effective at changing the population-level health outcomes that are driving our ever-diminishing relative life expectancy. There is a need for concentrated efforts on the upstream root causes of chronic disease.

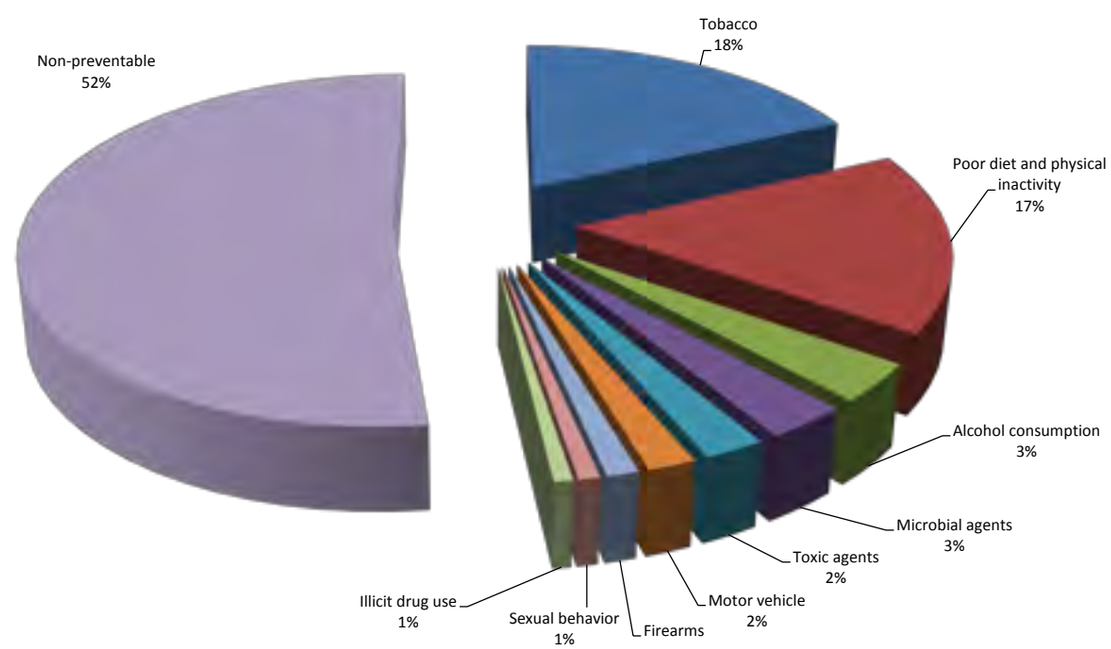
Emulating the successful environmentally-driven changes of the past could have the most dramatic and long-standing impact on population health today. Several studies have shown that physical and social environmental changes have larger effects on morbidity and mortality than medical treatments. Woolf et al. demonstrated in their research that, in the US from 1996-2002, medical advances prevented 178,193 deaths. During the same period, addressing educational disparities would have saved 1,369,335 lives.[7] The benefits of addressing the social and physical environment in an effort to improve health for everyone is evident.

One of the first steps necessary to impact population health is to understand the current status of the environment as it relates to health outcomes. This report seeks to highlight the differences in health outcomes as they relate to social determinants, stratified by neighborhood/geographic environments within Louisville Metro.

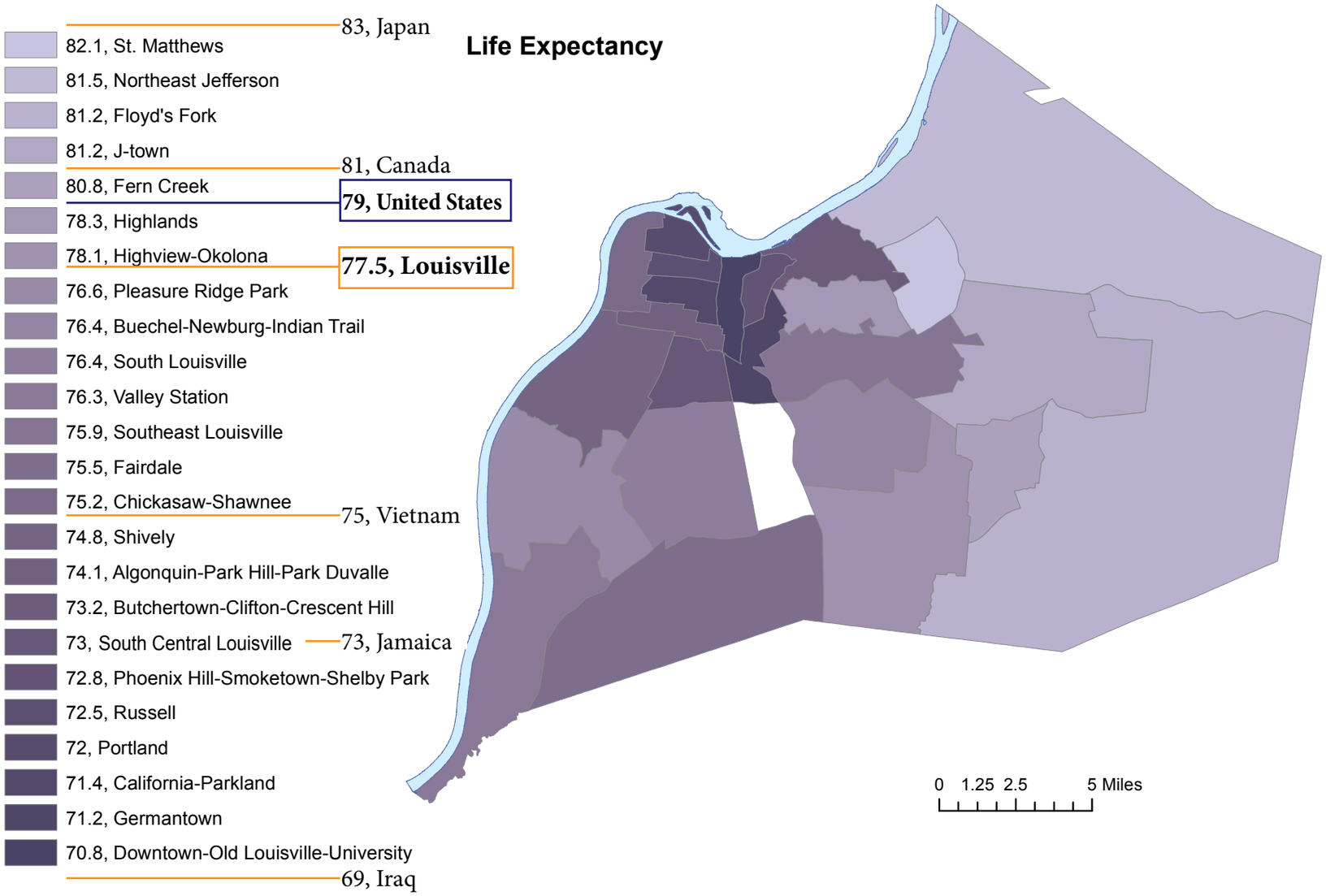
All Death (%) for the United States 2010



Preventable Causes of Death for United States 2000



Life Expectancy



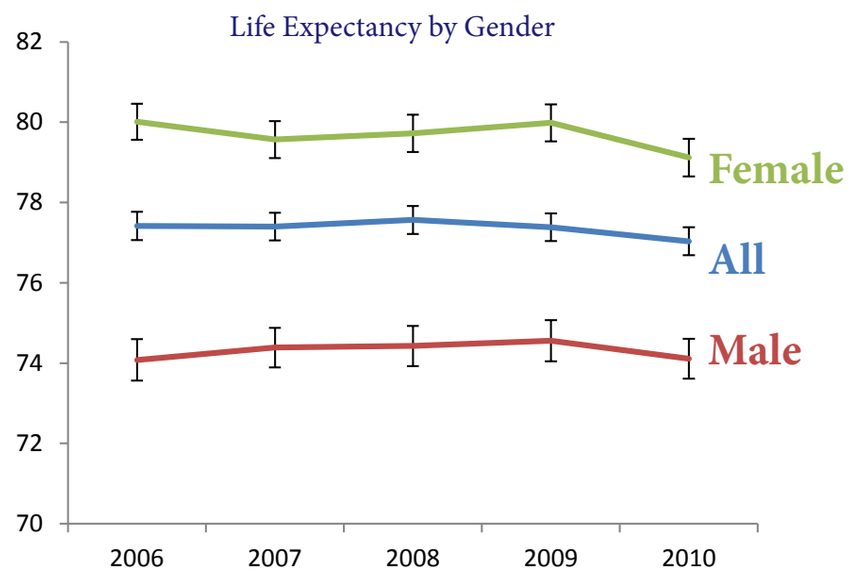
Data Source: 2006-2010 Death Records
2010 Census Population
Life Expectancy Formula following ONS guidelines in using Chiang II methodology for small populations

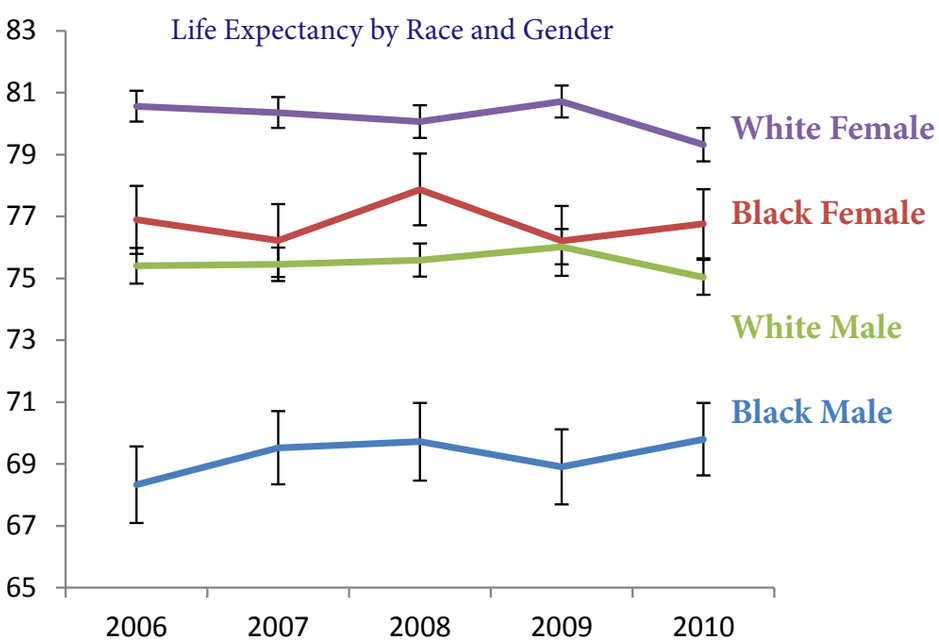
As noted in the previous section, it is important to understand the distribution of health status and health outcomes. One way to capture a snapshot of the health of a community is to examine the life expectancy of the different neighborhoods. For simplicity, life expectancy is an easy way to communicate the overall adjusted death rate in a more readily understandable manner. By definition, "life expectancy is the average number of years a person can expect to live, if in the future they experience the current age-specific mortality rates in the population."[18] For example and by referring to the map on the left, if infants born in Fairdale today experience exactly the same death rates at the same specific ages, they will likely live to 75.5 years old. However, this is based on current death rates. The fact is that environmental and social changes over the next 75 years will likely occur and impact the true longevity of those infants. In this way, life expectancy isn't the fate of the population, but rather a measure of what the current environment offers as a whole and a glimpse of what the future would hold if we don't act to change it. Life expectancy then becomes a measure of how an environment supports or depresses our opportunities for health -- such as behaviors, choices, and exposures -- that determine our longevity.

This map demonstrates the gradient of life expectancy across Louisville Metro using 2006-2010 death records to produce average life expectancies by neighborhood. There is obvious geographical clustering of lower life expectancies concentrated around the downtown and western portion of Louisville Metro. This map shows the five-year average disparities in how long people live based on where they live. This difference results in an 11.2-year gap between the highest- and lowest-ranked neighborhoods.

Although it may appear that just the downtown area needs improvement, this only tells part of the story. Typical mapping analysis, such as that presented here, can visually bias results. The color divisions are relative to the average for a specific area or group and should not be taken out of context. In this particular case, the map shows the differences in life expectancy of neighborhoods by moving from light blue (high life expectancy) to dark blue (low life

The Gaps



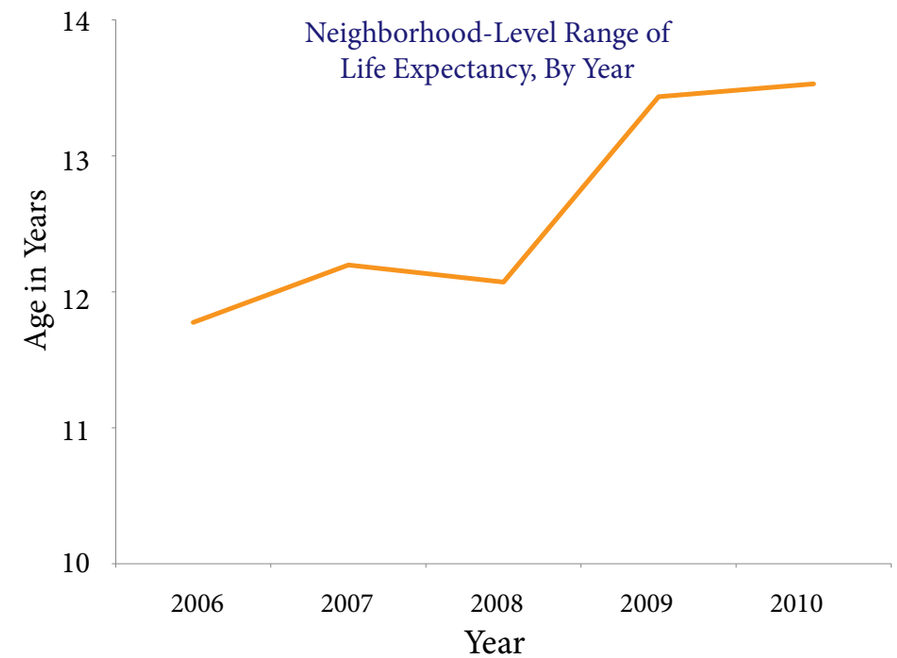


expectancy) relative to Louisville's average. Compared to the national average life expectancy (79 years), only five neighborhoods skirt just above it. Over 65%, or 485,000 people, live in a neighborhood with a life expectancy below the national average. When compared to other industrialized nations, even fewer neighborhoods pass the benchmark, further supporting the need for healthier environments throughout the entire community.

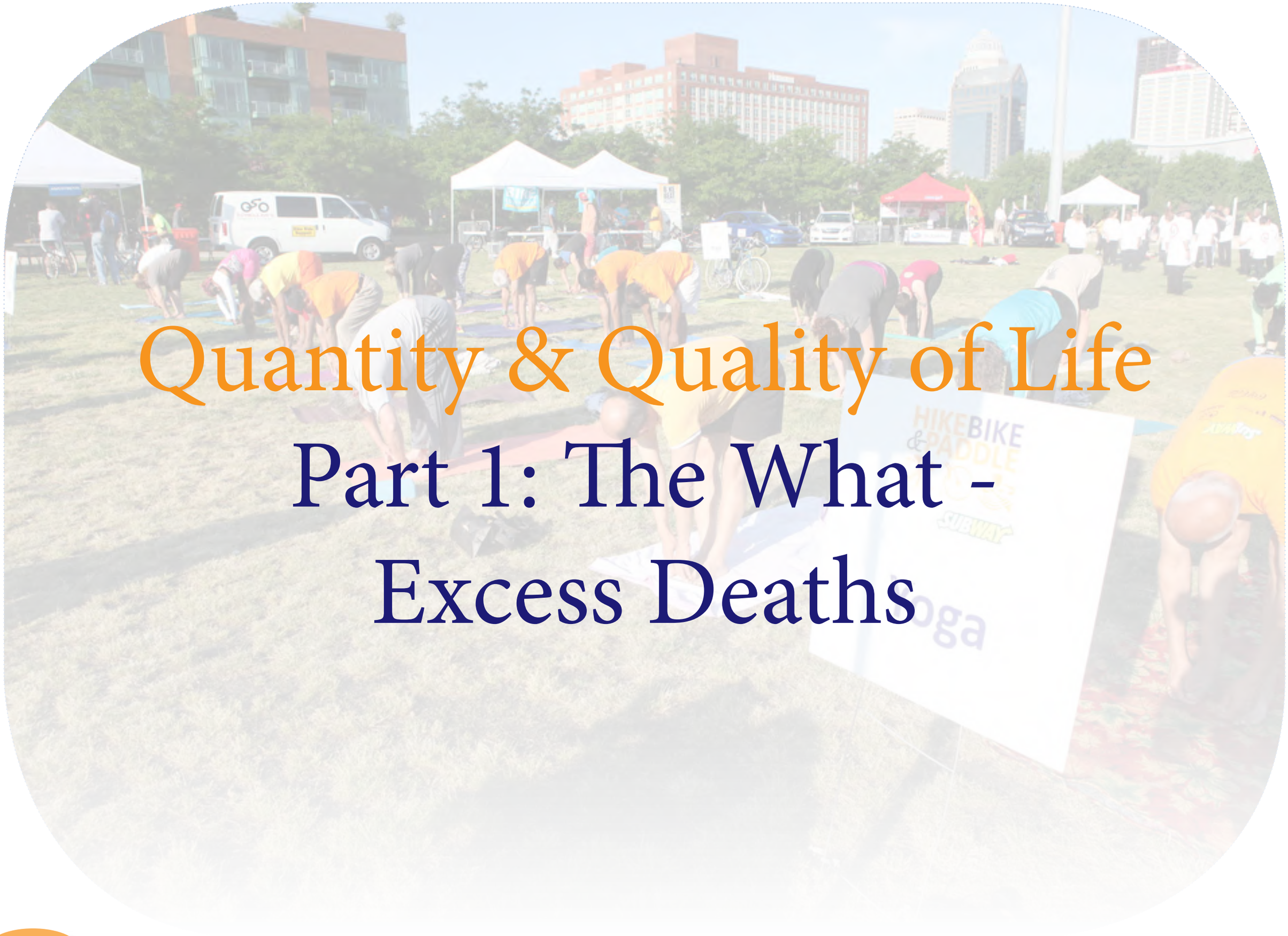
These findings are similar to those presented in the inaugural Health Equity Report. In this report, we are using a more current measure of population (2010 Census) and some additional death records (2010). Among other things, this report builds on the previous report by adding trend analysis for a year-by-year picture of life expectancy gaps. As can been seen in the accompanying graphs on this page, there has been little change over the five-year period and no group's life expectancy has increased in terms of statistical significance. However, there continue to be significant gaps between the different groups shown.

Differences in life expectancies between gender and race are apparent in the Louisville Metro population. These differences are similar to those seen around the country; however, Louisville Metro life expectancies are lower than the national average for all categories.[2] The gaps in life expectancy between males and females demonstrate that women are living approximately five years longer than men. However, this gap is more exaggerated when digging deeper into the data to look at gender gaps within racial groups. Based on the five-year average the difference between white males and females is 4.7 years, while the same gap for blacks is 7.5 years. When looking beyond race and simply focusing on "place," the single-year gap in life expectancies of individual neighborhoods has increased to more than a 13-year difference (by year 2010, shown in graph below). The rapidly expanding gaps between neighborhoods' life expectancies are of concern and demonstrate actual and trend-based increases in inequities.

"When it comes to health, it hurts to be poor and of any race, it hurts to be black no matter how much money you make, and it hurts doubly to be poor and black." [19]



The graph above shows the range of life expectancy seen in Louisville neighborhoods for each year. Life expectancy was calculated using single-year deaths, as opposed to the previous map, which utilizes five years of data for a more accurate average. Although these measures may be more variable, they demonstrate the overall trend of life expectancy differences in Louisville.



Quantity & Quality of Life

Part 1: The What - Excess Deaths

Measuring Excess Death

This report presents neighborhood-specific, age-adjusted death rates for Louisville Metro. These death rates act as a proxy for current health status. By utilizing death records, we can identify which areas are experiencing higher-than-expected levels of deaths for a given disease, regardless of population size. With chronic disease-related death as the final outcome of a poor chronic health status, we can use these death rates to estimate which areas have excess disease. For example, if an area has a high diabetes death rate, then it is nearly certain that the same area has a high rate of people living with diabetes. Death record data is one of the most comprehensive sources for determining which health issues are of concern and where the geographic focus on improvement should be.

Methods

The maps in the following section contain age-adjusted death rates for the 2006-2010 time frame. The maps were created using 2006-2010 Louisville Metro death records and 2010 census population. Utilizing five years of death records provides an accurate average for each of the geographic regions. Death records that were incomplete or outside of the geographic boundary were not included in this analysis. Through age adjustment, the rates are normalized to reduce biases of population size and age. Age-adjusted rates allow for comparisons across Louisville Metro neighborhoods and to other age-adjusted death rates for the state, country, or other areas of interest. In this document, there are typically two maps for each page. Unless stated otherwise, the larger map demonstrates the analyzed results from the neighborhood level. This map will contain the individual neighborhood values for the given topic. The legend will also be in order of highest-to-lowest rank. Where available, relevant and comparable rates will be included (such as the national rate of a given disease-specific death). If the topic has more detailed data it will be present in the smaller map. This smaller map will present census tract-level information, with colored region divisions based on natural breaks in the data. The smaller maps have a higher chance of statistical error and should be observed with this understanding.

Death Rates. These rates give a common calculated value that can be used to compare the number of deaths within areas of different population size. For a given area, the total number of deaths from a disease is divided by the total population of the area. This is important because population sizes can have large impacts on death counts. For example, two hypothetical populations: community A has 30 deaths (population size 9,875) and community B has 57 deaths (population size of 19,457). From just death counts population B appears to be much worse off, but it also has a larger population. To make them comparable, we use rates:

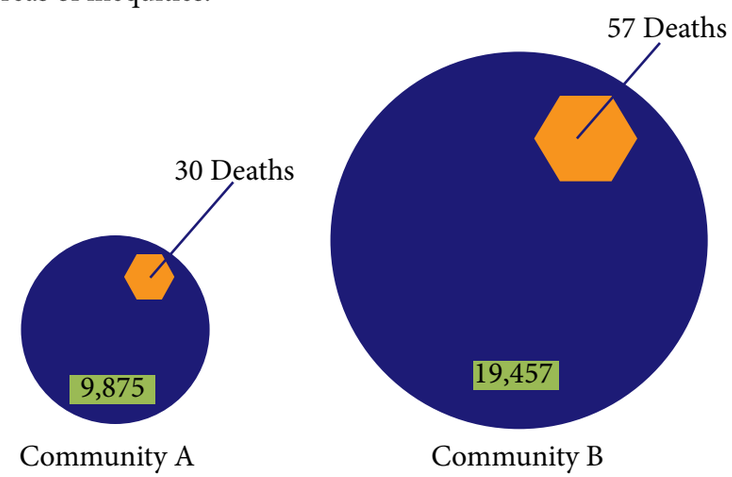
$$\text{Death Rate} = \frac{\text{Death count}}{\text{Total population}} \times 100{,}000 = \text{death rate per 100,000 people}$$

Example

Community A $\frac{30}{9{,}875} \times 100{,}000 =$ **303.8** deaths per 100,000 people

Community B $\frac{57}{19{,}457} \times 100{,}000 =$ **293.0** deaths per 100,000 people

In this example, it turns out that although community B has more total deaths, it is experiencing less death per capita compared to community A. This critical formula allows for comparisons between communities. Excessively high rates can indicate areas of inequities.

