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Environmental Racism in Baltimore: A Geographical Study into the connections between
Environmental Toxins and Public Health

By **Genevieve G. Block**

A Thesis Submitted to the Honors Council
For Honors in Geography at Bucknell University

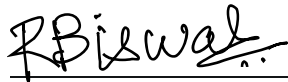
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Introduction and Background

Overview

In understanding and analyzing the development of urban areas, it is crucial to examine the impacts of environmental racism on minority communities. Specifically, one of the major sources of controversy surrounding environmental racism is the impact and placement of transportation routes such as pipelines. In what follows is a literature review exploring the larger societal intersections of air quality and health in Baltimore City neighborhoods. Further, I plan to explore the impact of these environmental hazards on the health of minority communities and the connection that this plays in the susceptibility to death from COVID-19 as a result of continued exposure to toxic air pollution. According to the Baltimore City Health Department, the current rate of asthma for adults is 12.4%, as compared to the national average of 8.6%. Furthermore, the asthma rate for children in Baltimore City, those under the age of 18, is 20% as compared to the national average of 9.4% (Baltimore City Health Department, 2018). This increased prevalence of asthma puts minority communities at higher risk for severe sickness from the COVID-19 virus. Recent research indicates that “Long-term exposure to...pollutant[s] may be one of the most important contributors to fatality caused by the COVID-19 virus in these regions and maybe across the whole world (Yaron Ogen, 2020). Thus, the purpose of this research project is to look at neighborhoods in Baltimore and take a spatial view of the intersections between neighborhoods and public health.

Neighborhoods need to be studied more closely to understand the impact of various environmental toxins and impacts that those have on the health of people who live in them. My suspicion is that people in neighborhoods impacted by environmental and racial violence are more likely to die from COVID because of these exposures, and not necessarily because of their

race. In this thesis, I argue that structural racism produces the conditions of poor health outcomes for demographic groups, not the race in and of itself. The point of the research is that it will show that governments and public health organizations need to take into consideration systemic environmental racism in communities when considering outreach and prevention or care of these communities. I hoped to further of our current understanding of public health by analyzing environmental toxins and intersecting them with health outcomes. By combining these factors, I want to extend opportunities for inclusion of vulnerable populations in public health policy.

I argue that each of these geographic approaches to studying racism does not include an emphasis on communities or smaller-scale neighborhood studies, which, I would argue, misses important considerations or evidence that they are more at risk than the general population. Black people are more susceptible to death from COVID-19, which is factually true given our current data, however, there are specific black communities that are at higher risk than others for death from COVID-19 because of environmental and economic choices made in the name of racial capitalism that shape their neighborhoods. So, stating that Black people are at higher risk, while factually true, omits all the reasons why Black people are at risk, which is not because their blackness is the health risk, but their blackness determines where they live in the US and this is the reason for environmental and capitalist damages.

The COVID-19 Pandemic

In December of 2019, a group of people in Wuhan, China, began experiencing symptoms such as shortness of breath and fever. While the illness was originally thought to be pneumonia, it was discovered that the genetic sequence was different from that of a typical pneumonia strain. Within a few months, the new sequence, the COVID-19 virus, quickly spread around the globe.

Infecting people from all regions of the world, the pandemic caused chaos, panic, and havoc. By mid-March of 2020, President Trump declared a national emergency in the United States and states across the nation began shutting down (CDC Museum, 2022). Since the beginning of the COVID-19 pandemic, almost 1 million people in the United States have died from COVID-19 (NYT, 2022). Additionally, “Black people have died at 1.4 times the rate of white people” (The COVID Tracking Project, 2021). This statistic highlights the public health and medical inequalities between races in the United States. COVID-19 is horrible, but there are disparate impacts on the way that it affects different peoples and communities. The literature that is currently available does not fully emphasize and develop the dire impacts of the COVID-19 pandemic on specific populations. Furthermore, it is crucial to underscore that the COVID-19 pandemic, did not create these issues. Instead, the pandemic ripped open and vividly displayed global issues of race and poverty, that were exacerbated by the pandemic. Thus, with an understanding of the unequal impacts of COVID on different racial minorities and geographic locations, we can further apply this knowledge to the intersection of public health and environmental toxins in the case of Baltimore city.

To begin this study, however, we must first ground ourselves in a foundational understanding of Baltimore’s history in terms of economic, social, political, and medical relations. The city of Baltimore has a rich and complex history. When Europeans first arrived in the Americas during the Era of Exploration in the 1400s, Baltimore was not one of the sites of primary settlement. In the 1600s, Europeans began to explore other areas and settled in Baltimore. The waterways and resources of the Chesapeake Bay and the current Inner Harbor

were perfect for shipyards and manufacturing plants, primarily for exporting Tobacco. In 1706, Whetstone Point, now known as Locust Point, was established as a significant shipping yard. Additionally, Fort McHenry, a Baltimore monument and key military point in the War of 1812, was established at the edge of Whetstone Point. European investment in grain and shipping in Maryland boosted its economy. For example, the grain trade changed Maryland., prompting the need for more slaves and the creation of more plantations (Crenson, 2017). As a result, domestic slave trade boomed, and Maryland become a hub for the internal slave trade as demand increased on plantations. Slaves in Baltimore were used as workers in manufacturing plants and shipyards. In 1808, the importation of slaves became illegal. As a result, people came to Maryland to buy slaves to sell them in the southern United States as demand increased on plantations. Thus, with its bustling transportation and slave trading businesses, Maryland became an important hub on the East Coast. Furthermore, these historical understandings of place ground our understanding of the spatial geographic and racial relationships in Baltimore. Thus, this provides a strong foundation for viewing the intersectionality of minority populations in the Baltimore area.

History of Racism in Baltimore

Since the early 1800s, Baltimore's Inner Harbor has served as an area of trade and exportation. Thus, "the memories of destructive capitalism, exploitative laboring relations, race- and class-based discrimination, and toxicity do not simply linger as historic artifacts, but rather continue to define how this landscape is viewed in Baltimore today" (Fabricant, 2019).