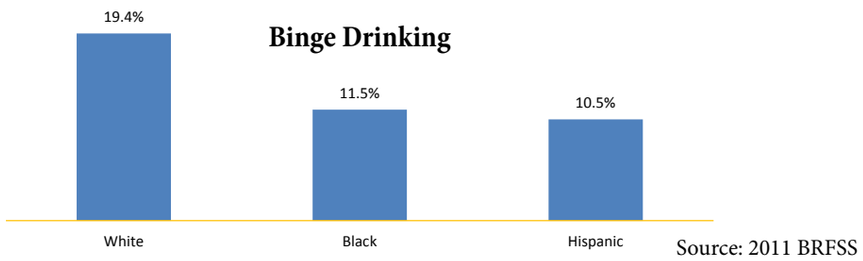


Total Population	A	<	B
Total Deaths	A	<	B
Rate	A	>	B

Age-adjusted death rates. This is a death rate similar to the formula above, but normalizes for the age of a population. Some communities will have larger proportions of older populations, which will lead to larger death counts. However, age adjustment will apply weighted values to compensate for these variances. The details of age adjustments are not included in this document but there are several resources online that can explain the detailed calculations.

Tell us what you think?

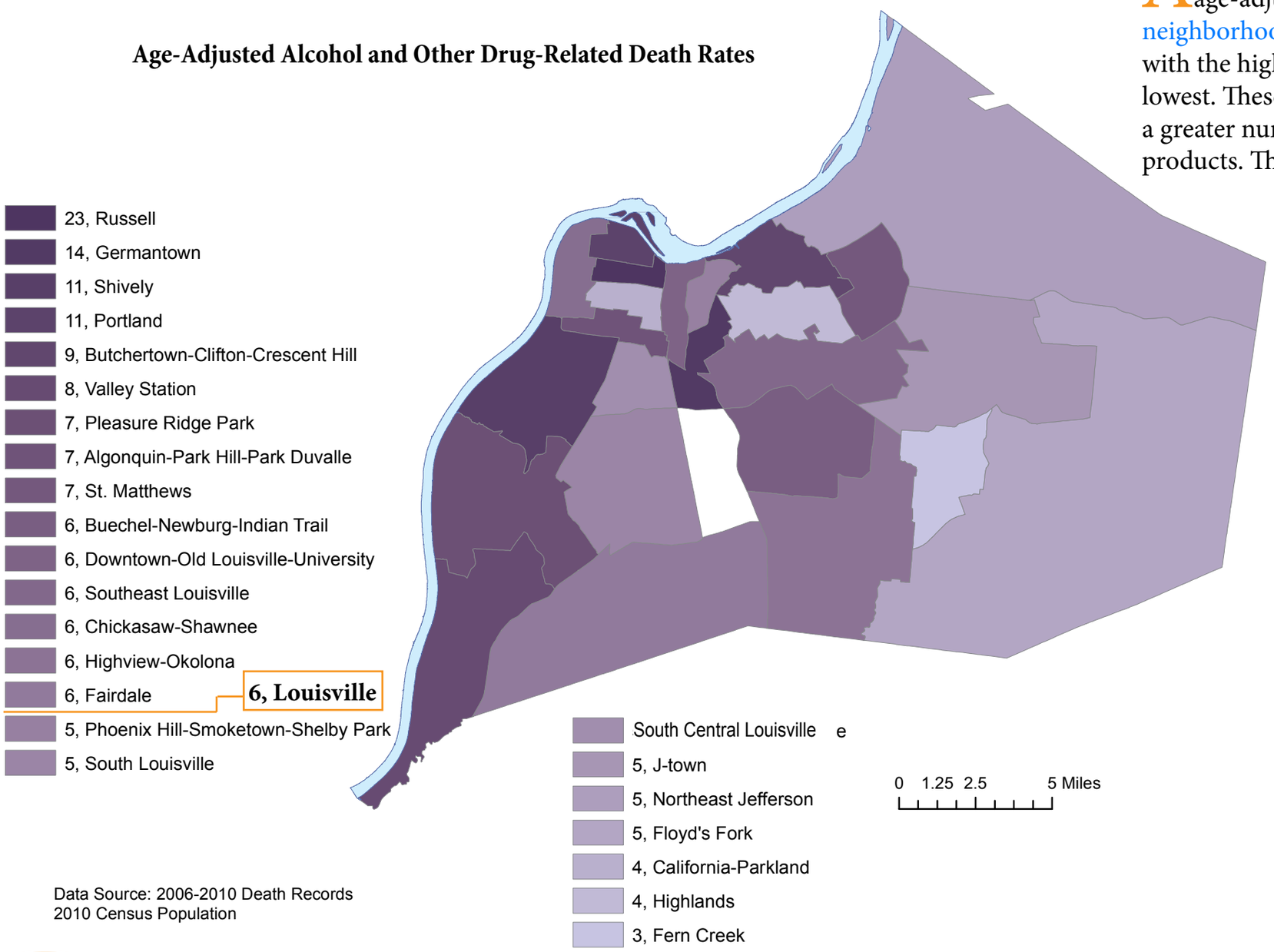
Alcohol and Drugs



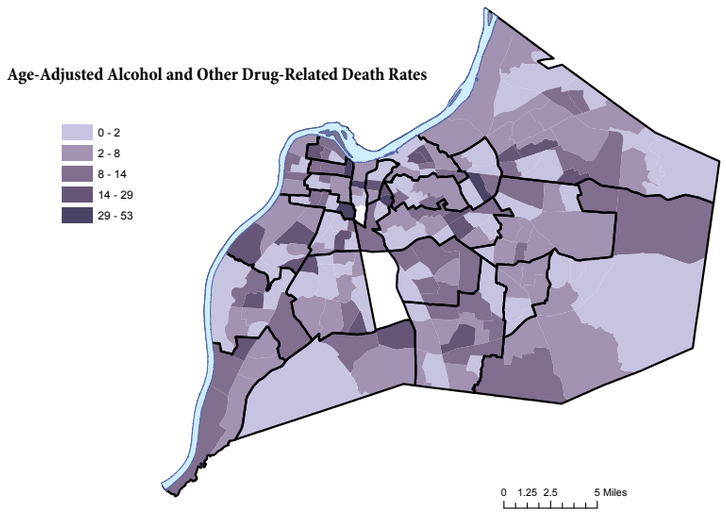
Abuse of alcohol and other drugs is a very serious public health concern. Long-term abuse of alcohol or other drugs can have drastic health impacts and ultimately lead to death. In the US, approximately 80,000 people die each year due to alcohol abuse,[20] and it is the third-leading lifestyle-related death in the nation.[21] In 2006, the direct and indirect effects of alcohol misuse added an estimated $223.5 billion in economic costs for the nation.[22]

According to the analysis in this map, the areas of highest age-adjusted death rates are concentrated in low-income neighborhoods. In this particular instance, the neighborhood with the highest rate of death is over seven times that of the lowest. These excessive rates typically fall in areas that have a greater number of alcohol stores and advertising of alcohol products. This higher concentration of supply and advertising can have impacts on the environment and health of residents. There have been several studies that show the connection between alcohol availability and increased negative outcomes from crime[23] to risky sexual behaviors.[24] The effect of alcohol store density on people's environment and health is a public health concern that many communities have addressed through policy changes such as zoning regulations.[25]

Age-Adjusted Alcohol and Other Drug-Related Death Rates

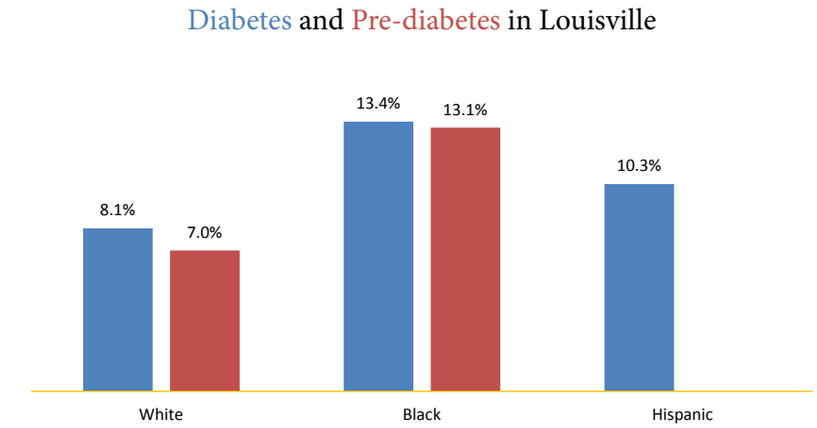


Data Source: 2006-2010 Death Records
2010 Census Population

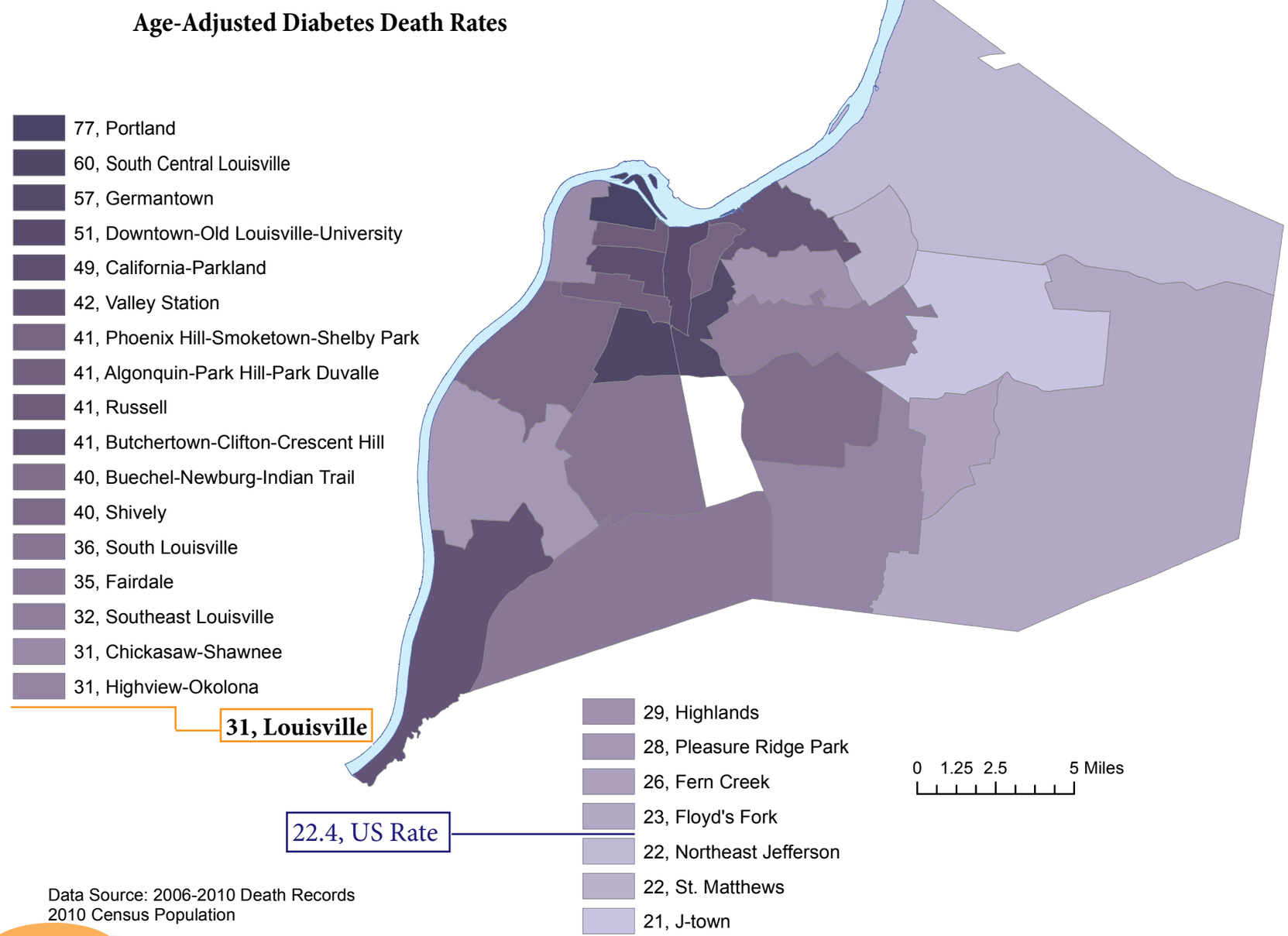


Tell us what you think?

Diabetes

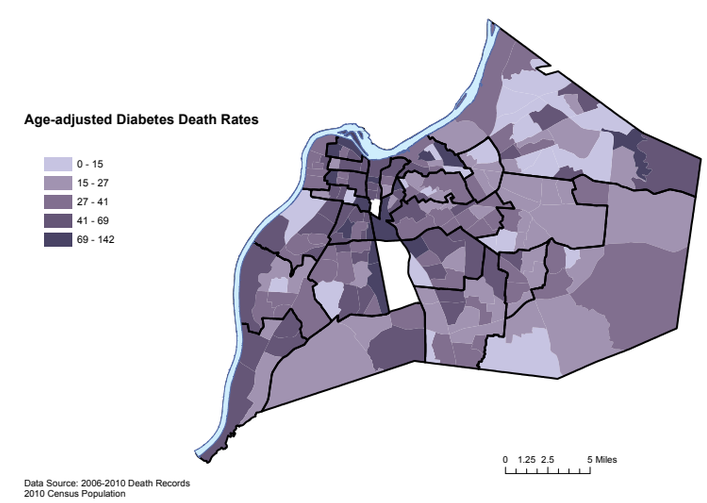


2011 BRFSS



Diabetes has become an all-too-familiar disease. More than one in ten adults currently live with diabetes in Louisville.[26] Diabetes is a difficult disease to manage and has devastating outcomes when not under control, leading to: heart disease, stroke, blindness, kidney disease, nervous system disease, amputations, dental disease, complications of pregnancy, and other morbidities. Diabetes is also an expensive disease, costing Americans an estimated $245 billion in indirect and direct costs.[27] This cost issue becomes an even larger barrier for the population most afflicted with diabetes, those living in poverty.

This map highlights diabetes-related death rates in Louisville. The dense clustering of high rates (shown in a darker shade) represents areas of higher risk and undue burden. As mentioned earlier, intervention needs to take place in more than just the neighborhoods with the highest burden. When compared to the rate for the US, only three neighborhoods fall just under the national rate. This leaves 75% of the population, or 556,634 people, living in high-risk environments. If we could bring all neighborhoods down to the national average, we would save 79 lives per year. Focusing on improvements that can benefit all of Louisville will have the greatest impact on health status and outcomes.

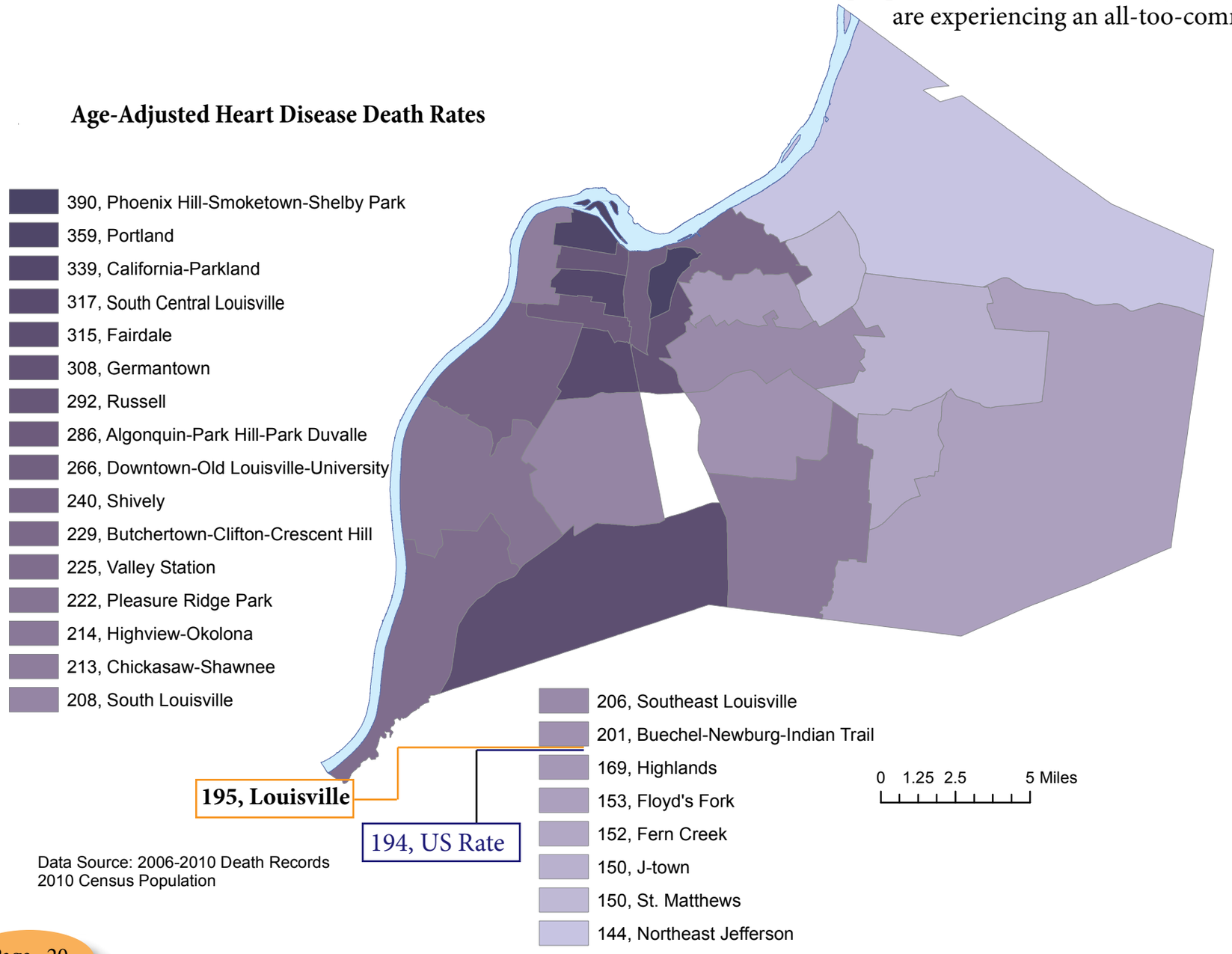


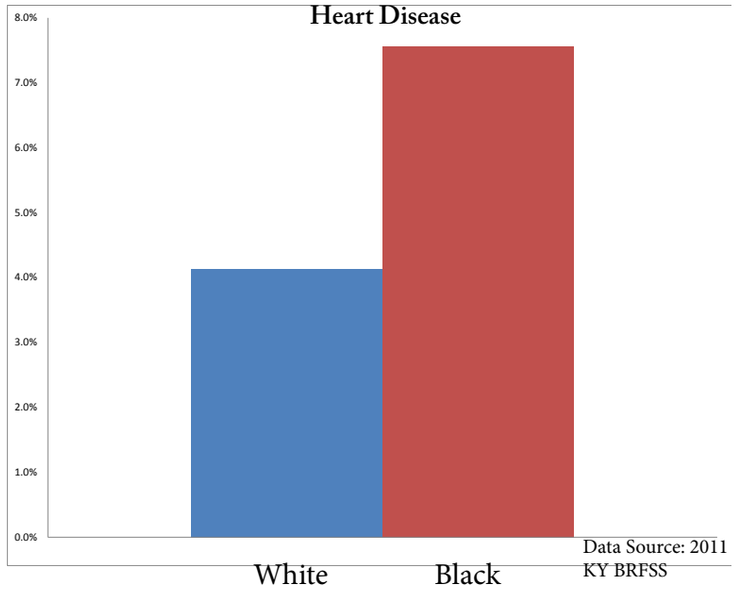
Tell us what you think?

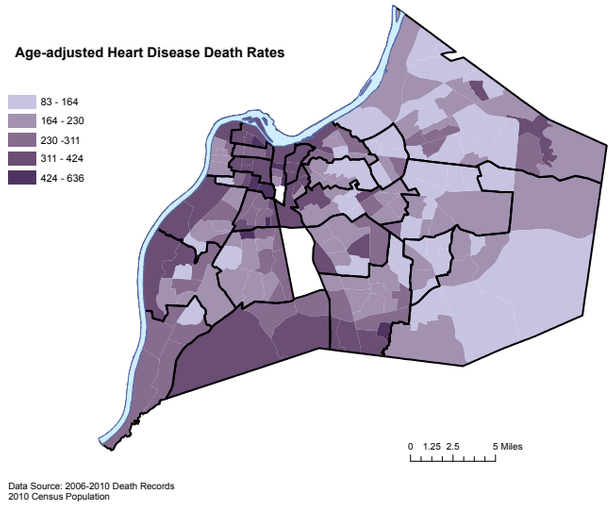
Heart Disease

Deaths due to heart disease are a serious concern for Louisville. Heart disease is the number one cause of death for both men and women in America,[2] leading to over half a million deaths per year.[2] This largely preventable disease is driven by behaviors such as smoking, lack of physical activity, and diet, all of which can and should be addressed through policy-level changes that improve the health outcomes for the entire population.

The map below illustrates the distribution of rates of death from heart disease. The gap between the largest and smallest neighborhood rate is more than two fold. Louisville is experiencing heart disease-related deaths at a higher level than the national average. In fact, if we could bring these neighborhoods down to the national rate, we could save 221 people every year. The majority of Louisville's population is living in high-risk areas that are experiencing an all-too-common chronic disease.