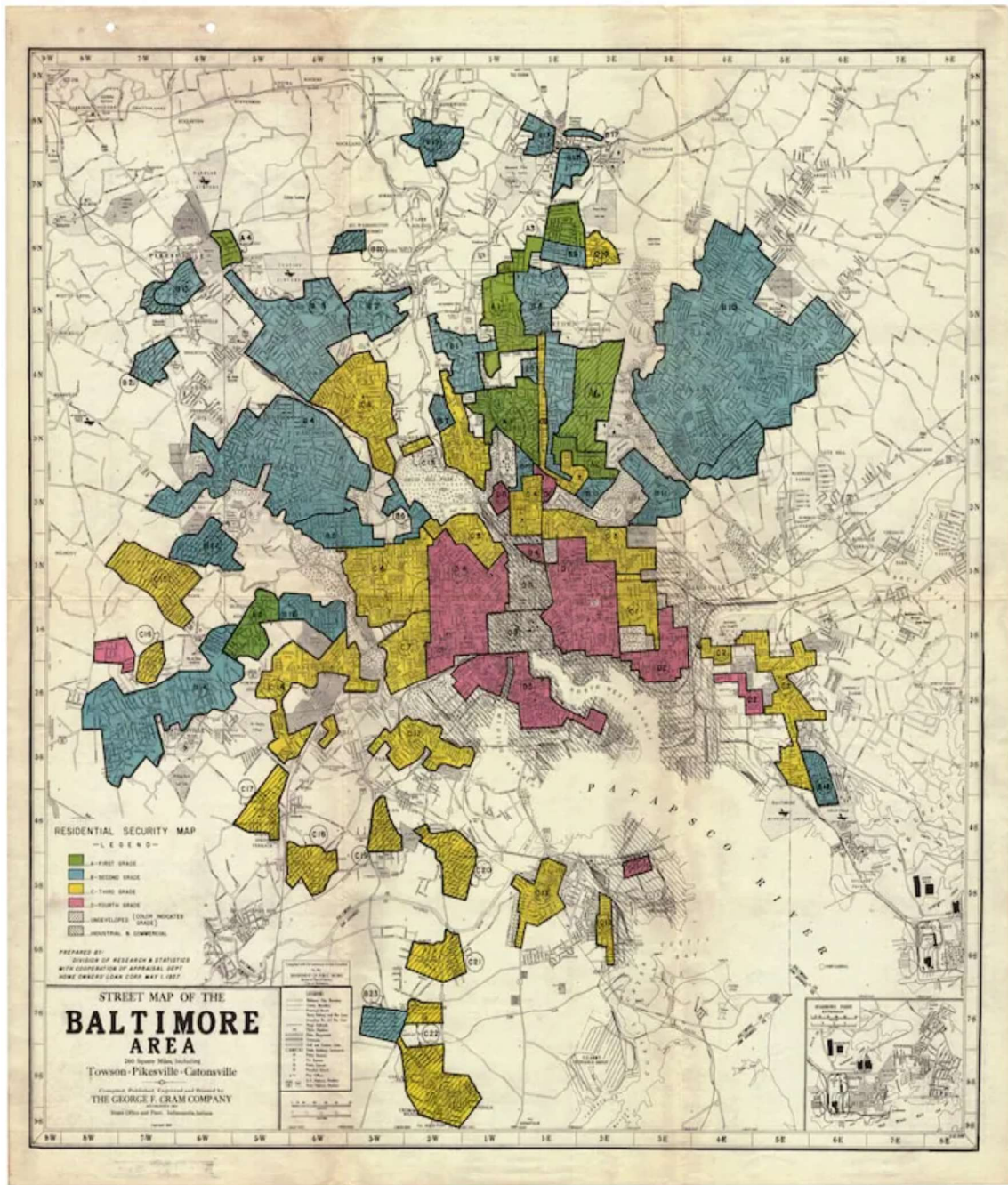
Baltimore's history is shaped by its environmental racism. Because of its location on the water, Baltimore has been a key area for importation and exportation. As Baltimore grew into an important shipping hub, racial relations were also cemented between White and Black

Baltimoreans. While White people controlled the shipping yards and boats, black people were left to work underneath them. This resulted in both social and economic disparities.

Furthermore, Baltimore implemented several red-lining laws. Redlining maps outlined prominent Black neighborhoods in Baltimore City (Figure 1). With high populations of “negroes” living in these areas, it made it very difficult for Black people to gain homeownership or be accepted for loans from the homeowners Loan Corporation. It is also critical to mention that Black people were not more likely to miss mortgage payments. Blacks were also limited from moving into white neighborhoods because of covenants that prevented the sale of houses to Black people. They were simply prohibited from these opportunities because of stereotypes relating to the color of their skin. For example, “From 1951 to 1971, 80 to 90 percent of the 25,000 families displaced in Baltimore to build new highways, schools, and housing projects were black. Their neighborhoods, already disinvested and deemed dispensable, were sliced into pieces, the parks where their children played bulldozed... We don't acknowledge that we created slums and perpetuated poverty. We don't acknowledge that people who are poor were denied the chance to build wealth. And we don't acknowledge that the problems we attribute to poor neighborhoods reflect generations of decisions made by people who have never lived there.” (Badger, 2015). By limiting Black people to segregated places, the city defined negative spaces. As a result, violence and tensions increased between White and Black Baltimoreans. Additionally, because Black neighborhoods gained such negative reputations, their property values decreased, further exacerbating economic differences between White and black people (Demby, 2018). This history of racism is still evident in the dynamics of the world today, “it is still today much harder for a black person to get a mortgage or home loan than it is for a white person... Because of urban planning that benefited those richer, whiter neighborhoods, people of

color are more likely to live near industrial plants that spew toxic fumes; they're more likely to live far away from grocery stores with fresh food, and in places where the water isn't drinkable...They're more likely to live in neighborhoods with crumbling infrastructure and in homes with toxic paint" (Demby 2018). These dynamics exacerbate racial inequalities and pave the way for environmental racism.

Figure 1: Redlining Map of Baltimore (John's Hopkins University, 1937):



This street map of the Baltimore area illustrated the process of redlining residential areas in Baltimore. The areas were rated different colors based on their safety and value. The areas in which white families lived were rated as desirable and the areas in which African American families lived were rated as undesirable.

Uneven development

As a result of the segregation discussed above, Black people did not have much social power and were limited to unfavorable neighborhoods. White people took advantage of this power by building hazardous plants and incinerators next to Black neighborhoods. Beginning in 1918, Baltimore had petroleum, refineries, and several fertilizer plants. They were all located next to Black neighborhoods because Black populations were seen as disposable. By 1932, the number of plants increased significantly, and more money was dedicated to the area to support the Baltimore and Ohio Railway system.

One of the major issues in Baltimore, historically, has been the presence of incinerators. In 1985, the Wheelabrator Baltimore opened in South Baltimore. This incinerator was created to manage the trash issue in Baltimore and create electricity. However, it is now the most significant source of pollution in Baltimore city. The incinerators are also troublesome because they contribute to several health issues for Baltimore city residents. While significant, this is certainly not the only source of history of environmental racism with incinerators in Baltimore (Boone, 2009). In 2016, Baltimore revoked the permit for the biggest trash incinerator in the United States that was set to be in Curtis Bay, a residential and industrial neighborhood in Baltimore City with extreme air pollution due to the surrounding plants. To stop the construction of the incinerator, people protested for years to protect their homes and their health. The incinerator was supposed to bring jobs and wealth to Baltimore. However, the toxic chemicals call into question the validity of incinerators. Who was the incinerator designed to benefit, and who would have accumulated that wealth? While their calls were answered on this occasion, they often go overlooked. Instead of bringing positive impacts to the area, the proposed incinerator would have contributed toxins, health issues, and decreased property value to the neighborhood.

Even today, areas of Curtis Bay remain environmentally hazardous. In 2007, a chemical plant created and distributed chemicals for agricultural use, pumping toxins into the neighborhoods of African American families. Furthermore, there is an area of Curtis Bay named “Vinegar Road” for its toxic smells.

Finally, there are four major sources of environmental toxins that are most prevalent in Baltimore City. The first, and most controversial, are the trash incinerators located in East Baltimore. These trash incinerators burn approximately 4,000 tons of waste per day and emit 240 pounds of mercury and 1,000 pounds of lead per year into the air (Fabricant, 2019). Historically, the Baltimore City government built these incinerators alongside minority communities. These incinerators are problematic because of the significant number of toxic pollutants that they release into the air. Second, Baltimore City is a primary exporter of crude oil. There are several crude oil train routes that weave throughout minority communities in the city. These trains are problematic because they are old and no longer meet the standards of the United States Environmental Protection Agency. As a result, they have the ability to explode easily and possibly release toxic chemicals into the surrounding area (Boone, 2002). Next, Baltimore has several coal-fired power plants that release sulfur dioxide pollution into the surrounding neighborhoods. These factories are particularly harmful because sulfur dioxide pollution is very triggering to those who experience asthma and as mentioned earlier, both adults and children living in these areas in Baltimore experience asthma almost twice as often as the national average. Finally, Baltimore’s gas system is experiencing daily leaks. The piping throughout the city is old and needs to be replaced. As a result, about two dozen leaks are discovered daily throughout the city. These leaks are particularly damaging to minority communities, who are

already experiencing an influx of air pollution and chemical toxins. For the purpose of this study, I examined the toxic pollutions that resulted from these toxic sites tog