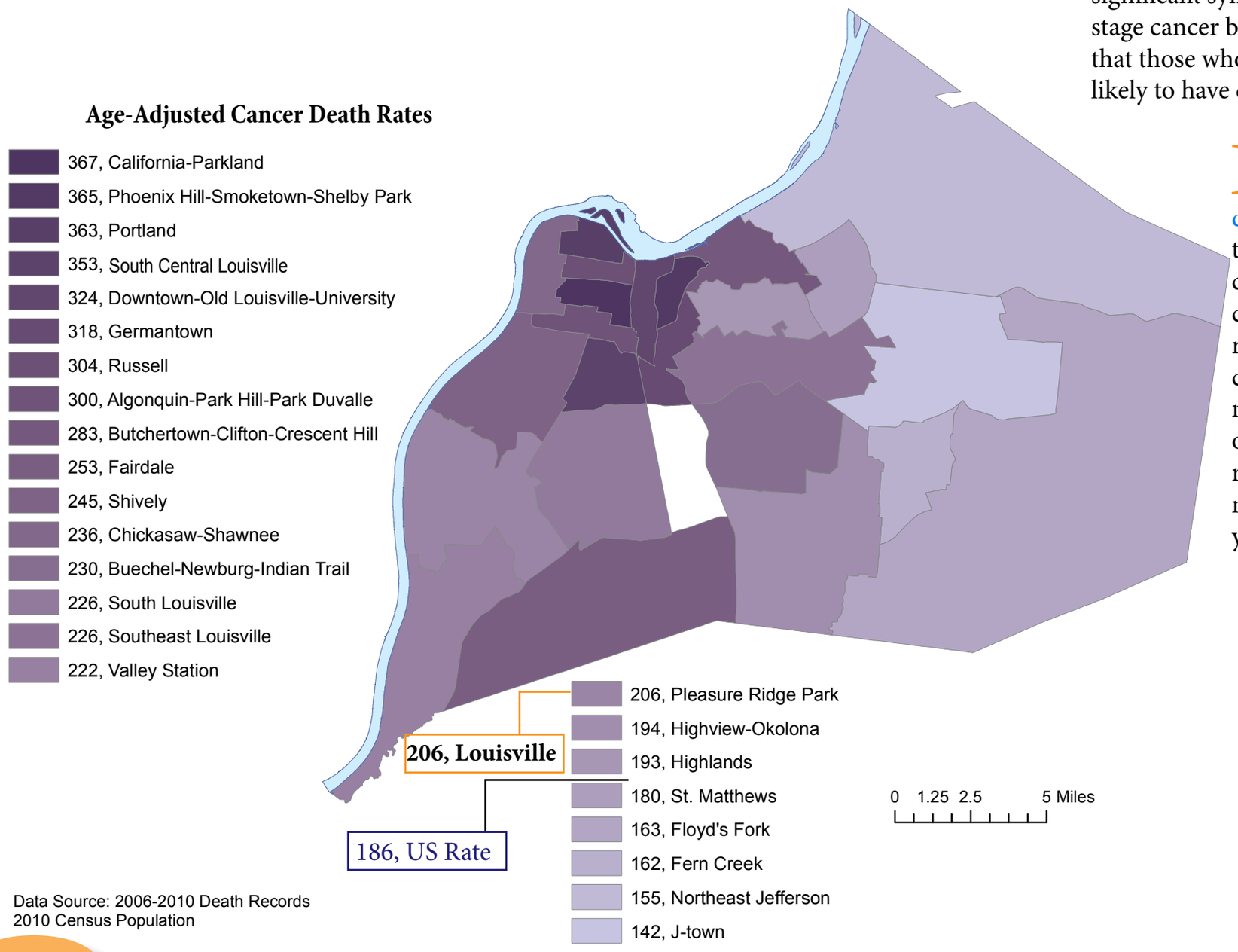
Tell us what you think?

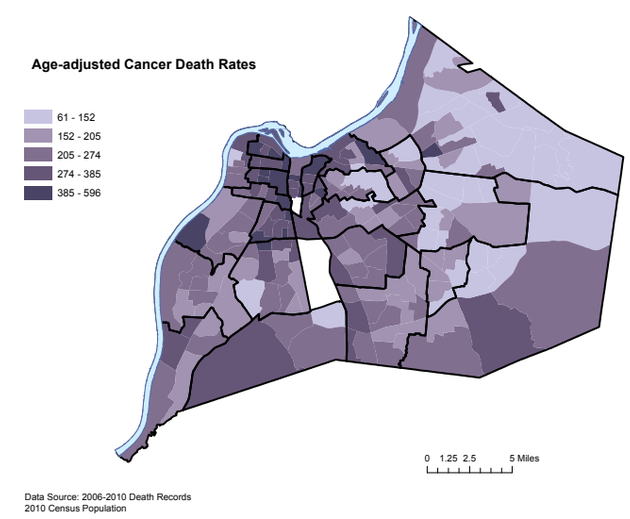
Cancer

The second leading cause of death of men and women in the US is cancer, claiming more than half a million Americans per year.[2]

Deaths due to cancer is disproportionately distributed across the community. New advancements in medicine have improved the prognosis for many patients; however, critical to increasing survival is early detection and intervention. This is difficult for those who live in poverty and have no regular access to medical care. Where cancer risk assessment and screening is not part of routine care, cancer is typically diagnosed only after significant symptoms have developed. This more aggressive late-stage cancer becomes much more difficult to treat. Research shows that those who are less-educated or without insurance are less likely to have cancer screenings.[4]

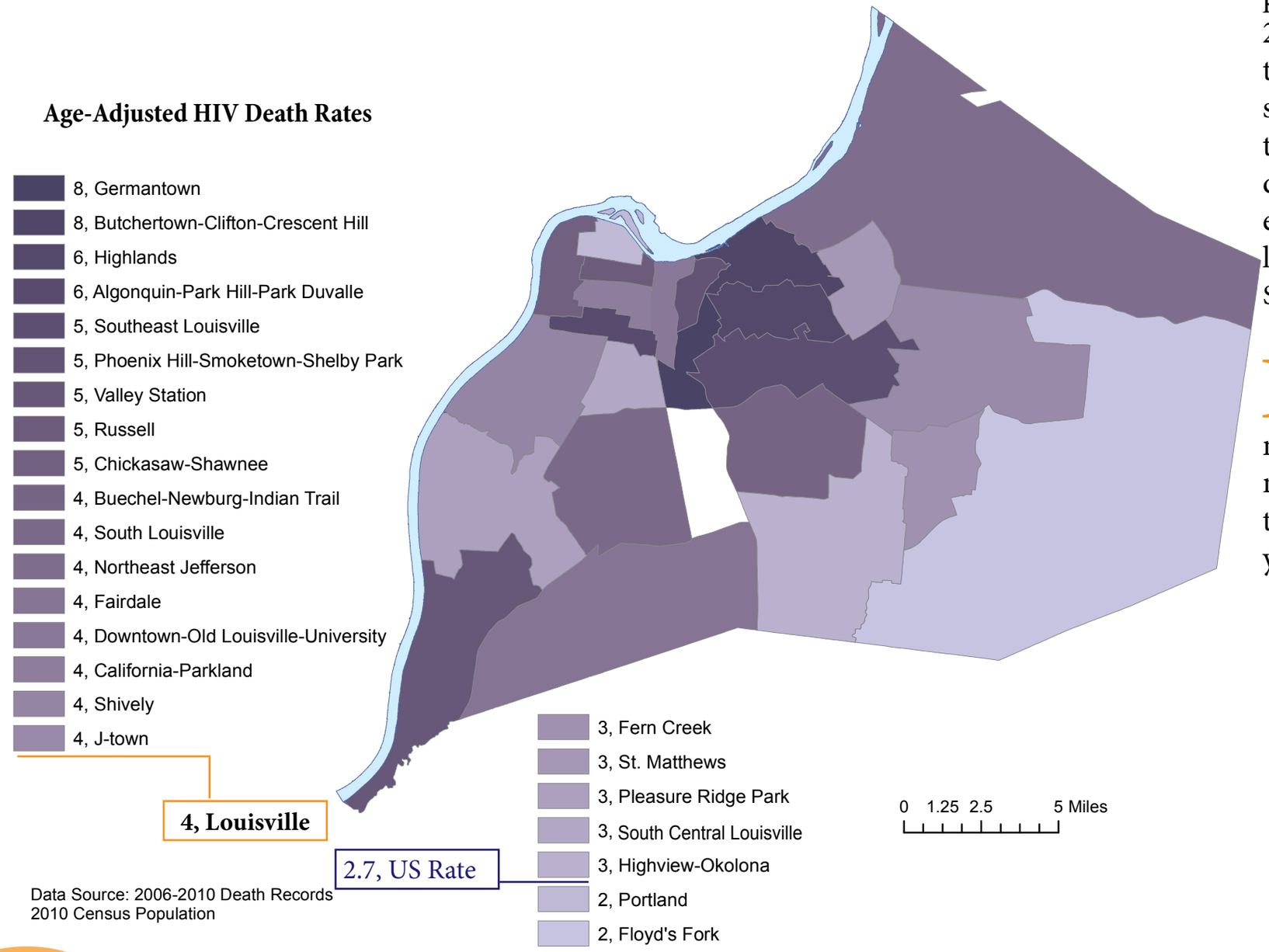
Louisville's rate of deaths due to cancer are similar to the numbers seen within the previous heart disease death rate map. Similarly, the trend shows that the highest rates are concentrated around the central downtown area. The gap is over twofold when comparing the highest and lowest neighborhood rates. Importantly, the national death rate for cancer is 186 per 100,000 people; only five of the neighborhoods have a lower rate. This leaves 65.5% of the population living in areas above the national rate. Bringing these neighborhoods down to just the national average would save over 300 people every year.





Tell us what you think?

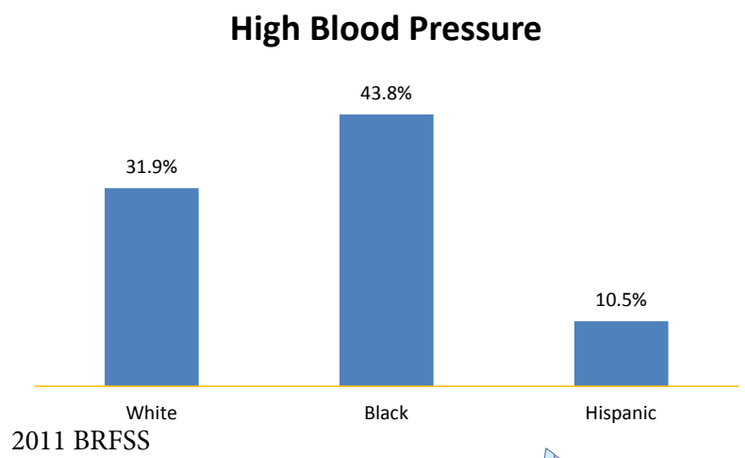
HIV & AIDS



Today, the number of HIV/AIDS-related deaths has decreased drastically since its peak as the number one killer for people ages 25-44 in the US.[28] This has been addressed through major focuses on prevention, screening, education, and new medical treatments. However, HIV is still an incurable, deadly disease for which treatment is very expensive. One study calculated the individual lifetime cost of living with HIV at over $600,000.[29]

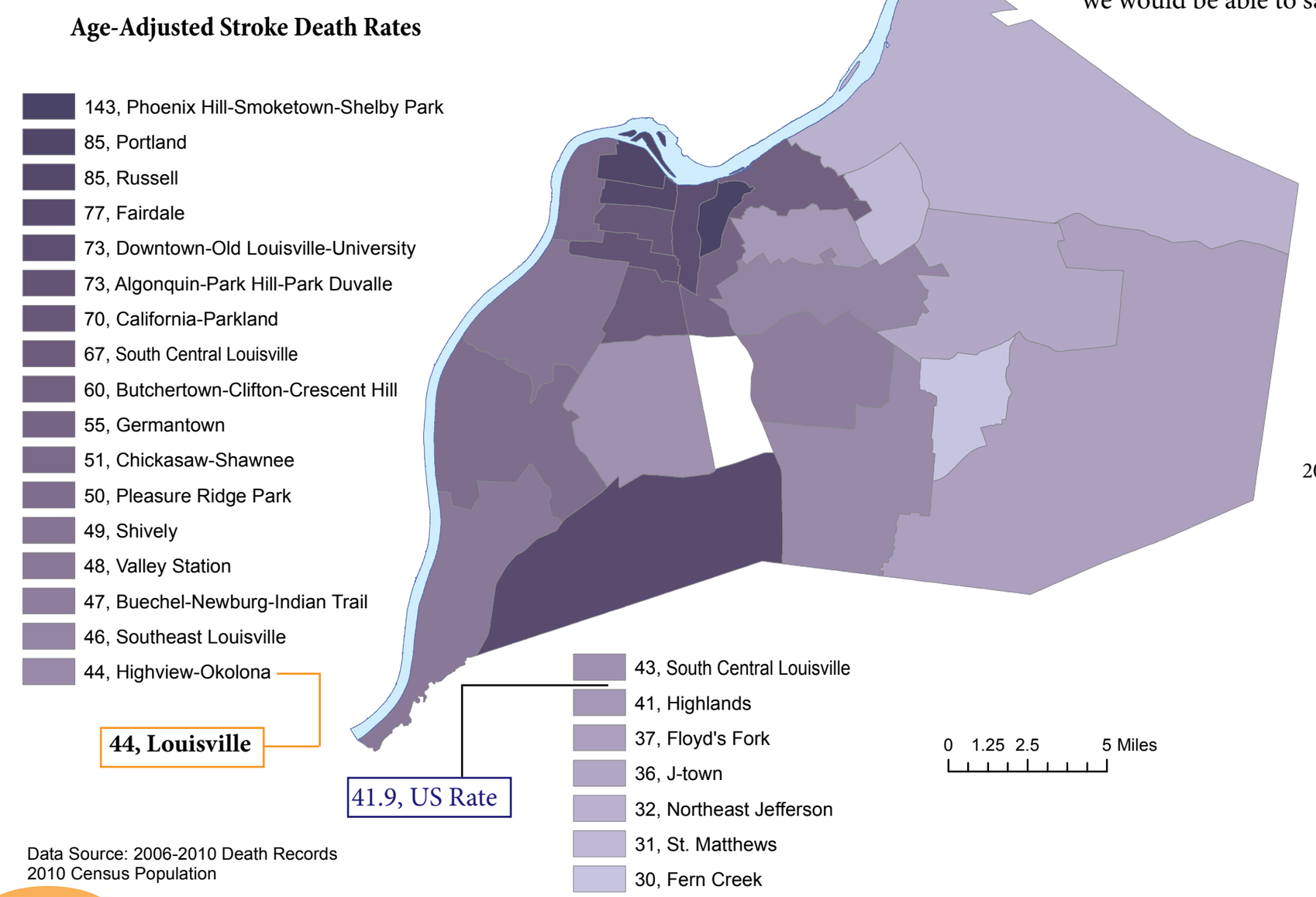
In Louisville, the death rate due to HIV is higher than the national average for the majority of neighborhoods. Bringing these neighborhoods down to a rate equivalent to the national average would save 10 people per year.

Stroke

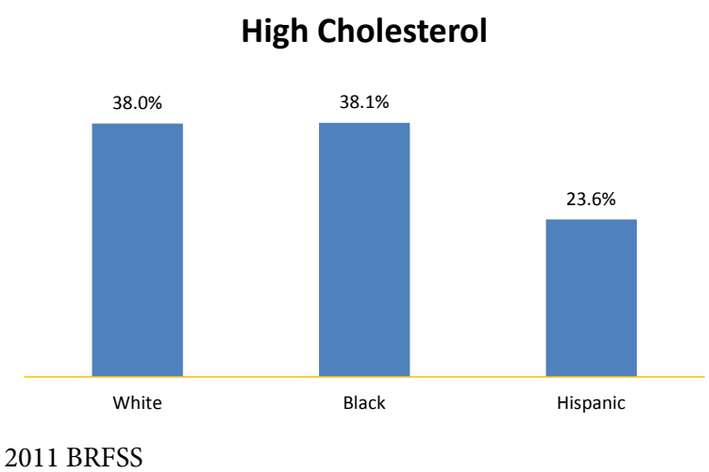


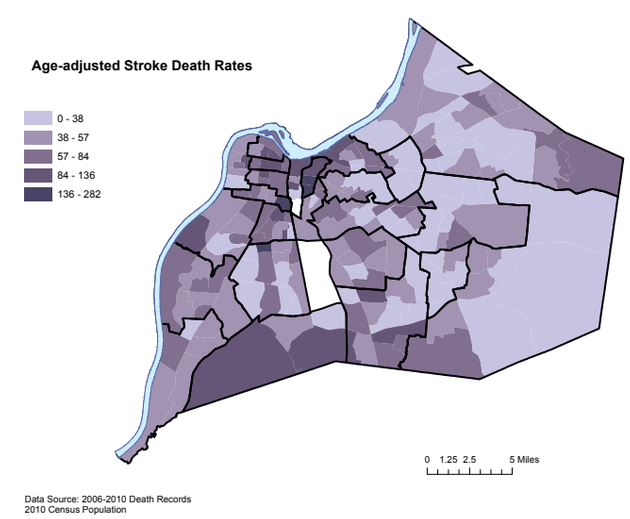
Nationally, stroke is the fourth-leading cause of death, resulting in the death of over 100,000 Americans.[4] Premature death due to stroke continues to be higher for blacks than whites.[4] Risk factors for stroke include high blood pressure and high cholesterol, which further underscores the need for individuals to be screened early and often.

Louisville death rates for stroke follow the same geographic trends observed previously. From the map, we can see that the majority of neighborhoods are above the rate seen nationally. In terms of population at higher risk, 63% of Louisville residents live in neighborhoods that experience higher death rates due to stroke compared to the US rate. If interventions can bring these neighborhoods down to the national level, we would be able to save 62 people every year.



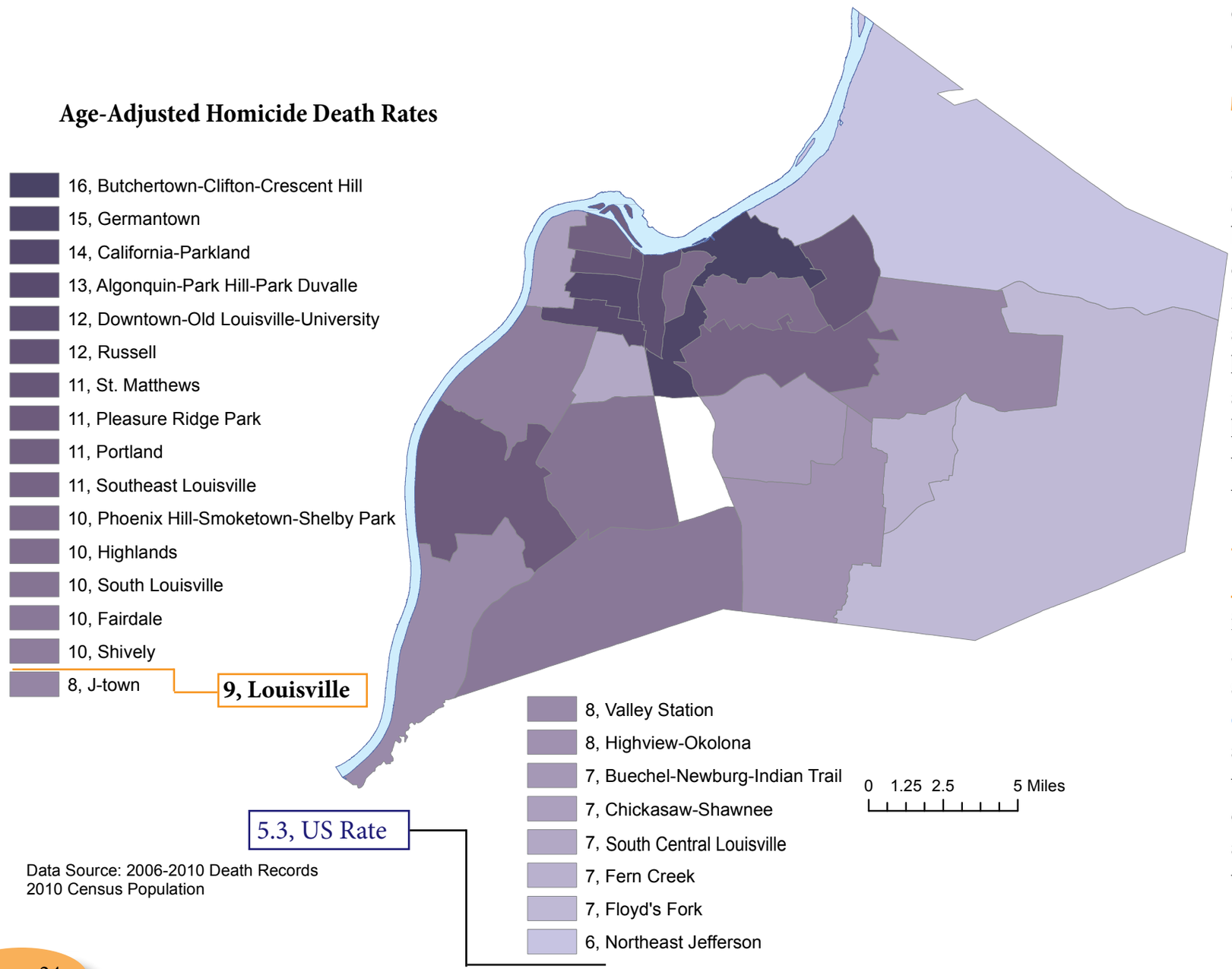
Data Source: 2006-2010 Death Records
2010 Census Population





Tell us what you think?

Homicide



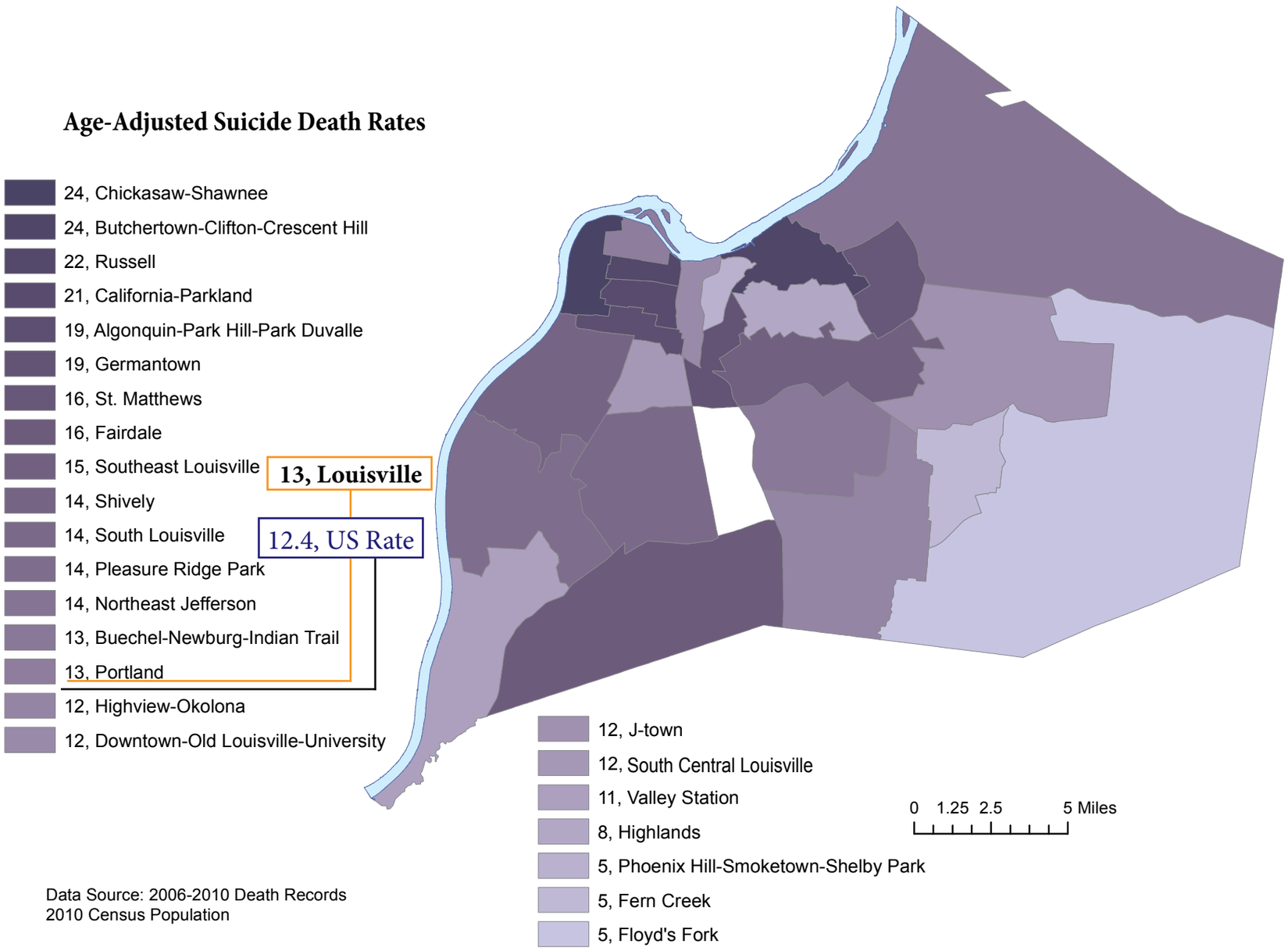
Homicide, among other things, is a proxy for the safety of a neighborhood, and is an important component to understanding the economic and social environmental conditions for residents. In terms of who is directly affected, homicide is largely a significant factor for the younger population (age 1-40) as it ranks in the top four causes of death for this specific age group.[4] Although homicide has a direct impact on this age group, it also has a ripple effect that affects other individuals, families, and communities.