Examining Baltimore's Environmental Racism Geographically

In examining these topics geographically, it is important to consider the impacts of slow violence, the impact of capitalism, and the disposability of certain populations. First, environmental racism became violent because of the repeated intentional practices of disturbing, harming, and polluting Black communities. In other words, environmental racism became a form of structural violence, a violence that “forces our attention to the forms of suffering and injustice that are deeply embedded in the ordinary, taken-for-granted patterns of the way the world is” (Taylor, n.d.) The idea of slow violence grew out of the term structural violence to further highlight uneven development and segregation towards Black communities. Slow racism can be defined as “a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all” (Nixon, 2011). This perspective will allow me to analyze the underrated and often overlooked contributions of environmental racism. By situating the historical racism of Baltimore and understanding the processes of gentrification and urbanization of the area, I can further provide a framework for analyzing the current system in Baltimore city. As described in the history of Baltimore above, Black people living in Baltimore have experienced slow racism for many years. The residential laws and labor policies that were implemented against Black people slowly built-up inequality in the city. It also created cycles that contribute to health issues that can be passed down through several generations (Nixon, 2011).

In addition to slow violence, structural violence is also at play in this realm. Structural violence is a systematic way of purposely excluding some groups from equal access to work, food, healthy living conditions, and many other necessities. Powerful people establish structural violence to disadvantage less powerful groups. In turn, structural violence allowed for white populations to restrict and negatively impact the economic growth and health of black populations. For example, “structural violence is one way of describing social arrangements that put individuals and populations in harm’s way... The arrangements are structural because they embed in the political and economic organization of our social world; they are violent because they cause injury to people ... [structural violence is] historically given (and often economically driven) processes and forces conspire to constrain individual agency” (Farmer, 2009).

In connection to both slow and structural violence is the idea of black bodies being disposable. Writer for the New Yorker, Teju Cole, explains that “This fantasy about the disposability of black life is a constant in American history. It takes a while to understand that this disposability continues. It takes whites a while to understand it; it takes non-black people of color a while to understand it; and it takes some blacks, whether they’ve always lived in the U.S. or are latecomers like myself, weaned elsewhere on other struggles, a while to understand it. American racism has many moving parts and has had enough centuries in which to evolve an impressive camouflage. It can hoard its malice in great stillness for a long time, all the while pretending to look the other way. Like misogyny, it is atmospheric. You don’t see it at first. But understanding comes” (Cole, 2014). Historically, white populations in the United States have benefitted from the disposability of black populations. Paul Farmer builds on this idea by explaining that “A wall between the rich and poor is being built, so that poverty does not annoy the powerful and the poor are obliged to die in the silence of history” (Farmer, 2010). This

racism and violence have been able to thrive because of our economic system. The current set-up of our economic system fosters an atmosphere of profit for banks and large corporations as they prosper by exploiting third-world nations. This creates a cycle of poverty within developing communities, trapping them and their resources.

There are also several political contributions to the realm of environmental racism. As Capital Gazette writer, Mary Ashanti describes, “Environmental racism is particularly insidious because it often seems mundane — it is hidden away in government siting and permitting decisions, or the lack of representation as governments make decisions about who will bear the brunt of pollution. Lawyers, judges, and governmental agencies chokehold our hope of equality when environmental regulations and statutes are not upheld and equally enforced, only protecting White and wealthy communities” (Ashanti, 2020). As a result of this, there is inequality socially and in terms of public health. For example, “The results of this disparity are clear. People of color breathe 38 percent more nitrogen oxide than whites. People of color in 46 states live with more air pollution than whites. More than 68 percent of African Americans live within 30 miles of a coal-fired power plant, compared with 56 percent of whites and 39 percent of Latinos” (Bullard, 2020).

Intro to Public Health in Baltimore

In the United States, public health is not equal and is not accessible. Health care is a privilege, granting access to those who can pay for it and rejecting those who cannot. As described in the introduction thus far, societal racism and government policies have discriminated against Black Americans, making it more difficult for them to secure safe housing, reliable incomes, and access to strong medical care. With generations of Black Americans being

disregarded, untreated, and forced to live near toxic environments, there has been a recurrence of health issues throughout generations of Black communities. For example, Black pregnant mothers are four times more likely to die during pregnancy or childbirth than white pregnant mothers, (Villarosa, 2018). By understanding these troubling statistics, it is helpful to analyze the issue on a smaller scale. In Baltimore, there are significant disparities in health care and rate of illness, based on race. One study discovered that “In Southwest Baltimore, Black Americans had greater odds of having diabetes compared to whites....” (LaVeist, Pollack, Thorpe, Fesahazion, and Gaskin). Furthermore, there have long been troubling interactions between Black Americans and the medical system. One of the most famous cases of medical racism, occurred in Alabama. From the 1930s to the 1970s, the United States Public Health Service, performed a study in which it withheld penicillin from 400 Black men to see how their disease would progress without treatment. The racist study created extreme backlash from the Black community and contributed to an already growing mistrust of the medical system by Black Americans. For example, “Distrust of the health care system by African Americans runs from the feelings or ill gains for participation in clinical trials to being used only as guinea pigs... In addition, they, along with other minority groups, need more minorities of their own cultural groups visible and practicing in the health care system and their communities” (Kennedy, Mathis, and Woods, 2007). The lack of representation of minority communities is also troubling for Black communities. The combination of previous Black exploitation and the high percentage of white doctors in the medical field today, create unrest and mistrust for Black Americans. Even with some of the top hospitals in the country, this mistrust is also present in Baltimore. For many Black Baltimoreans, stories of mistrust altered their perception of the medical system in Baltimore. For example, there are “Stories dating back to the 1800s that so-called night doctors kidnapped black children for

medical experiments are vividly remembered. At Johns Hopkins, researchers famously took tissue cells from Henrietta Lacks, a black cancer patient, without permission in 1951” (Woodruff, 2016). As a result, Black Baltimoreans are less likely to seek medical care than their white counterparts and are more likely to die at a younger age. The mistrust of the medical system coupled with increased systemic exposure to environmental toxins is creating an epidemic of Black health issues and higher death rates. Thus, this leads me to the crux of my honors thesis question: Does increased exposure to environmental toxins increase one’s susceptibility to death by COVID-19? To study this using a geographical scale, I plan to look at this on a neighborhood level, questioning and analyzing the impact of COVID-19 on some of the most impacted neighborhoods in Baltimore City by environmental racism and environmental toxins. To further this study, I will create and analyze maps to visually display the social and medical inequities of environmental racism in Baltimore. Ultimately, I hope to stress that environmental racism, environmental toxins, and public health disparities are not individual entities. Instead, each of these sectors interacts and intertwines, leaving vulnerable communities open to further vulnerability.

Literature Review

Introduction

This chapter includes a literature review introducing the social, economic, and geographic themes at play in this honors thesis: environmental racism, environmental (in)justice, racial capitalism, slow violence, health disparities, and GIS. The analysis of these themes allows for further exploration and analysis of the impacts of environmental racism on public health. Furthermore, with a foundation in scholarly works, it is evident that this issue is not unique to Baltimore. By understanding the intersections of environmental toxins and public health, there are greater opportunities for creating meaningful policies to support minority populations.