The data map on the left shows homicide rates (per 100,000 people) based on cause of death and the address of the deceased -- *note that this is different from where the death occured*. This could be layered with police data for more insight on root causes and solution development. Homicide death rates appear to fall on a geographical gradient with a gap of almost three fold between the highest and lowest neighborhood rates. Compared to the US rate, all neighborhoods experience higher than average homicide rates. Addressing homicide in a way that would bring Louisville down to the national average would save an average of 28 people every year.

Research shows that community factors such as unemployment, poverty, and economic inequality are closely linked to homicide rates.[4] Those same factors are visibly related to the high incidence seen in Louisville. Poverty, unemployment, and economic inequality are all social factors that can be addressed through policies that drive community-wide changes. Policies that address root causes as discussed throughout this document, can also make a contribution to reducing violence and homicides, with improvements to community safety.

Tell us what you think?

Suicide



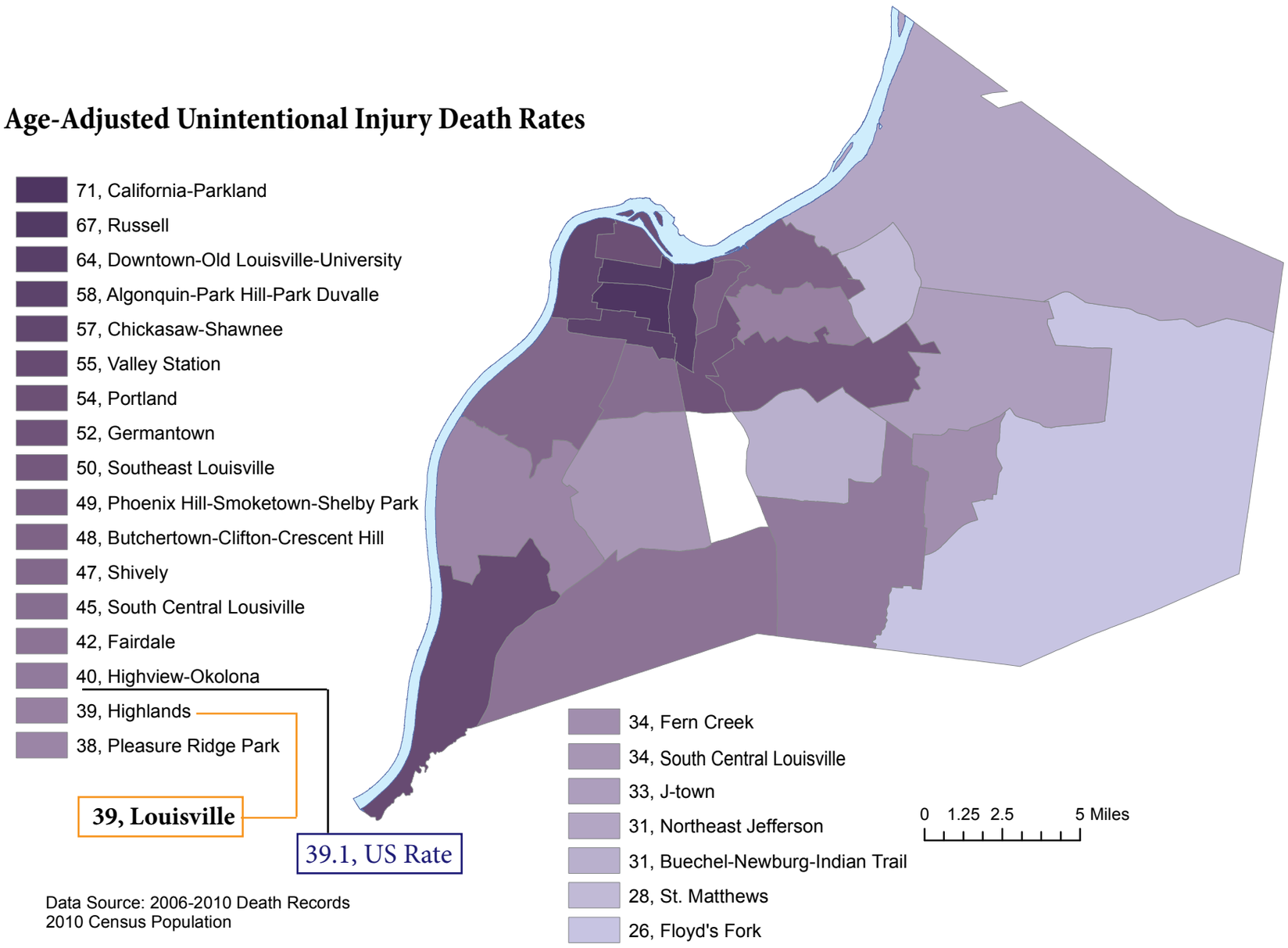
Both national and local suicide rates are noticeably higher than homicide rates. Suicide can stem from multiple factors; however, there are several protective factors that help mitigate the incidence of suicide, such as family support, community connectedness, social support, and employment.[30] Coupled with the risk factors of poverty, unemployment, and substance abuse, there are other social factors that contribute to suicide rates.

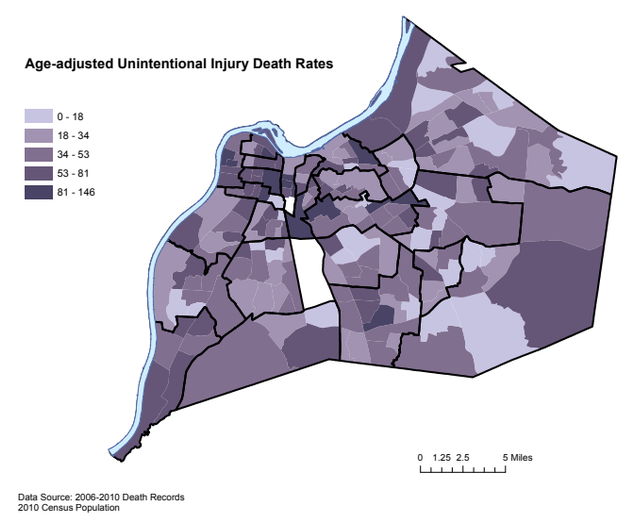
Observing the map, suicide is more evenly distributed throughout the community compared to other health outcomes. Higher rates align with areas of higher proportions of risk factors (unemployment, lack of social connectedness, and poverty). When observing the range of suicide death rates, the gap shows the neighborhoods with the highest rates to be almost five times the rate of the lowest. In comparing Louisville to the US average, we fare a bit better than the other disease-related death rates previously discussed. Even so, if neighborhoods with higher-than-average suicide rates were brought down to the US average, an additional 14 people would be saved every year.

Accidents

Unintentional injury deaths, know as accidents, are among the top causes of preventable deaths. Unintentional death are typically related to chronic risk-taking behaviors and unsafe environments. Improvements in vehicle safety have played a major role in decreasing unintentional injury over the past few decades, but a large portion of unintentional injury deaths are due to motor vehicles, as well as falls and accidental poisoning.

As with the other causes of death discussed in this document, accidental death follows a gradient across Louisville. The gap in death rates due to accidents between neighborhoods is nearly three-fold (2.7) and shows a geographical relationship. Furthermore, as a city, we have a little less than half of our residents (48%) living in areas with rates higher than the national unintentional injury death rate. Reducing these neighborhood rates to the US average could save as many as 37 people each year.





Tell us what you think?

Quantity & Quality of Life

Part 2: The Why - Determinants of Health

Determinants of Health

A person's health status in life is determined by a number of factors including one's behavior (such as smoking); genetics; social circumstances; the environment in which one lives, even as an unborn child; and one's access to health care.[12]

In the previous section, information on current age-adjusted death rates is presented to demonstrate the correlation of geographic location and health outcomes. Understanding that these health outcomes are related to where we live logically points to the next question of "Why?" What is it about these areas that leads to such poor health outcomes? What are the root causes of health inequities?

This section seeks to dig deeper into these differences within the neighborhoods to help identify the causes of disparities seen within the previous section. Current research in public health focusing on root causes points to inequities in the socioeconomic status of individuals and their neighborhoods.[25] Some of the identified social determinants of health are:

- -Income
- -Education
- -Environment
- -Stress
- -Inadequate access to quality care
- -Discrimination and biases
- -Geography

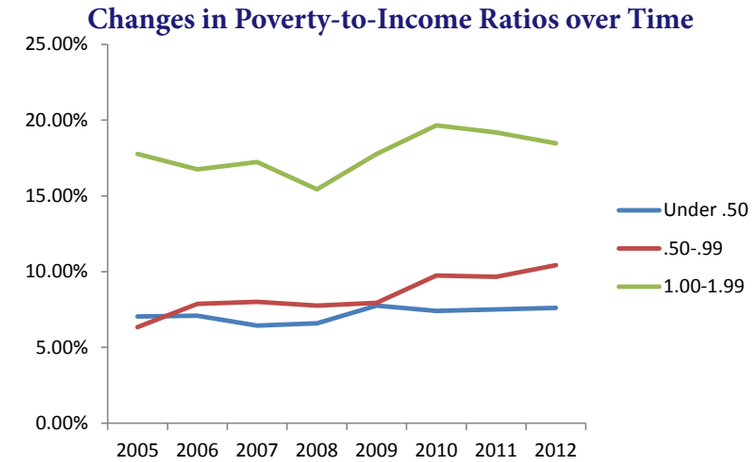
The following section will take the same approach as the previous section to visualize the distribution of these social determinants from a neighborhood perspective. Each of the maps will provide geographical trends across the metro. While each map is intended to detail a specific social determinant, keep in mind the geographic areas and neighborhoods that commonly experience higher burdens of disease as previously presented. The recurring relationships between the social determinants of health and health outcomes are important considerations for the health equity for Louisville.

Methods The following maps' primary data source is the Census Bureau's American Community Survey (ACS). The ACS is a continuous survey the Census uses to estimate current demographic, economic, and socially relevant data. The ACS is a replacement for the Census Bureaus' "long form" and provides more up-to-date information, as opposed to being collected every ten years. ACS data is available in three time windows: one-year, three-year, and five-year averages. The five-year estimates used for this report utilize 2007-2011 data averages, which are more accurate for small-level analysis than one-year and three-year estimates. At the time of analysis, the most recent five-year estimates available were 2007-2011 ACS estimates. The ACS data was retrieved from the Census Bureau's online data tool, American Fact Finder. Relevant data was retrieved for each census tract. There are large margins of error for estimates at the census tract level; however, combining multiple census tracts into neighborhoods reduces error.

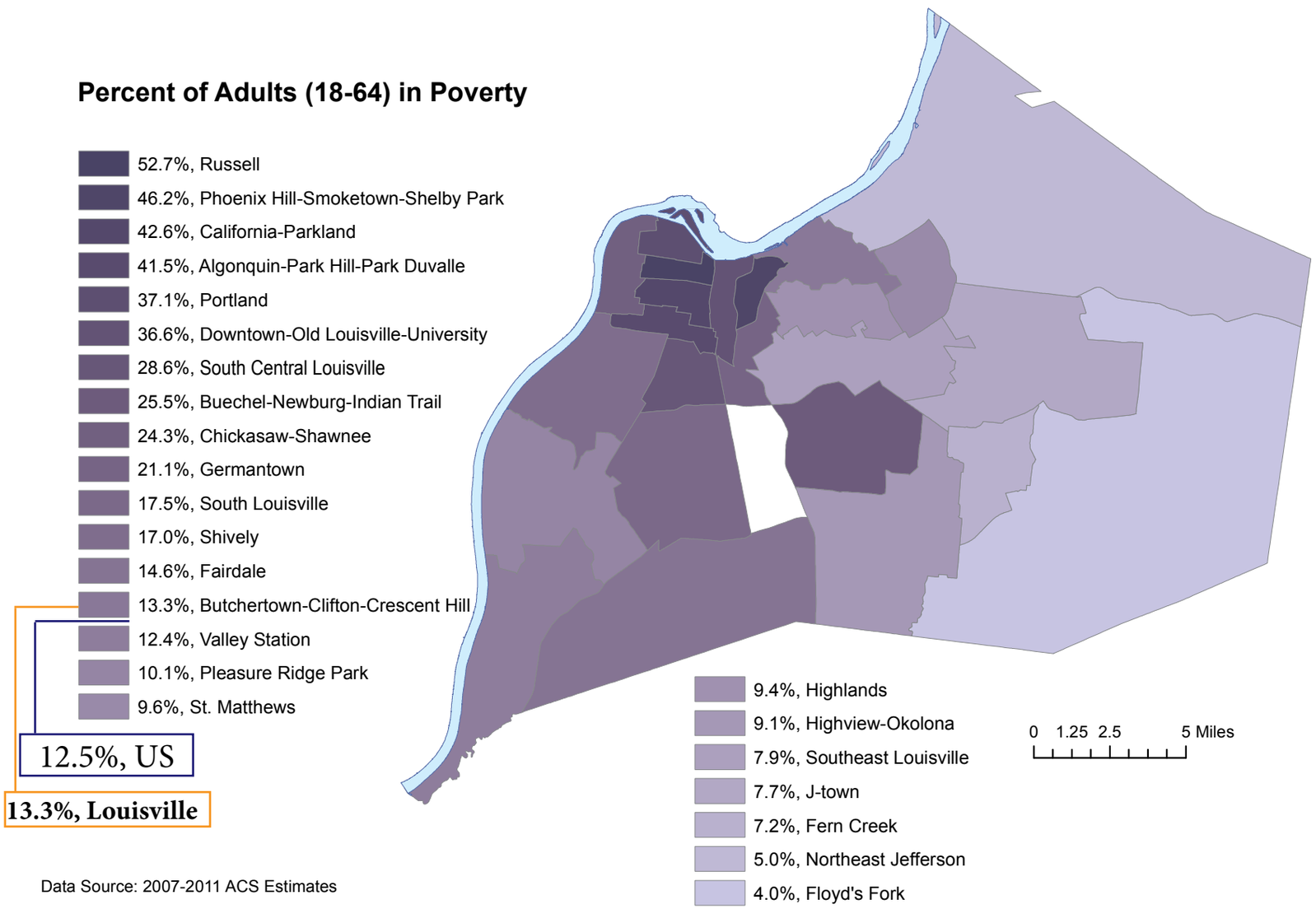
Tell us what you think?

Living in Poverty

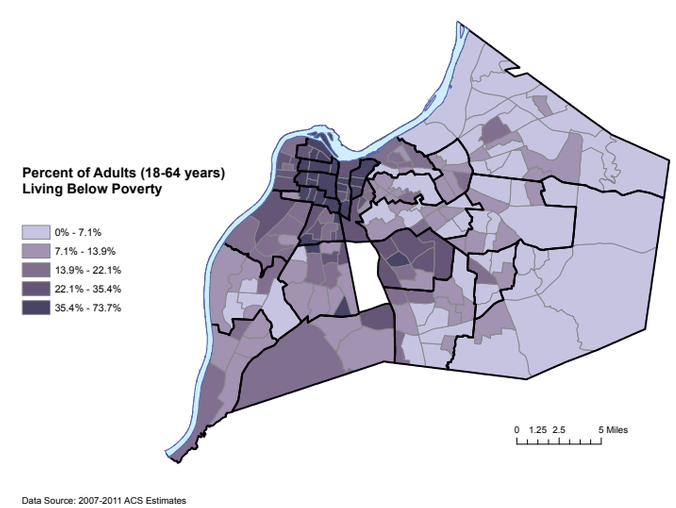
Poverty is one of the strongest social determinants of health. An individual living in poverty is greatly limited in terms of access to affordable healthy food, safe environments, healthcare, education, and many other factors. Adults living in poverty are more than five times as likely to report that they are in poor or fair health.[31] A national survey also demonstrated that poverty is a stronger determinant of obesity than access to healthy food alone.[32] Reducing poverty could alleviate many of the associated chronic diseases and burdens experienced by these vulnerable members of our community.



The graph above shows the percentage of Louisville residents at three different poverty levels: less than half of poverty level, poverty level, and twice the poverty level.



Louisville has a slightly higher proportion of adults in poverty (13.3%) compared to the national rate (12.4%). A total of 280,271 people in Louisville live in neighborhoods with poverty rates above the national average. The map to the left shows not only the clustering of those in poverty, but also the more than ten-fold gap between neighborhoods with the highest and lowest proportions of adults in poverty. The map below shows the more detailed sub-neighborhood analysis and further demonstrates the clustering of low-income areas.

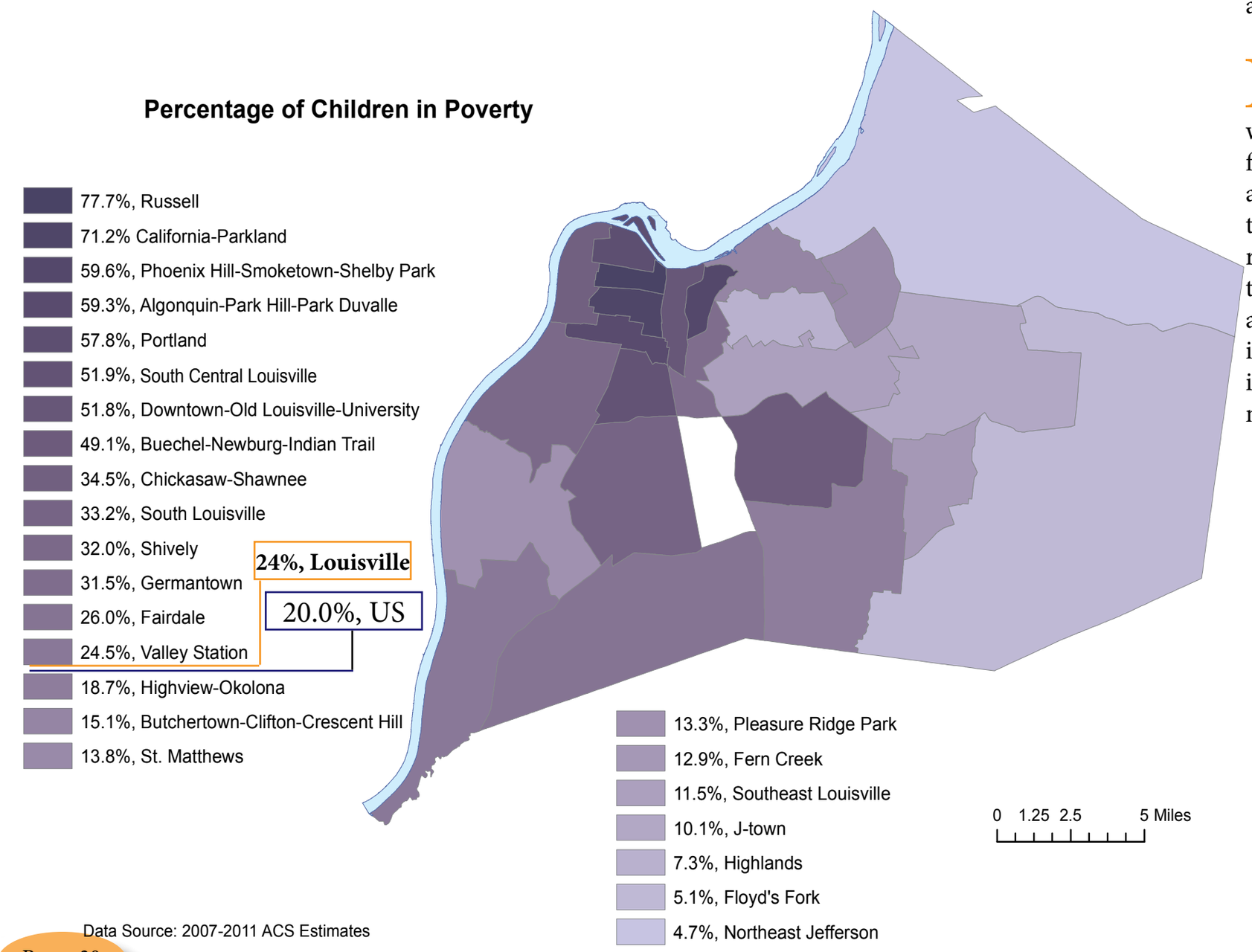


Tell us what you think?

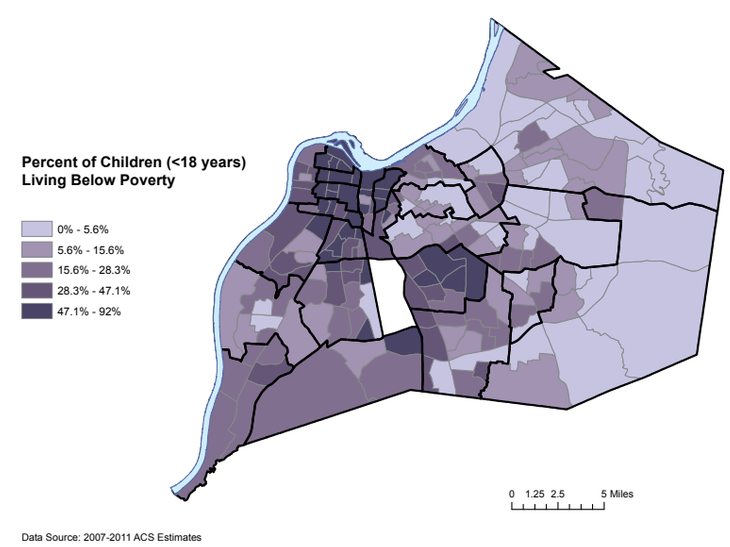
Growing Up in Poverty

Compared to the limitations and burden put on adults in poverty, children are impacted even more. Children rely on adults to provide the essentials for them to survive and thrive, but children in poverty have limited access to a wide range of resources as basic as education, food, and safety. Living in poverty as a child can lead to poor health and development with life long consequences.

In Louisville, 24% of children live in poverty. Nearly one in every four children is growing up without enough basic resources, limiting his or her future development and potential. These numbers are approximately five percentage points higher than the national average (20%), yet very similar to the rate for all of Kentucky (25.1%). This map is similar to the previous map on adult poverty. It is clear that adults, children, and families are living together in dense clusters of poverty with limited options in terms of education, employment, food access, medical care, and other resources.



Data Source: 2007-2011 ACS Estimates



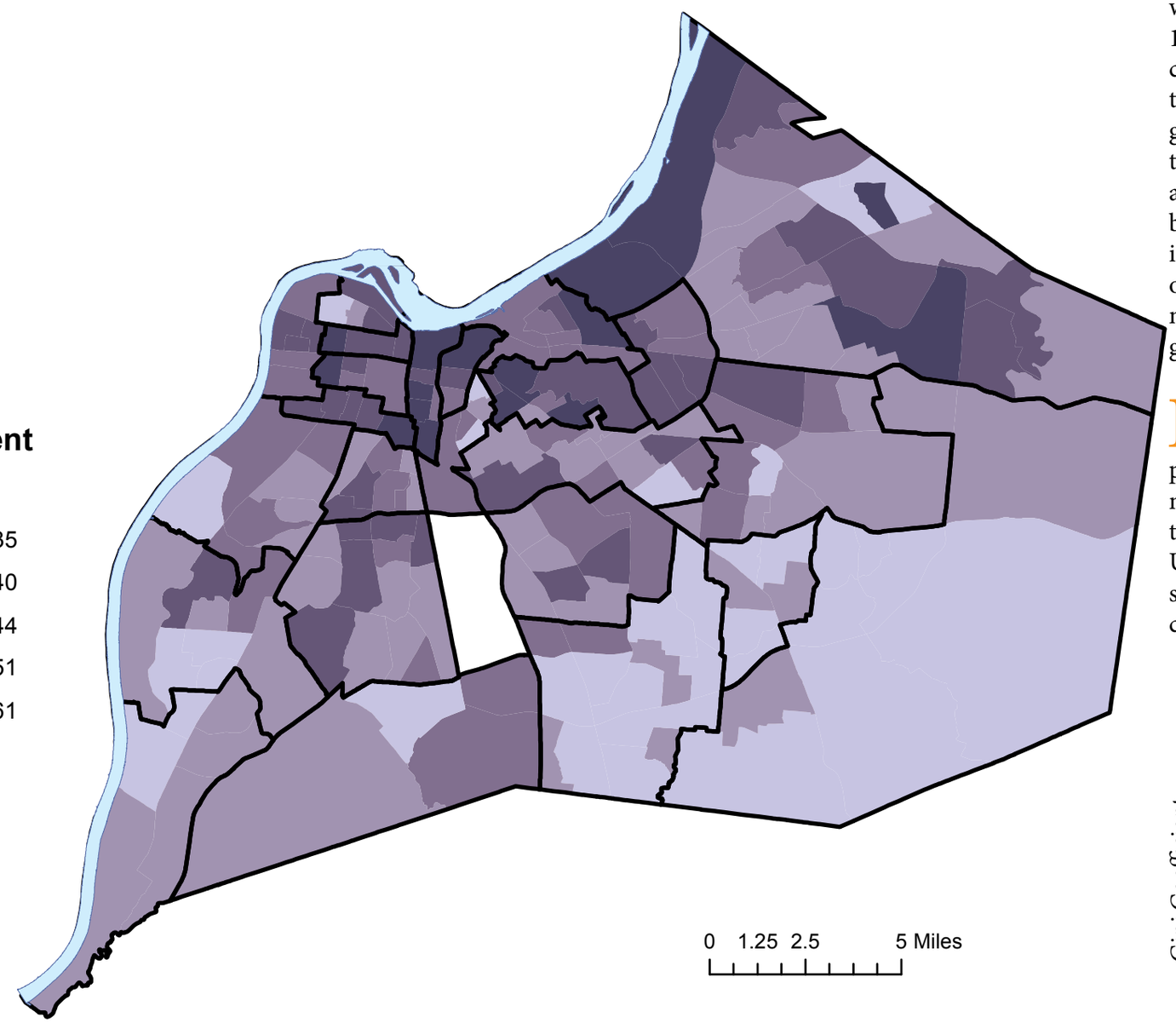
Data Source: 2007-2011 ACS Estimates

Tell us what you think?

Where is the Money?

Ratio of Poverty to Income

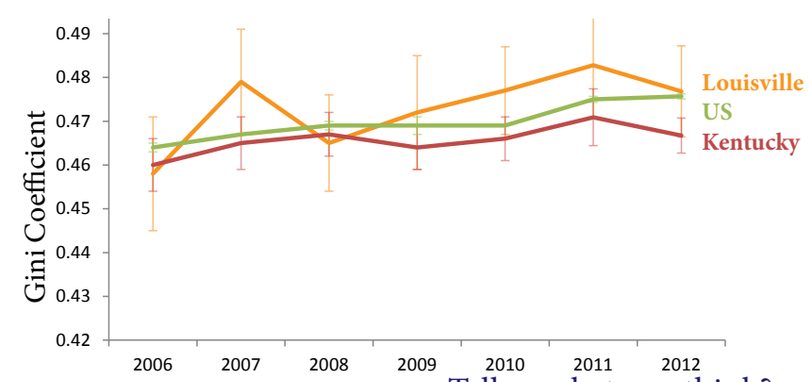
Data Source: 2011 ACS 3 year estimate



Income inequalities have been increasing in recent years. One of the largest contributors to health inequity is inequitable access to financial resources. Those that earn the least typically have greater health care needs and less ability to afford the necessary treatment. In Louisville, almost one in five people lives at or below the poverty level.

The **Gini coefficient** is commonly used as a measure of income inequality and represents relative differences between the current income distribution and a theoretical, completely equal income distribution. A value of 0 would be completely equal income distribution (ex. 20% of the population earned 20% of the income) and a value of 1 would be a completely unequal distribution (1 person earned 100% of the income). In simplest terms, the lower the Gini coefficient, the more equal the income distribution. However, this interpretation can be skewed when looking at small geographic areas, such as a census tract. The coefficient shows the distribution of income for a given area. If everyone in that area has approximately the same income, the coefficient will be low. Areas of concentrated poverty and concentrated high income are homogenous groups that share the same level of income and therefor produces a low Gini coefficient. The map can also be compared to the map on poverty, giving the geographical representation more meaning.

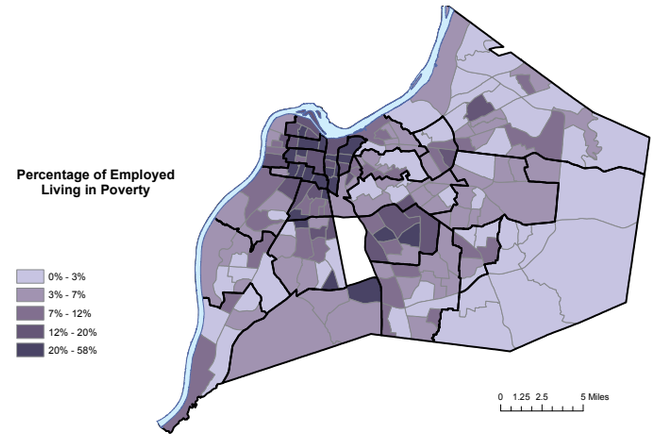
Data shows that income inequality is increasing at city, state, and national levels. The graph below provides insight into the trends in income inequity. While not statistically significant, Louisville does appear to be trending upwards at a greater rate than Kentucky and the US. Comparing Louisville to the national and state average shows that we are slightly above the Kentucky average. In a comparison of the largest 100 cities, Louisville ranks 42nd.



Tell us what you think?

Employment

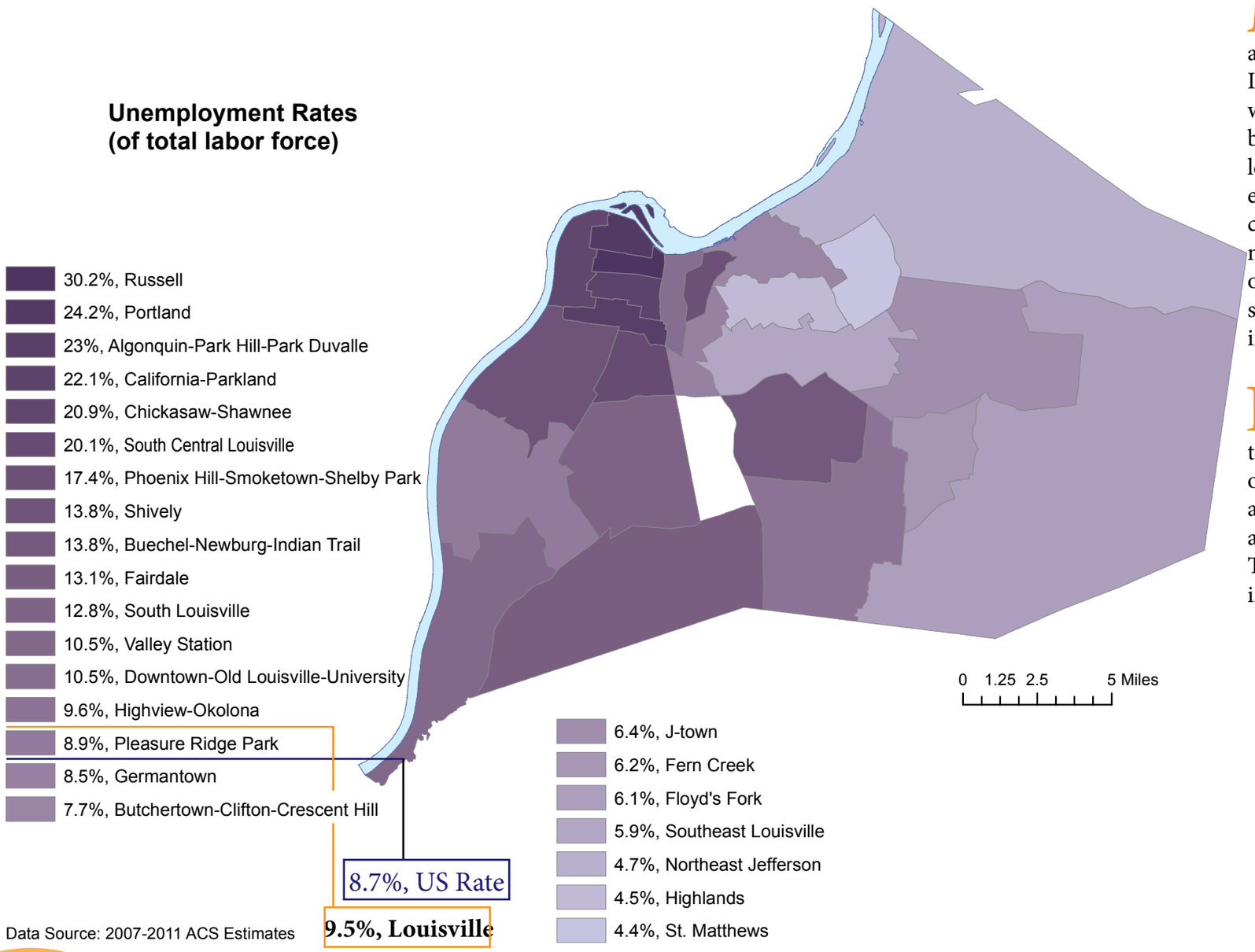
Unemployment is highly correlated with poverty, and is another determinant of poor physical and mental health.[4] On the individual level, being unemployed limits resources to find a new job, secure transportation, and obtain medical care. On the population level, the difficulties of unemployment are even more profound. Research shows that not only does unemployment drive poor health, but having poor health can make it difficult to find and maintain employment.[4] This close relationship of unemployment and poor health can make if very difficult for those living in unemployment-saturated environments to even have the option of employment as an avenue out of poverty. All too often, the result is being stuck in a vicious cycle of poverty, unemployment, and poor health.



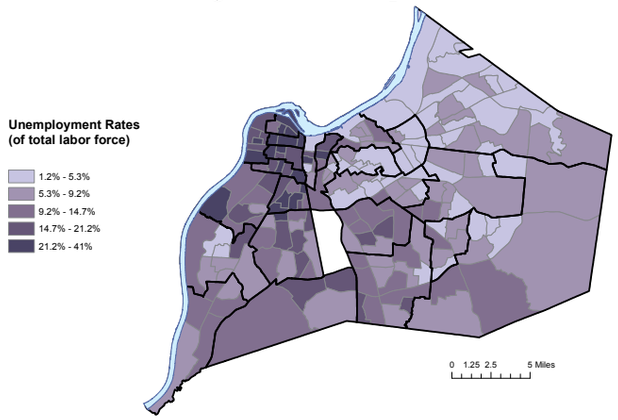
Data Source: 2007-2011 ACS Estimates

Much of Louisville's population is living in neighborhoods with unemployment rates over three times the national average, while the gap between neighborhoods reaches ten-fold. In perspective, 375,824 (51%) people live in neighborhoods with unemployment rates above the US average. The map in the bottom right details the same information but at the census tract level, and shows that some census tracts have unemployment estimates as high as 41%. This map demonstrates the geographic clustering of unemployment, which reaches beyond individual neighborhoods. These areas have limited employment opportunities, requiring residents to travel long distances in search of work. The need for further travel brings about increases in other barriers such as lack of reliable transportation.

In some areas, just having a job is still not enough to make ends meet. The map above shows the proportion of people that have employment but still live in poverty. There is an obvious geographic relationship when looking at employment and poverty, demonstrating that the jobs in the higher-stressed areas are likely neither high-skilled nor adequate-paying jobs. These jobs are even less likely to supply benefits such as health insurance, further limiting the access to preventive care.



Data Source: 2007-2011 ACS Estimates



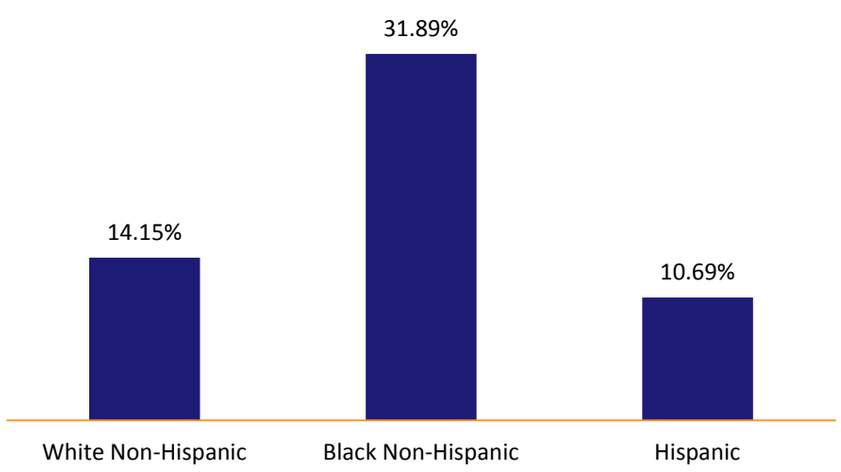
Data Source: 2007-2011 ACS Estimates

Tell us what you think?

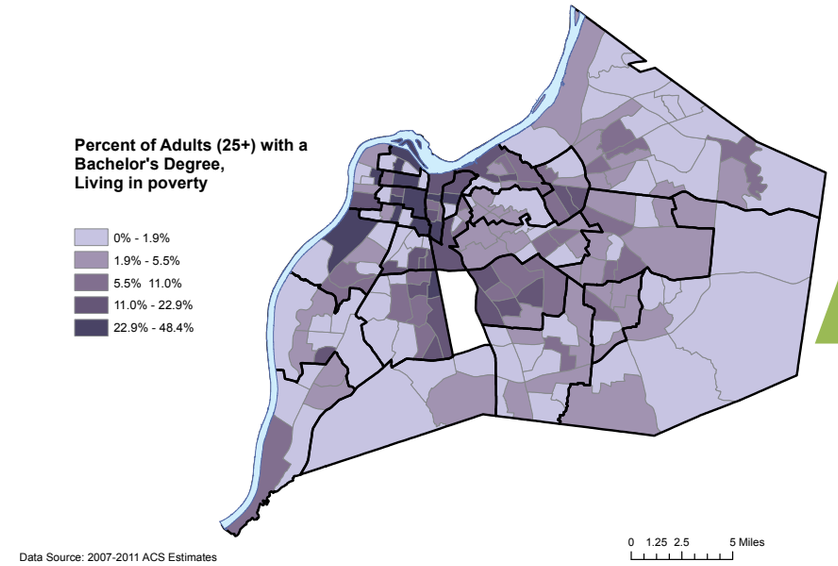
Education

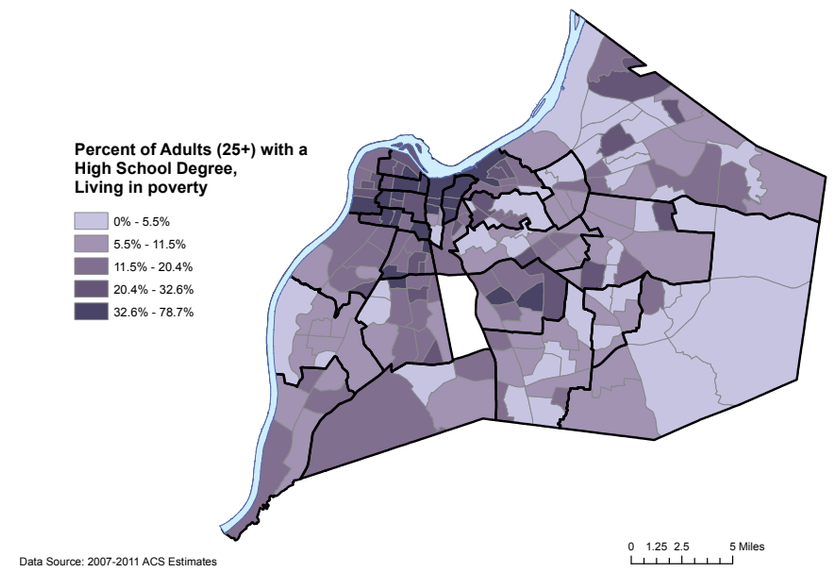
Educational attainment has major implications on employment opportunities, financial resources, social networks and life choices. There have been several studies that have shown the importance of education on morbidity, mortality, and prosperity.[33] Focusing on increasing educational attainment is a logical step critical to curtailing the unemployment and poverty epidemic. People with higher levels of education enjoy higher-earning employment, make more money over their lifetimes, and can choose to move to areas that support healthy lifestyles. Educational attainment is therefore one of the major targets of public health interventions. Increasing graduation rates can decrease unemployment, poverty, and thus, chronic health conditions.[4]

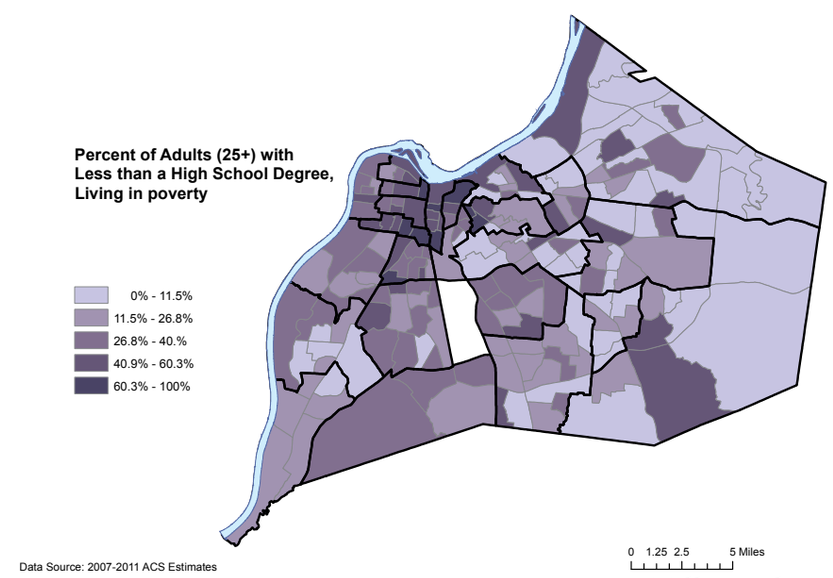
While support of educational attainment is essential, other relationships between education, income, and where one lives must be considered. In the maps to the right are three levels of educational attainment: less than high school, high school diploma, and bachelor's degree. More specifically, these maps show, for a given degree attainment, the proportion of people in poverty. In the middle map, for example, the dark blue color designates census tracts where 33-79% of those with a high school diploma are still living in poverty. Collectively these maps show that beyond educational attainment, there are still disparities. Although higher educational attainment lowers poverty levels, there is still a geographical trend of concentrated poverty at all educational attainment levels.

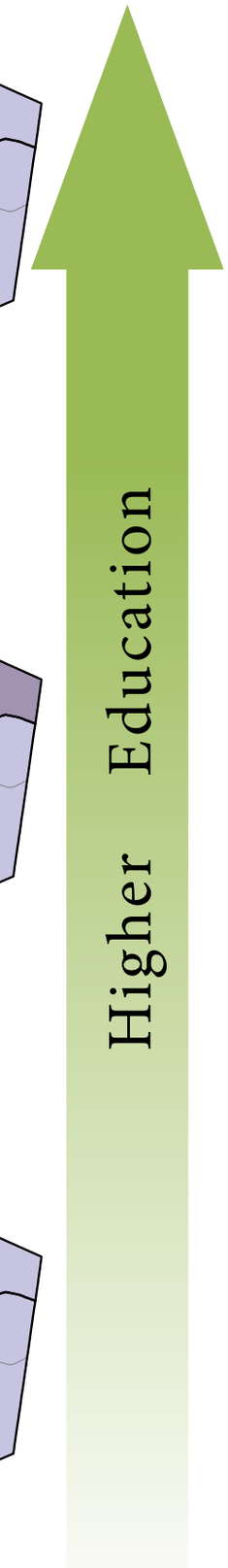


2011 BRFSS







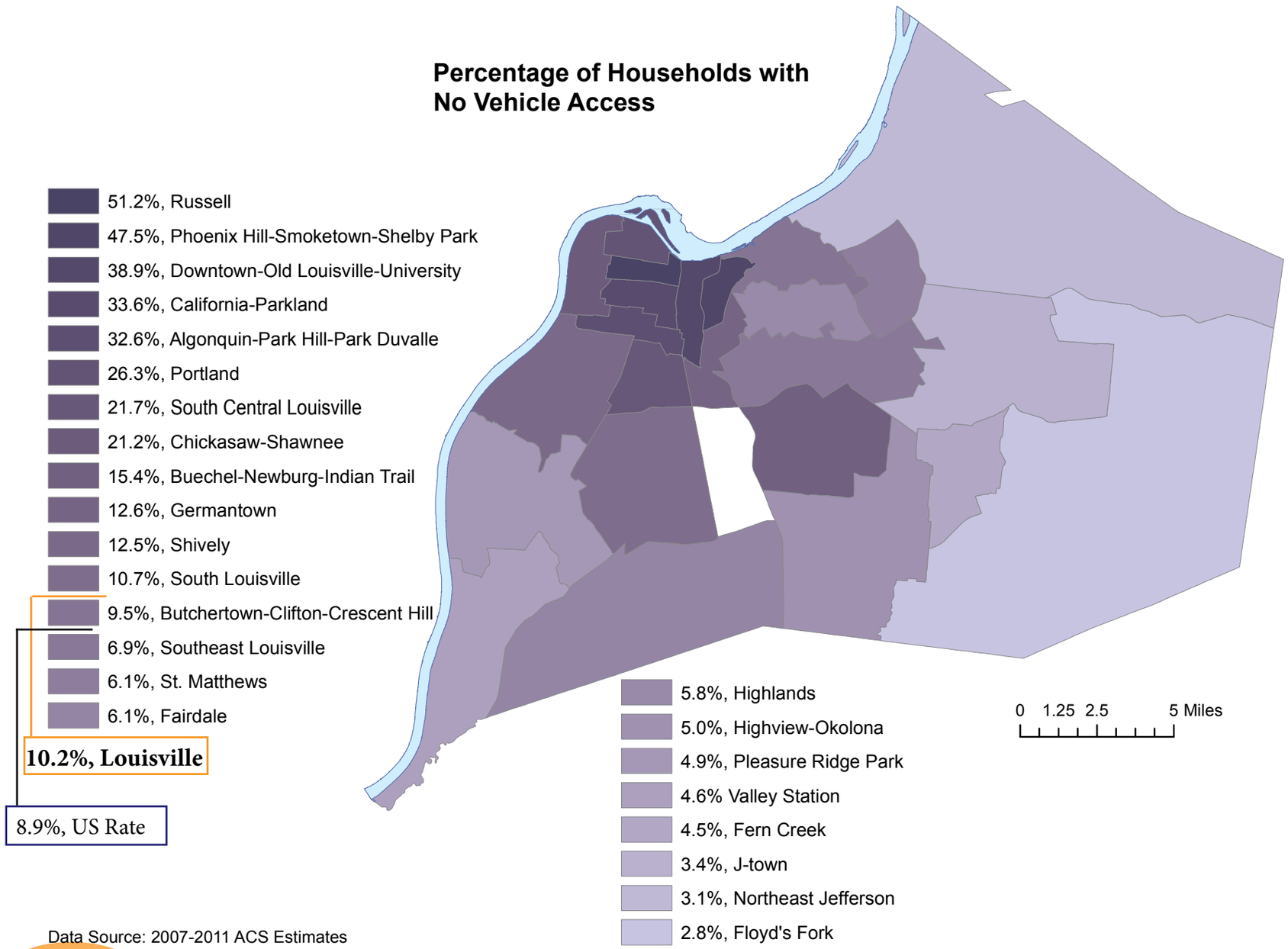


Tell us what you think?

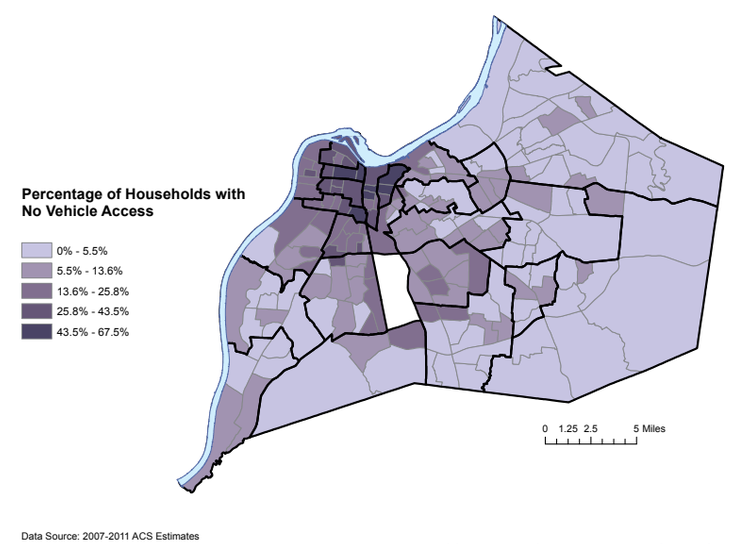
Mobility

Transportation is necessary to live effectively in modern society, and has a connection to health. We use transportation to access food, parks, health care, education, and employment. Not having a consistent form of transportation can make all basic components of living much more difficult.

Access to reliable transportation is especially important in those areas that have dense unemployment. As shown in the unemployment map, areas of low vehicle ownership correlate with areas of unemployment. These vulnerable populations are dependent on public transportation to get to employment. This can limit job opportunities, due to lack of service, travel time or other factors. Reliable transportation is also highly important in areas affected by real and/or perceived crime, limiting ventures on foot or bicycle. This further compounds the effect of lack of independent transportation by keeping people inside their homes and reducing active lifestyle opportunities for fear of their surroundings. For many people in these areas, owning a car is not financially feasible. This underscores the need for effective and efficient public transportation, especially for these areas with low rates of vehicle ownership.



Data Source: 2007-2011 ACS Estimates



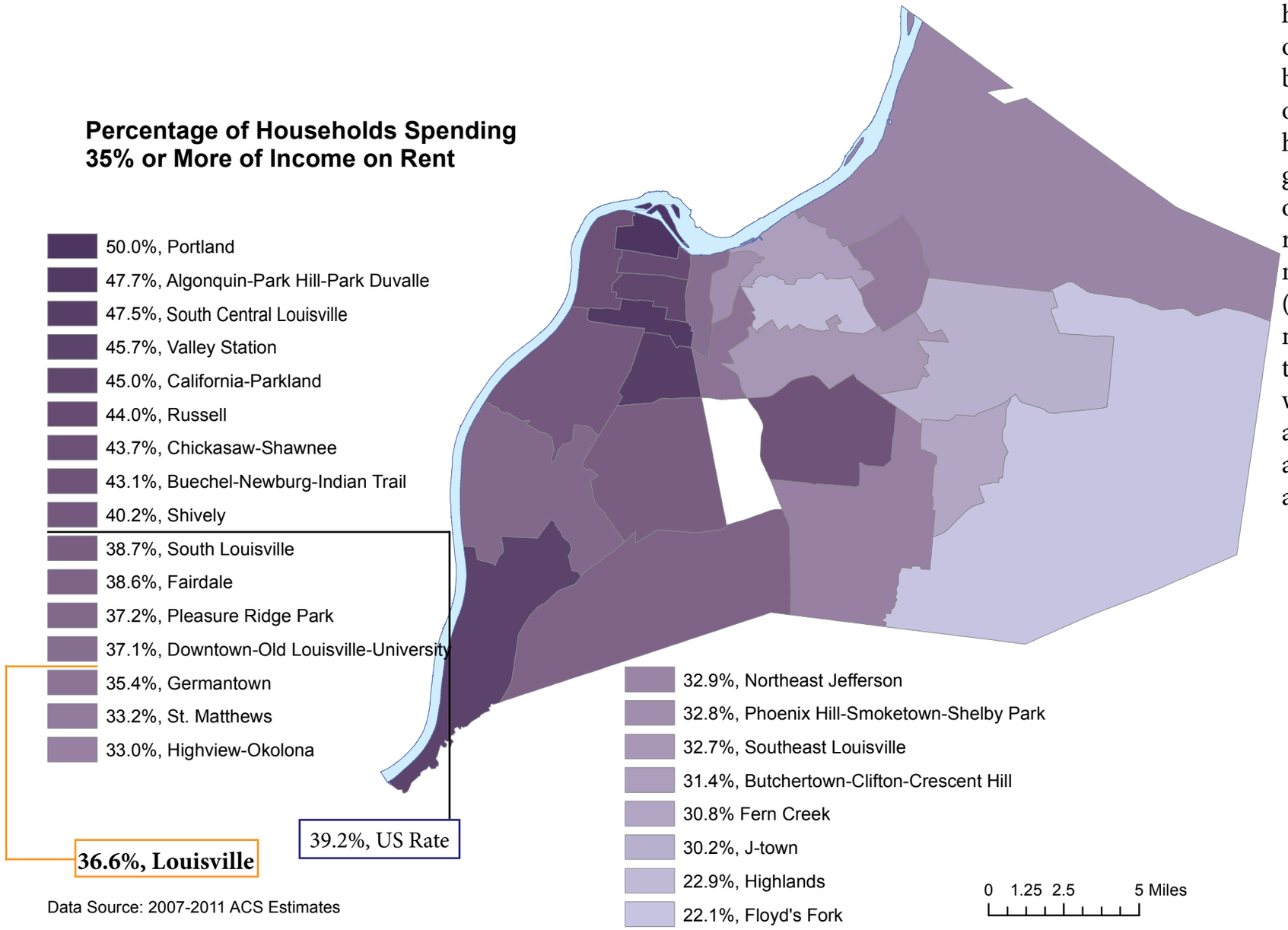
Data Source: 2007-2011 ACS Estimates

Tell us what you think?

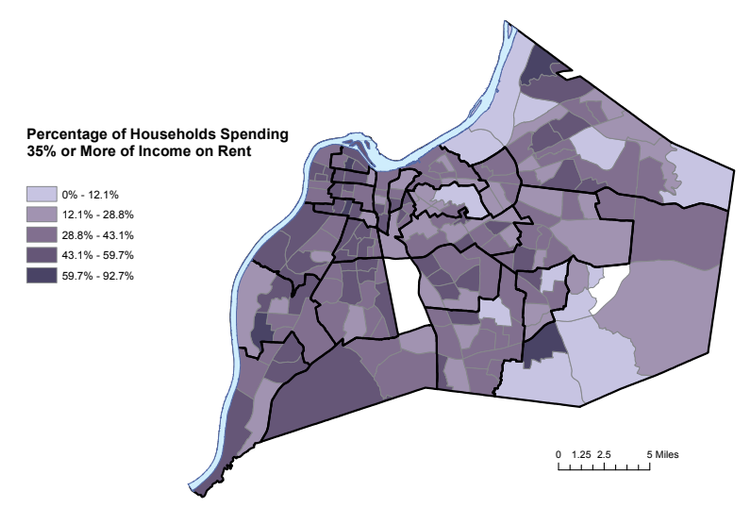
Cost of Living

Income and wealth drive opportunities for health. At the end of the day, there is only so much that can be budgeted and managed at any income level. For those in poverty and with low incomes, budgets are even tighter and less flexible. For some, however, the cost of housing alone can place extremely high burdens on finances and often controls a sizable portion of the household budget.

As also seen in the 2011 Health Equity Report, there is a very large portion of households spending 35% or more of their entire income on housing. The threshold of spending 35% or more on rent is a standard used to measure housing cost burden.[43] In areas of high poverty, where housing options are minimal, the costs are proportionally higher. As seen in the map, there is a stark geographical relationship to cost of living. The rate of people spending over 35% of their income on rent is over twice as high for the most vulnerable neighborhood. Compared to the national proportion (39.2%), Louisville fares a bit better, with the majority of the population (about 80%) being below this national benchmark. While housing costs as a whole might not deviate from the national average as much as other factors, the inequality of access to affordable housing relative to income still needs to be addressed especially within vulnerable communities.



Data Source: 2007-2011 ACS Estimates



Data Source: 2007-2011 ACS Estimates

Tell us what you think?

Quantity & Quality of Life

Part 3: The Where - Living Spaces & Places

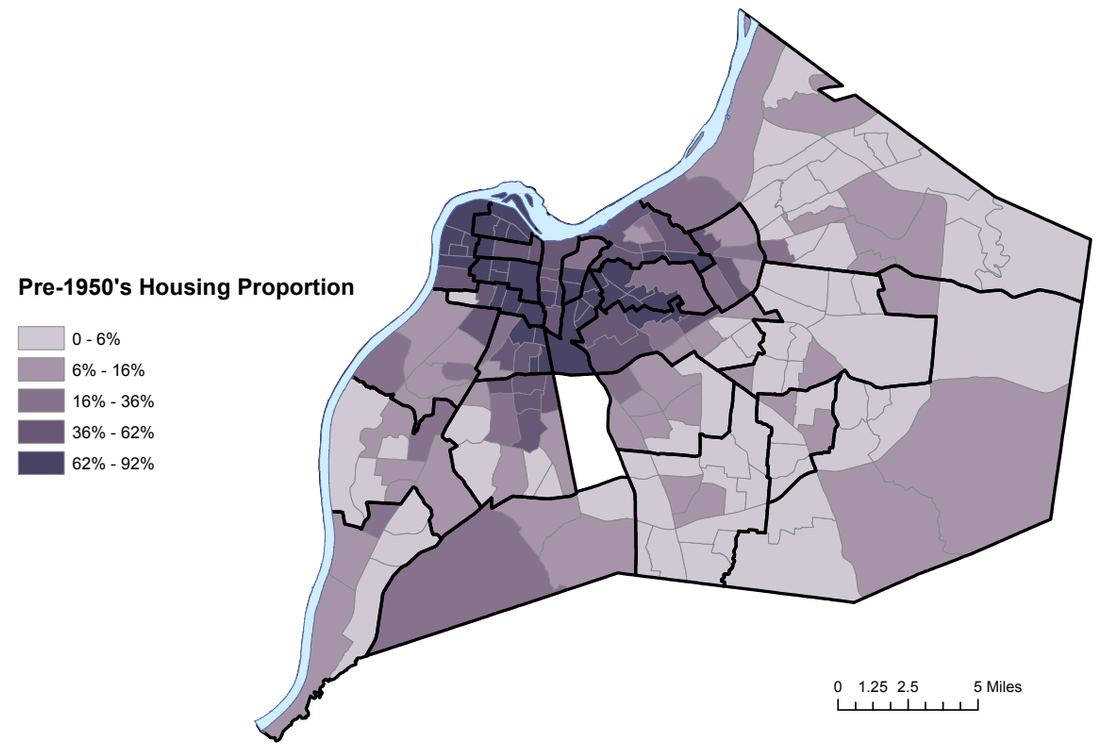
Living Spaces & Places

Healthy homes and sustainable communities require a comprehensive approach to preventing diseases and injuries. The CDC notes that "economic, social and cultural factors often drive exposure to environmental hazards. Most often these hazards harm minority, low-income, tribal, and other native populations disproportionately. Members of these groups are more often harmed by environmental hazards than others."[43] Our home and community environments can greatly influence our health through multiple pathways, including:[43]

- Exposure to lead: old, chipped paint, or other household dangers
- Pesticide residues
- Weak floors, beams, or other structural problems
- Tobacco smoke
- Mold and excessive moisture
- Noise

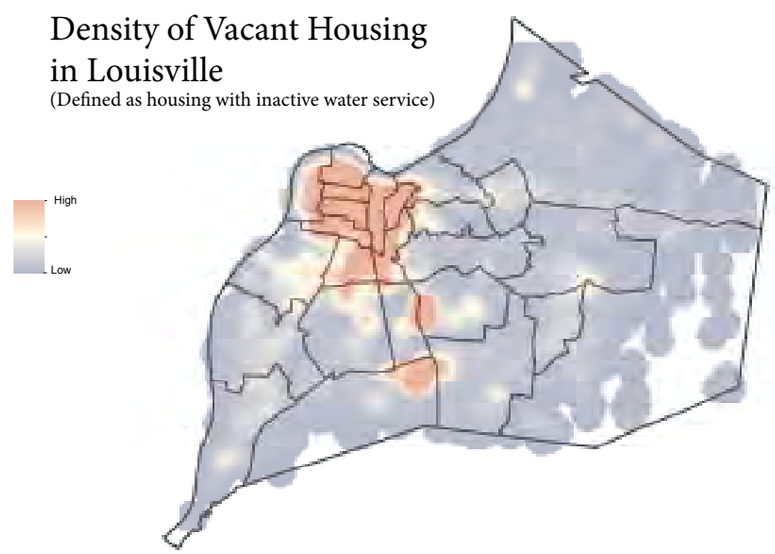
There is no single catch-all measure for these environmental health influences, but there are several metrics that collectively can be used to estimate the state of environmental determinants of health. When mapped, the state of poor environmental health correlates geographically with the health outcomes and social determinants discussed in the previous sections. Indicators of environmental health at a geographic level presented here describe areas of Louisville that are dense in household vacancies and older housing which, among other things, can contribute to an increase in estimated lead risk (based on a model developed by the San Diego health department).

Mapping this data can offer insights into multiple and compounding effects. Areas where there are both high rates of older and dense vacant houses are indicative of a lack of economic investment.



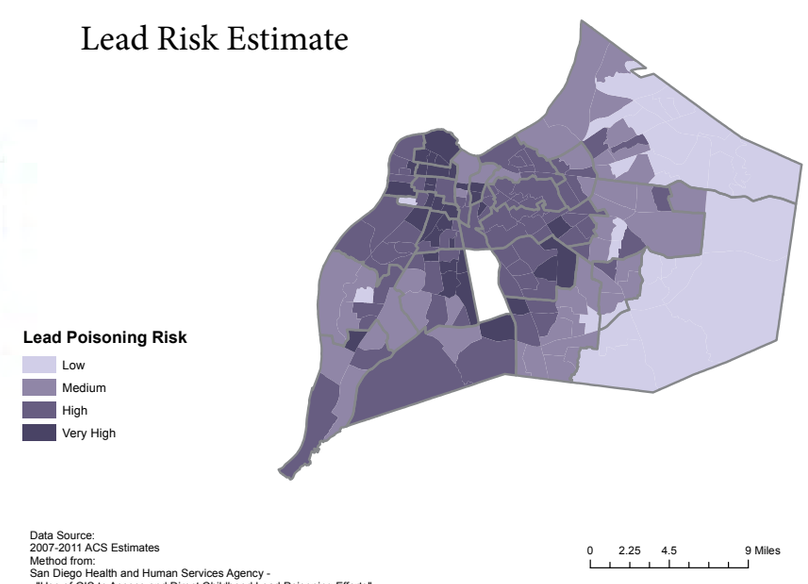
Data Source: 2007-2011 ACS Estimates

Density of Vacant Housing in Louisville
(Defined as housing with inactive water service)



Data Source:
Address level data of residential areas without water service
acquire from Department of Community Services & Revitalization
Method: Kernel Density of geocoded addresses

Lead Risk Estimate

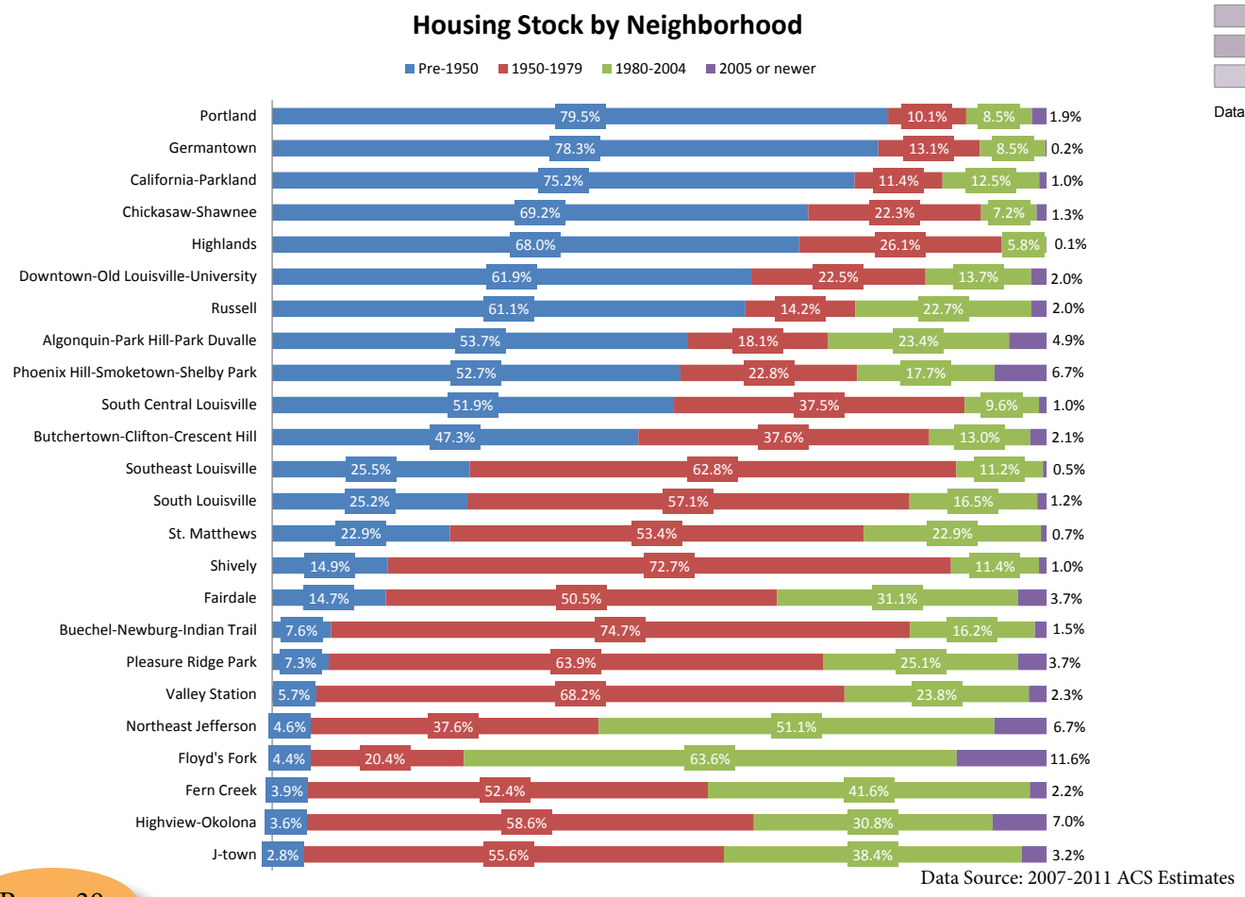


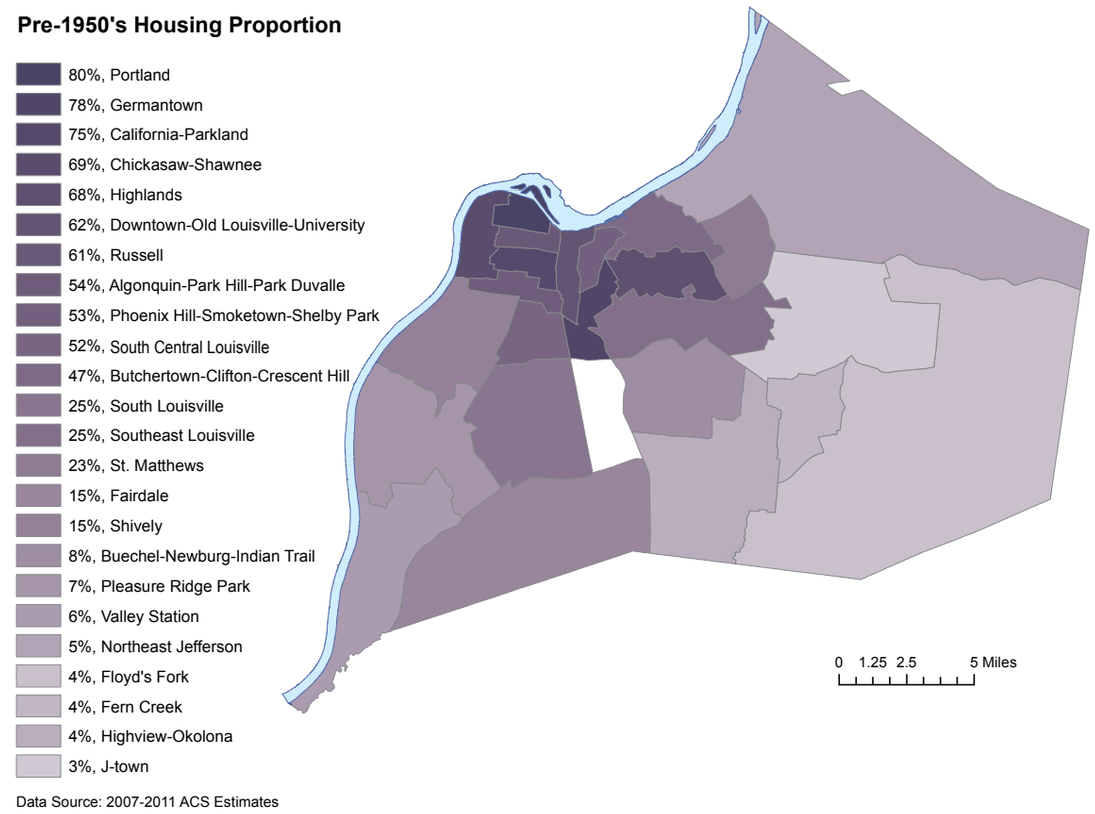
Data Source:
2007-2011 ACS Estimates
Method from:
San Diego Health and Human Services Agency -
"Use of GIS to Assess and Direct Childhood Lead Poisoning Efforts"

Tell us what you think?

Housing

Louisville's history of growth and population changes have shaped the current physical environment in which we all live. Following the end of World War II, changes in public policy and housing culture, especially the G.I. Bill, incentivized the movement of middle-class Americans out of city centers and into the suburbs. Implementation of the G.I. Bill did not provide equitable opportunities; people of color were systematically redlined and excluded. Without opportunities to purchase new homes in the suburbs, African American and other minorities' choices were limited to these older and decaying, vacating city centers. The cummulative results of these defining historical events are evident in persistant geographical segregation and differing physical environments. This also has implications for differential wealth accumulation today, as home equity is the most important source of wealth for most households. Recent estimates suggest that home equity makes up two-thirds of the wealth of a typical American household.[44]





In Louisville, there is a geographical pattern of areas of high poverty and minority populations overlaying dense older housing. The map above demonstrates the neighborhood proportions of homes that were built before 1950. When combined with the chart to the left, which depicts housing stock proportions for each neighborhood, the trends of housing age, quality and diversity can be seen readily.

The persistent impact of post-war differential housing access generated by the G.I. Bill offers an example of the power of public policy on community-health. It will take equally robust policy systems and environmental change to effectively eliminate disparities, equalize opportunities for health, and transform community-health outcomes.

For a more detailed examination of the historical events that impacted Louisville's physical environments, the Louisville Magazine March 2013 issue provides useful analysis

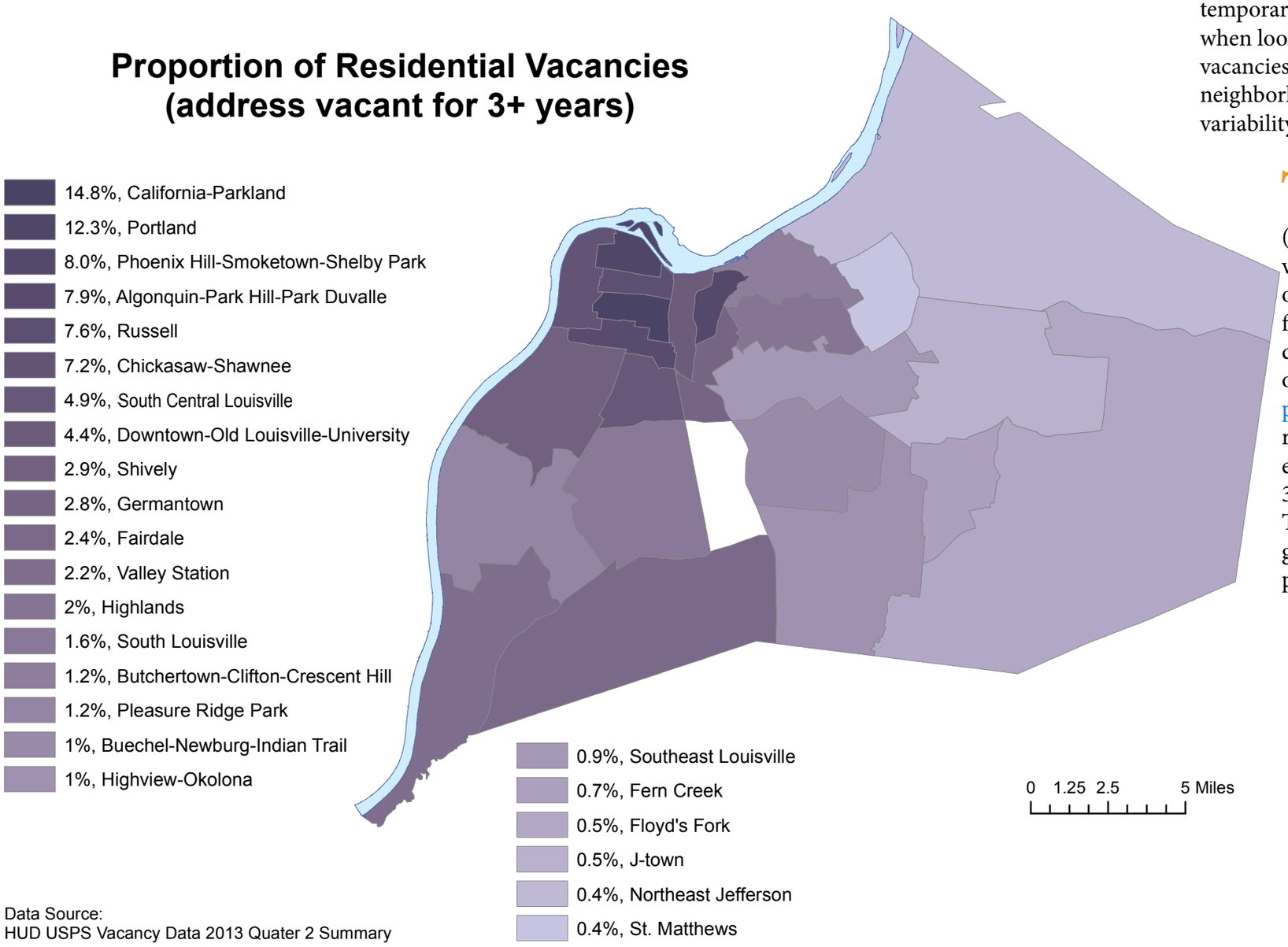
Tell us what you think?

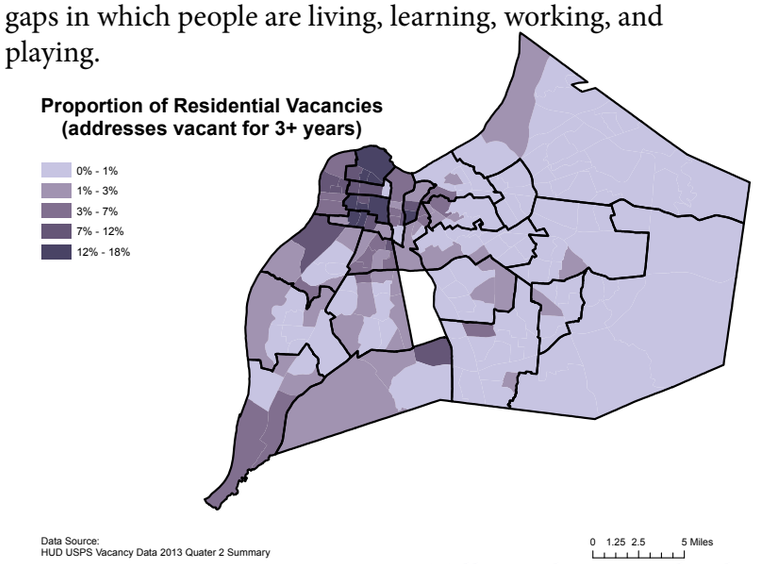
Vacant & Abandoned Properties

Abandoned and vacant homes are a measure of disinvestment in areas and communities with resultant net loss of population, resulting from occupant death and in/out-migration(people moving in/out of the community), generating and reinforcing a downward spiral.[40] High neighborhood vacancy is associated with decreased property values and housing rents, increased poverty, and other related factors. Mapping the extent of vacant homes in Louisville can provide a useful proxy of the built environmental conditions.

Chronic vacancies, defined here as residential properties vacant for three or more years, paint a picture of neighborhoods where houses have been boarded up for several years and are not just temporarily vacated. The global implications for communities with dense chronic vacancies are more extreme than in areas with temporarily vacated homes. A deeper layer of inequity can be seen when looking at these abandoned homes compared to just current vacancies previously presented. There are major subregional and neighborhood differences in the level of abandoned homes, indicating variability of environmental conditions.

The maps presented here use the 2013 third-quarter Department of Housing and Urban Development's (HUD) United States Postal Service (USPS) address-level vacancy list of addresses that were reported as vacant for three or more years. The proportion of vacant houses was calculated for each neighborhood. The resulting map displays the overall distribution of chronically vacant houses. The distribution of vacancies falls along the geographical trends similar to poverty, unemployment, and other maps displayed in this report. The gap in vacancies is approximately 35-fold; for example, for every one vacant home in St. Matthews, there are 35 vacant homes in the California-Parkland neighborhood. This map adds to the challenging contexts and environmental gaps in which people are living, learning, working, and playing.





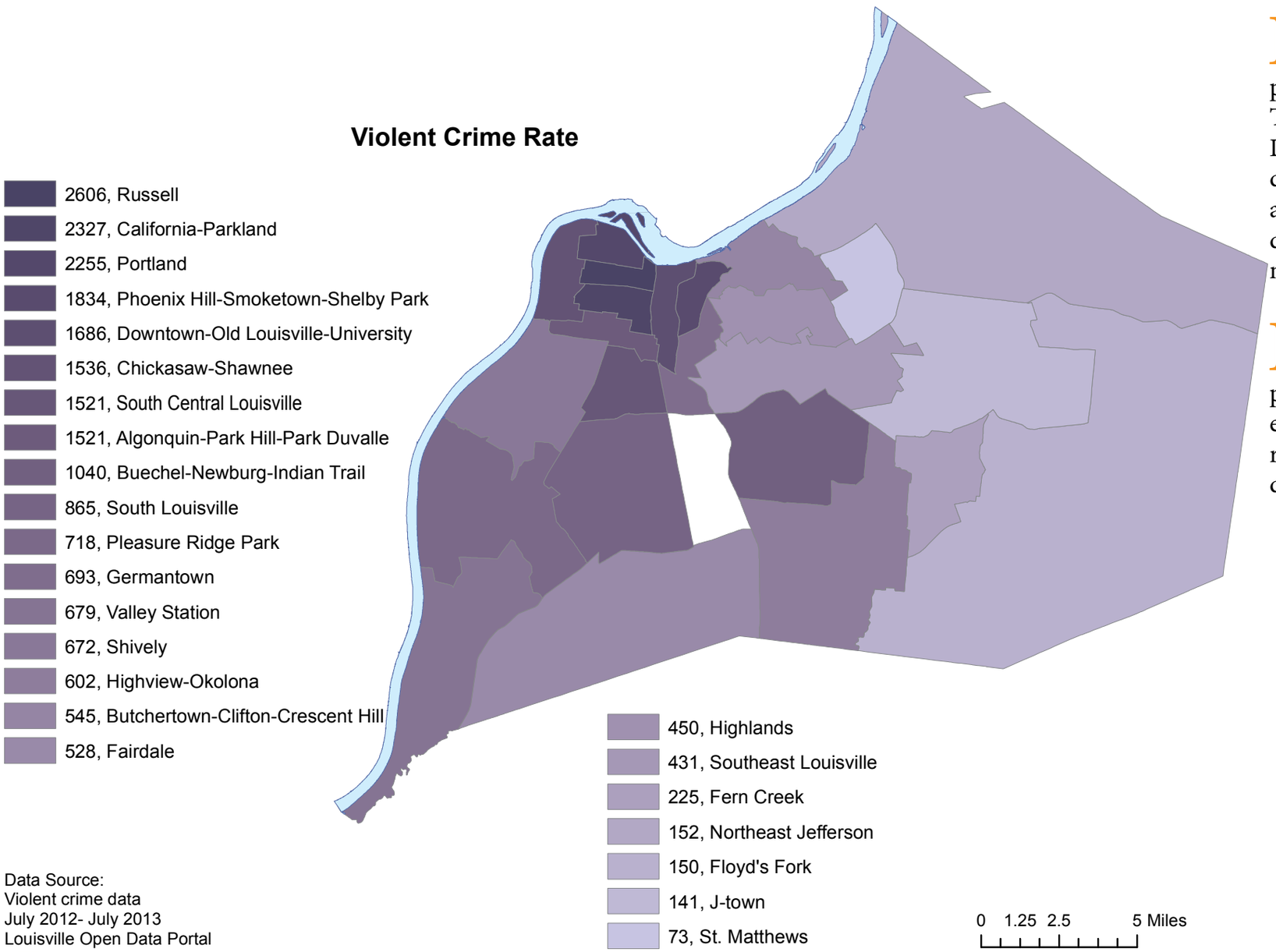
Tell us what you think?

Safety

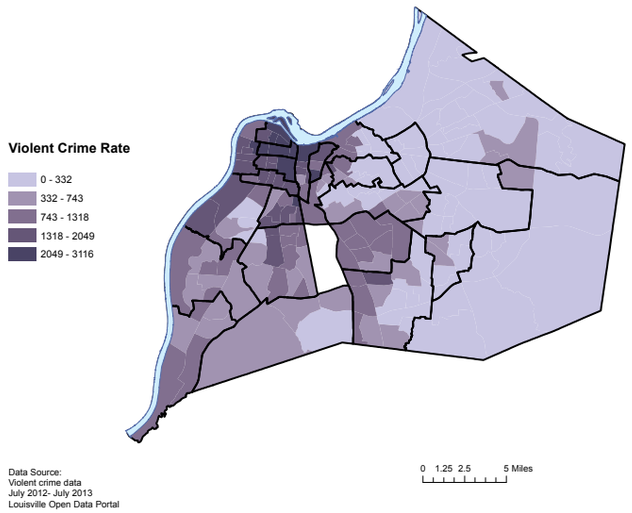
Safety and perceptions of safety can be estimated from the rate of reported violent crimes. High crime rates can cause individuals to be afraid of their surrounding environments and create increasingly stressful living conditions, acting as a barrier to an active healthy life. Perceived lack of safety can limit outdoor physical activity and depresses the amount of social connectedness. In this way, crime can have a large impact on the social, mental, and physical environments of individuals in communities.

Louisville has varying violent crime rates that clusters in areas of disadvantaged neighborhoods. The maps presented here display the rates for each neighborhood. The data was acquired from the Louisville Open Data portal for July 2012-2013. Violent crimes were defined as those labeled as simple assault, aggravated assault, robbery, or homicide. The data shows a 35-fold difference between the rates of the highest and lowest neighborhoods.

Research has shown strong associations between crime rates, poverty, and unemployment.[41] Addressing poverty through increased employment opportunities, educational advancements, and social supports will likely reduce the crime rate, in addition to many of the health disparities presented in previous sections.



Data Source:
Violent crime data
July 2012- July 2013
Louisville Open Data Portal



Tell us what you think?

Air Quality

Air pollution can be an added layer to the cumulative stresses affecting community health. Air pollution exposures are unique in that they can be invisible to the people they are affecting, and over the course of several years have serious impacts on health outcomes.

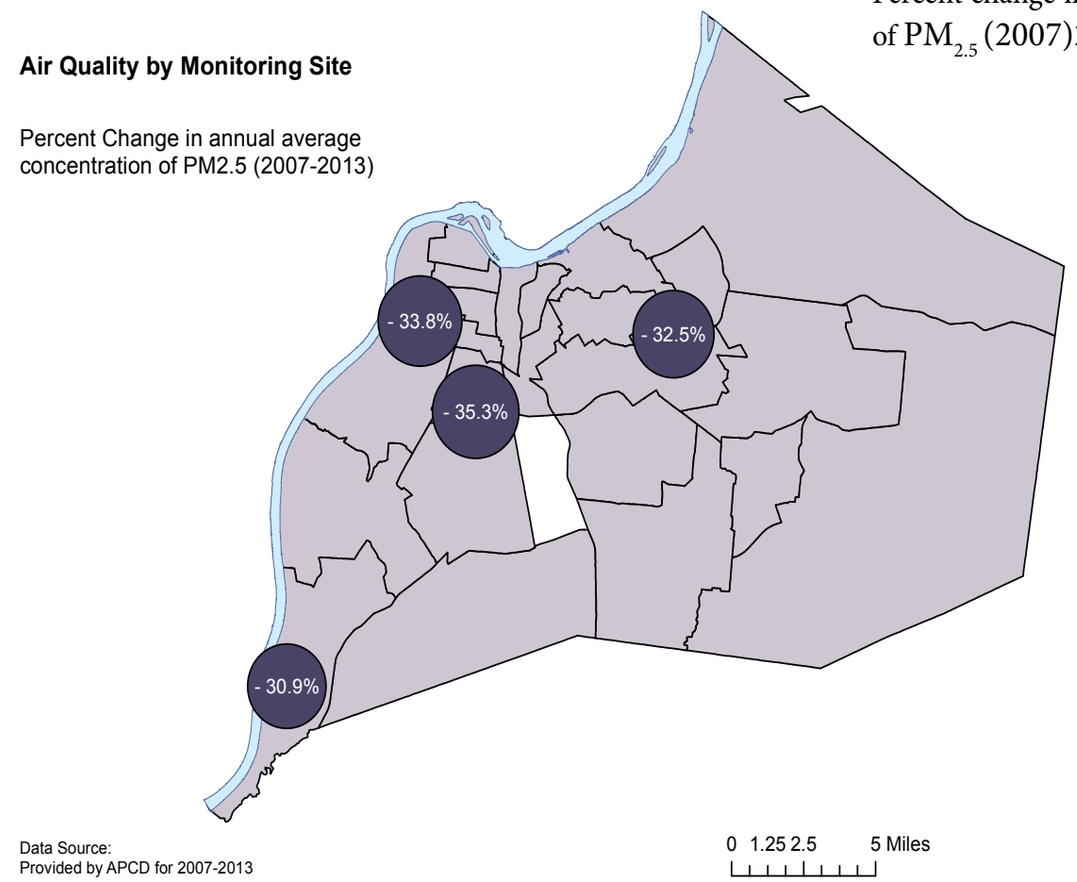
Chronic and acute exposure to air pollutants can have major impacts on health including increased hospital admissions, ischemic heart disease, heart failure, COPD, and respiratory disease.[38] Research also shows that minority and poor populations typically have higher exposures to air pollutants because of where they live geographically.[39] However as noted below, the most recent data regarding $PM_{2.5}$ shows a similar concentration throughout the county.

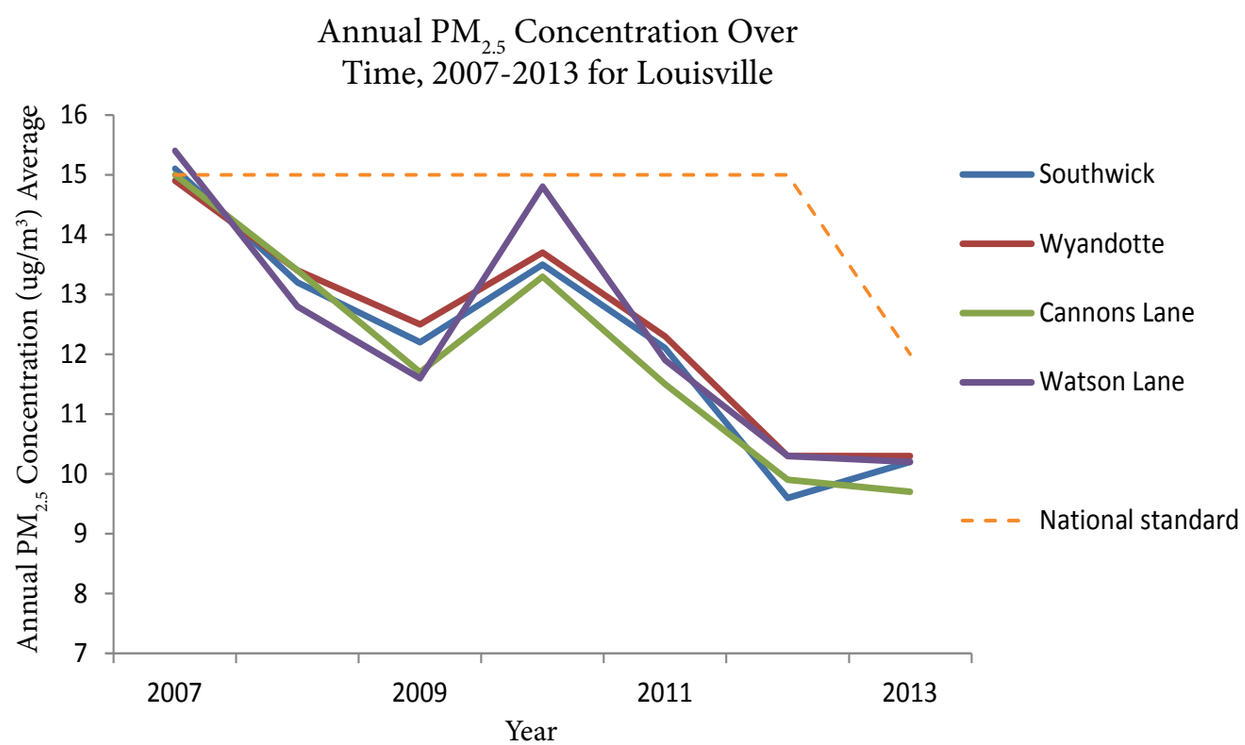
The map presented here demonstrates a commonly-monitored pollutant used in measures of air quality, particulate matter ($PM_{2.5}$). This map shows the air monitor site-specific percent change in annual $PM_{2.5}$ from 2007 to 2013. It shows a trend of decreased $PM_{2.5}$ throughout all of Louisville. Although the area-based inferences are limited due to numerous factors, including the number/location of monitors, $PM_{2.5}$ is on a downward trajectory for the entire county and is below the national standard. This suggests a relatively even distribution of exposure to $PM_{2.5}$ for all residents.

Air Quality Details. More description on common air pollutants and associated health concerns is available on the EPA's website.

Technical notes: Quality assurance of the data has not been finalized and the data has not yet been certified. In 2013 the standard for $PM_{2.5}$ was reduced to a more stringent concentration of 12 ug/m³ from the previous 15 ug/m³ and can be seen in the graph to the right.

Percent change in annual average co
of $PM_{2.5}$ (2007)2013)





Tell us what you think?

Food Access

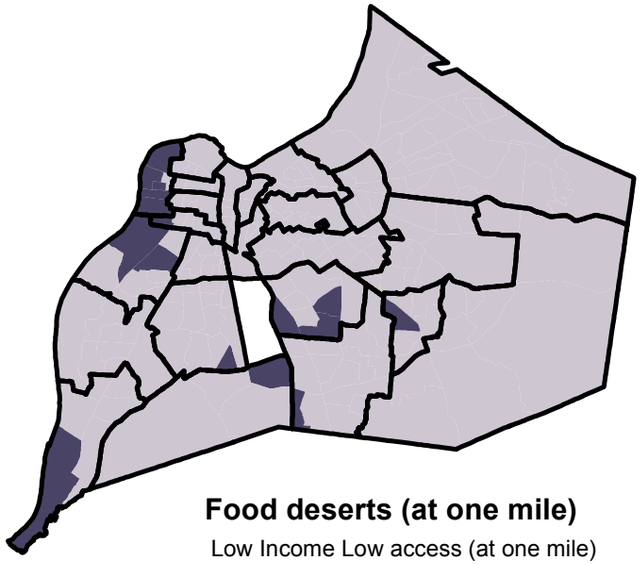
Access to healthy foods is necessary to maintain a balanced diet rich in nutrients. Research shows that people who live in neighborhoods with access to large grocery stores and supermarkets have healthier diets.[4] Access to healthy foods is an important component of public health and a necessary component to neighborhood health.

These maps show various measures of food access. The maps to the right indicate areas that meet the USDA definition of *food deserts.* These are areas in which there is low access to healthy food options of any type, as well as increased poverty. Access is defined by census tracts that are low-income and a specified distance from the nearest grocery store. The first two maps show access at one mile and then at one-half mile. The standard for food desert measures report the "one mile" numbers, but when observing the map on vehicle access, a one-mile, one-way trip might be unreasonable for many of the neighborhoods. At the half-mile radius we see a much larger population without appropriate access to healthy food. Using 2010 census counts, there are only 57,049 people living in food deserts at one mile access, but 199,078 people living in food deserts at the one-half mile access measure.

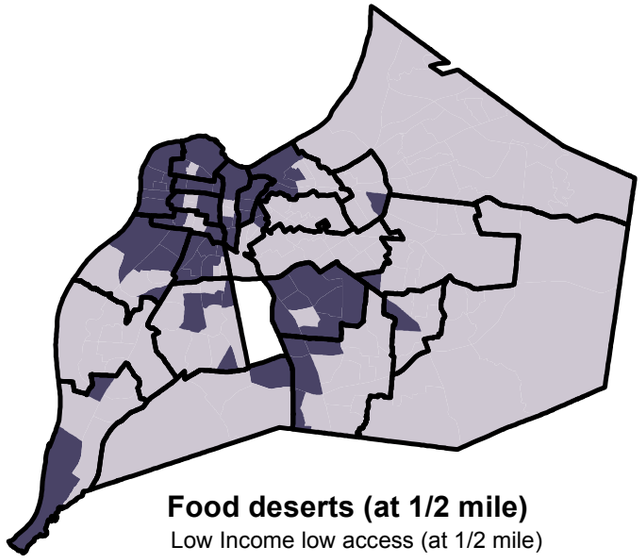
The maps of food deserts are important for understanding where the absence of healthy stores are, but they often miss another component of food access, *food swamps*. These are areas where there is a low number of healthy food stores compared to unhealthy ones. The modified Retail Food Environmental Index (mRFEI) map, at the bottom right, calculates the proportion of healthy food stores from all food options in a given census tract. For example, an index of 10 would simply mean 10% of the food stores were healthy food stores.

The final map included in this section is a "kernel density" map, in the bottom left, demonstrating the density of stores that accept SNAP benefits. To be eligible for SNAP benefits requires low income, and therefore the stores that accept SNAP may be focused around those areas of dense low-income. While this does show a fairly good distribution of stores, there appear to be gaps in the south-southwest regions of Louisville.

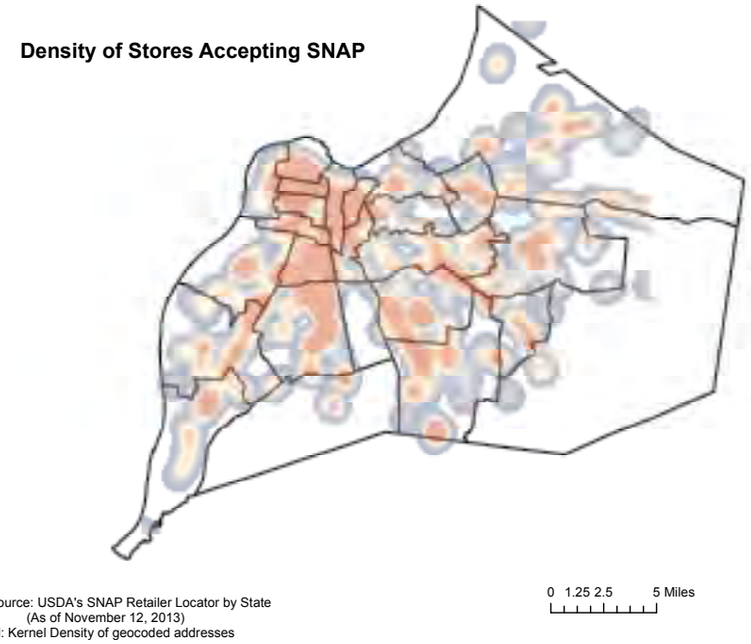
Access to food is more than simply availability. Variety, cost, and quality are all important aspects that are not typically analyzed in most research, but could have some of the largest impacts.



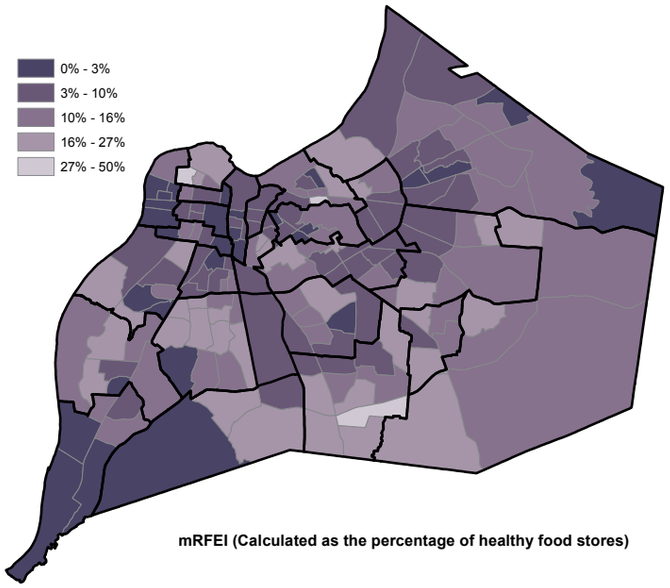
Food deserts (at one mile)
Low Income Low access (at one mile)



Food deserts (at 1/2 mile)
Low Income low access (at 1/2 mile)



Data Source: USDA's SNAP Retailer Locator by State
(As of November 12, 2013)
Method: Kernel Density of geocoded addresses



Tell us what you think?

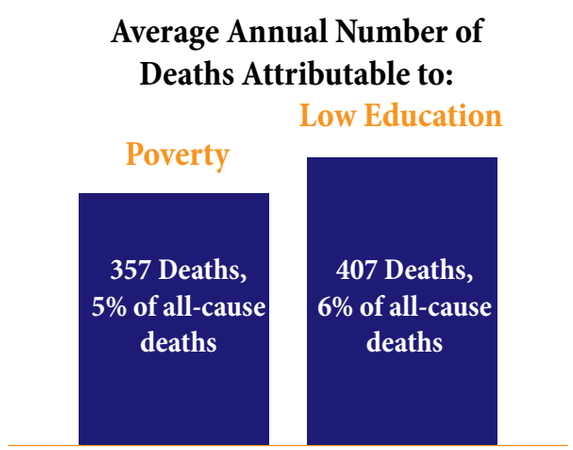
At the Crossroads:
Quantity & Quality of Life

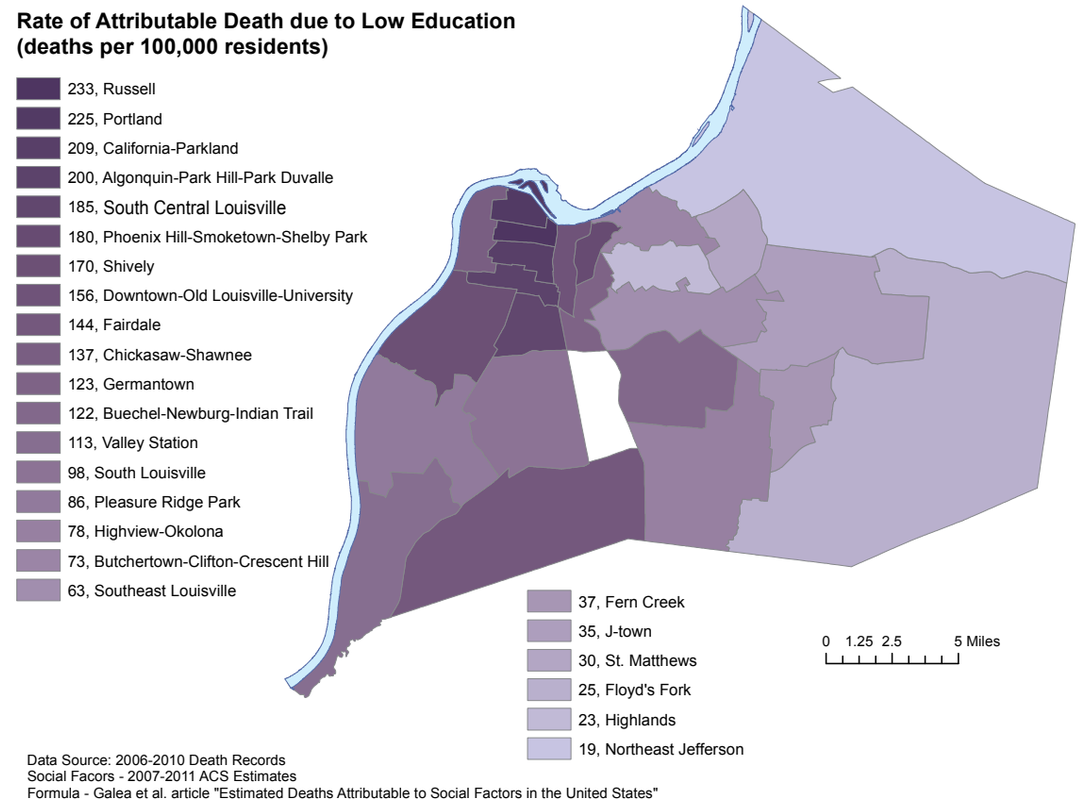
Distressed Neighborhoods

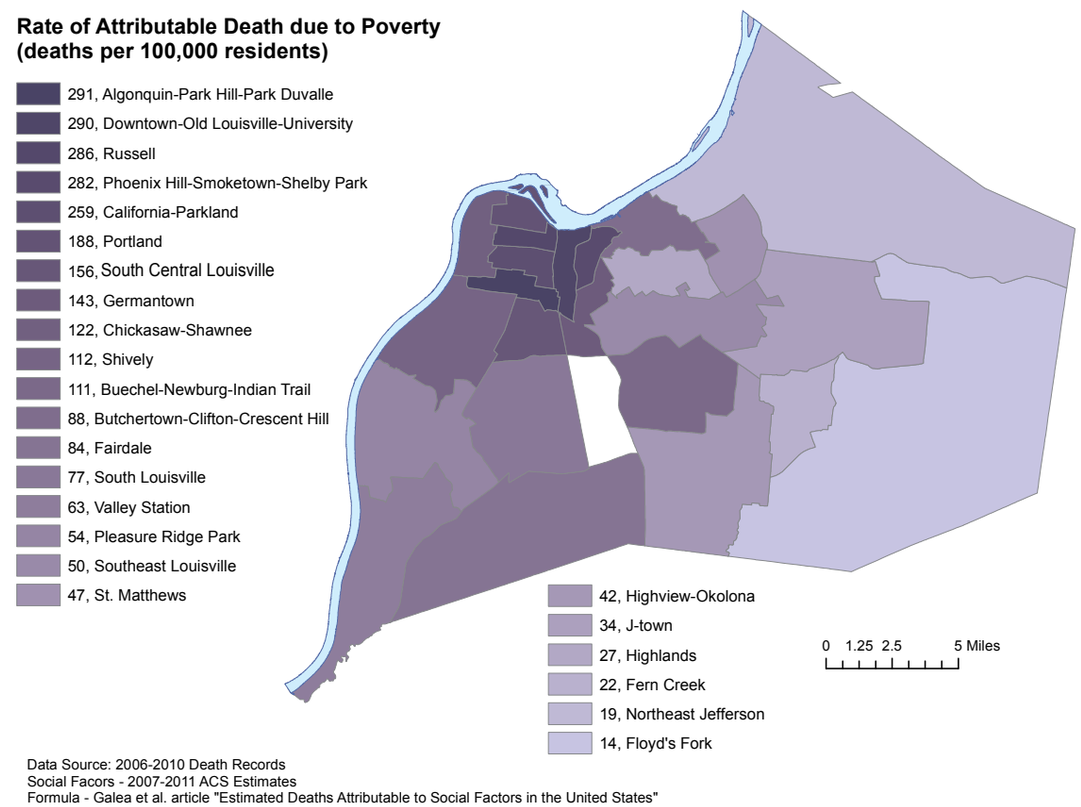
In this report, we have presented the distributions of health and social determinants, as well as the inequities and disparities that vary by neighborhood, and discussed the overlap between the two. Here we present a way to measure the impact of poverty and low educational attainment on death rates using a statistical model developed by Galea et al. in their research article *Estimate Deaths Attributable to Social Factors in the United States*.[37] In the research article, the authors presented a statistical method to estimate the number of deaths that can be attributed to social causes such as poverty and limited education (defined as less than a high school diploma). This model was developed after extensive review and analysis of several scientific studies to develop a relative risk for social determinants. Relative risk is simply the risk an individual has relative to an exposure -- for example, the relative risk of a smoker developing lung cancer compared to a non-smoker. Both smokers and non-smokers can get lung cancer, but smokers have a higher risk relative to non-smokers. The model discussed here is similar, but instead of smoking status, the "exposure" is living in poverty or having limited education. The model uses this relative risk to estimate the number of deaths due to these particular social determinants throughout Louisville.

The results of this analysis can be treated in similar fashion to other estimates for behavioral causes of death such as tobacco use, physical inactivity, diet, and others. This formula for estimation developed by Galea et al. follows the same methods presented in the well-known article *Actual Causes of Death*. It is important to note that this method of analysis does not produce mutually exclusive results (i.e. you cannot simply combine the number of deaths attributed to poverty and low education, because there is overlap).

The attributable death model was applied to Louisville data in order to estimate the number of total annual attributable deaths and to analyze geographic differences in the rate of socially attributable deaths. The analysis shows that there are 357 people dying every year due to poverty, which is equal to 5% of all annual deaths in Louisville Metro. This is the percentage for the entire city and does not effectively capture the neighborhood-level differences and inequities, which can range from 1%-26% of deaths (not shown). Similar results are seen when looking at attributable death for lack of education. In Louisville, 407 people are dying each year due to not having at least a high school diploma, constituting 6% of all Louisville Metro deaths with a neighborhood level range of 1%-19%. To demonstrate these geographic inequities, the maps presented here show the attributable death rate for poverty and education. Similar to the rates presented earlier, this rate is calculated by taking the model-derived attributable death count and dividing by population size. Both maps show the trend of inequitable socially-attributable deaths with gaps that are ten-fold.







Inequity and Health

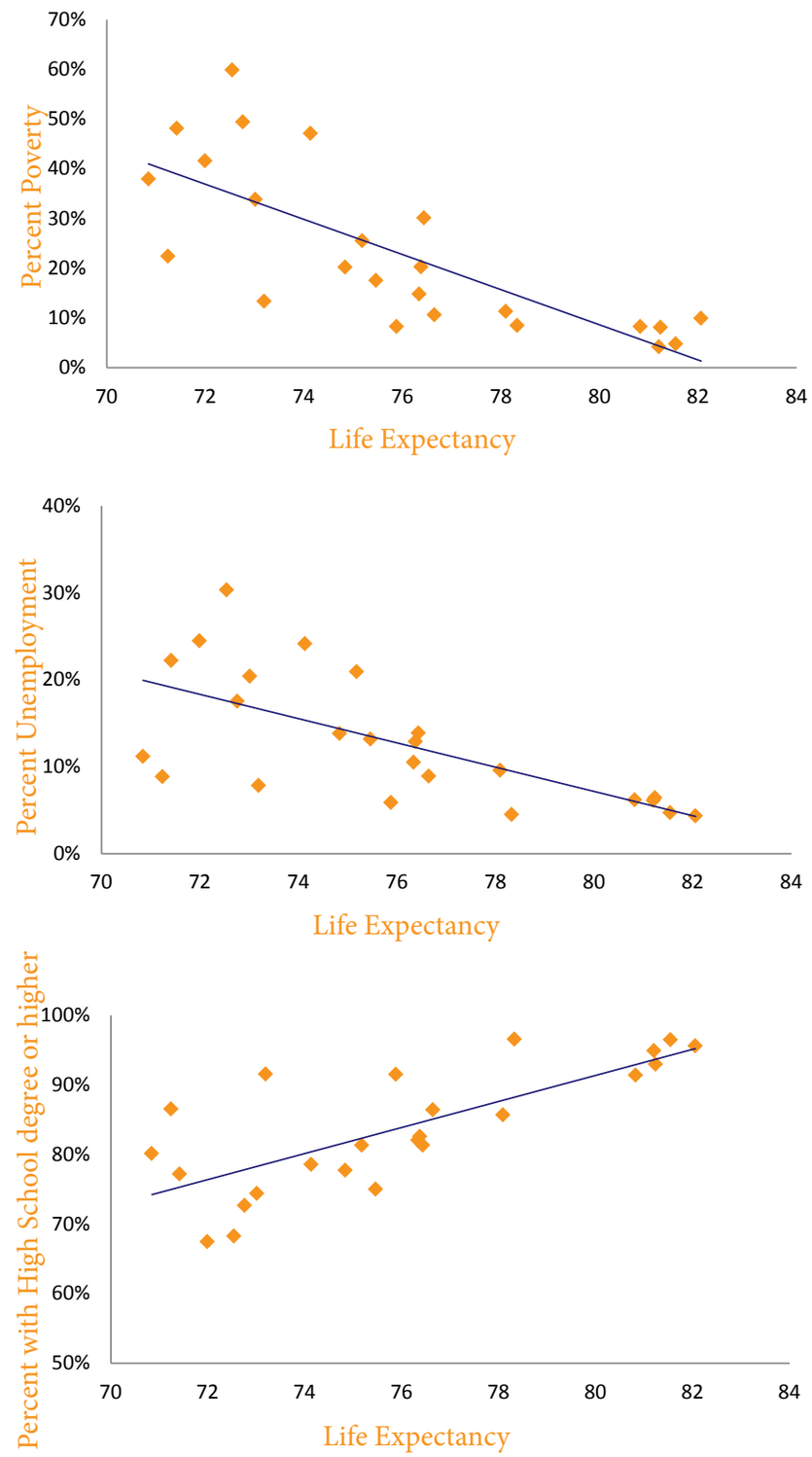
The data, maps, and other detailed information presented in this report clearly show the interwoven relationship of life expectancy, health outcomes, and social determinants with geographical context. In this report we demonstrate the compounding impacts of where someone lives and how that relates to the barriers he/she faces. This report demonstrates that place matters. The impact of social determinants of health varies based on where someone lives, and can drive the unfair distribution of health conditions.

By itself, any one of the previous maps presented in this document can show areas of disparity and inequality. However, when we consider the compounding effects of being unemployed in an area of dense unemployment, being in poverty in poverty-dense areas, living in high-crime areas, living without easy access to healthy food, living among a high density of vacant homes, spending high amounts of income on rent, and others, the cummulative effect of dealing with all of this on a daily basis can lead to the numerous unfair health consequences presented within this report. Research has shown the connections of all of these individual components and their relation to health and health outcomes. However, it is hard to effectively capture the compounding effects of living in multiple determinate-defining environments. Applying a geographical context for health is a useful way to capture more information around health determinants affecting specific populations and relating this information to the general public.

The maps presented demonstrate not only the measurements relative to Louisville, but other important, and possibly more relevant, benchmarks, such as national rates. The health, economic, and social data presented show that there are some neighborhoods experiencing conditions that are significantly worse relative to the rest of the city, highlighting areas where improvement should be focused. When we compare to the national benchmarks, this focus should take on a broader perspective. This perspective should include all of Louisville, and the focus should be structured so that intervention is most intensive in these vulnerable neighborhoods, but also includes changes that improve health for all of Louisville's neighborhoods.

In order to support and achieve these social determinant-level changes and improve health, policy-level change is required. From public health research and practice perspective, it is known that policy-level population health intervention has the largest reach and longest-lasting effect on community change. The importance of centering intervention on communities to improve health is receiving national attention. A new report from the Robert Wood Johnson Foundation, *Time to Act: Investing in Health of Our Children and Communities*, gives explicit recommendations and examples for ways to effect community change. Their recommendations are for policy driven change that fully integrates health into community development, starting with increasing awarness of the importance of integrating efforts to address health in neighborhoods.[17]

Our hope is that this 2014 Health Equity Report serves as a useful tool that engages and informs all sectors of Louisville - business, education, faith, government, nonprofits and more - and that all embrace a health-in-all-policies approach essential to driving towards innovative, equity-enhancing strategic solutions.



The graphs above show the direct correlation of life expectancy with multiple social determinants previously mapped. The graph shows on the y-axis (vertical) the proportion of population for a given determinant. The x-axis (horizontal) is life expectancy. Each point represents a different neighborhood. There is an additional trend line added to show how the two variables relate.

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- Grant applications
- General Interest
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Race*

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- Black
- Asian
- Other

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- Hispanic
- Non-Hispanic

Age*

- 0-18
- 19-24
- 25-44
- 45-64
- 65+

Education Level*

- some high school (no diploma)
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