Environmental Racism

The discussion on environmental racism began with the publishing of the Toxic Wastes and Race Study, which investigated the relationship between minority communities, proximity to toxic living environments, and resulting health issues (United Church of Christ, 1987). The study was revolutionary in that it was the first of its kind to publicly define environmental racism and identify the uneven impacts of environmental hazards on minority communities. The authors of the study described that “Race proved to be the most significant among variables tested in association with the location of commercial hazardous waste facilities. This represented, a consistent national pattern... Although socioeconomic status appeared to play an important role in the location of commercial hazardous waste facilities, race still proved to be more significant” (United Church of Christ, 1987). The recognition of racism as a factor in the development of urban areas expanded the scholarly scope of understanding on this issue. As a result, the field

broadened to include research that expanded on the idea that race and place were both intertwined and impacted by one another. This study was just the beginning of the framework of environmental racism.

Continuing with a focus on environmental racism, Robert Bullard applied this approach to the dumping of toxic chemicals in Black neighborhoods in North Carolina. His study illustrated a direct correlation between race and toxic dumping places, as toxic chemicals were dumped all along minority sites. However, due to their location near a disposable community, the toxins were dumped near Blackwater sources (Bullard, 1993). He also developed a definition of environmental racism as “any policy, practice or directive that differentially affects or disadvantages (where intended or unintended) individuals, groups or communities based on race” (Peña-Parr, 2020). His work built a strong foundation for studying and researching environmental racism and its impacts. It was, and still is today, integral in scholarly works on environmental racism. Bullard’s work served as a foundation for studies on environmental racism. Geographer Ryan Holifield, built his thinking around Bullard’s revolutionary ideas, promoting the understanding that intent is irrelevant, and racism can measure outcomes (Holifield, 2013). Both Holifield and Bullard’s writing mark a turning point in view of environmental racism. Racism was often dismissed as being unintentional or the reality of society. However, both authors challenge that idea with the viewpoint that any type of racism is dangerous. This is not to say that an analysis of the origins of racism is not important, but to emphasize that racism is a reality for many, regardless of its beginnings (Holifield, 2013).

Furthermore, Geographer, Laura Pulido, continues the discussion on environmental racism by incorporating the importance of “whiteness” and white privilege. Pulido’s ideas challenge the way that environmental racism has been studied in the past, by overlooking the hegemonic forms of racism (Pulido, 2000). By broadening the scope and structural design of environmental racism, scholars can develop a greater understanding of both racisms, generally, and environmental racism. Pulido introduces the concept of white privilege in relation to environmental racism. The connection of these themes is crucial because it strengthens and clarifies the root of environmental racism. White privilege, purposeful or not, feeds into and allows for racist practices to thrive. Specifically, environmental racism is often the result of comfortability for white homes and neighborhoods. In other words, in order for white communities to have safe, homogenous, and habitable living conditions, Black and brown people must live in areas that are the opposite. Pulido explains, “a focus on white privilege enables us to develop a more structural, less conscious, and more deeply historicized understanding of racism... White privilege allows us to see how environmental racism has been produced” (Pulido, 2000). While Pulido’s article focuses on examples of environmental racism in California, her powerful ideas can be seen across the United States.

Even today, Pulido holds importance in the literary world of environmental racism. Geographer, Willie Wright, cites Pulido’s importance in our current understanding of the intersections between race space. In Pulido’s works on Flint, Michigan, she changed the narrative surrounding racism by making it inherently geographic. In doing so, there are clearer connections and understandings that race can become embedded into spaces, making spaces inherently racist (Wright, 2018). Pulido’s works were also cited by those across different

disciplines and countries. Geographer Max Liboiron of Canada, Sociologist Manuel Tironi of Chile, and Interdisciplinary Professor Nerea Calvillo of the United Kingdom, published a paper with strong connections to Pulido's work. Similar to scholars before them, these scholars grounded their work in Pulido's understanding of race and space, furthering the discussion with an examination of containment of both people and toxins. Ultimately, from an analysis of her work, it is clear that Pulido's perspectives left long-lasting impacts many.

Pulido's ideas were enhanced in coupling her themes with power and spatial studies (Gilmore, 2002). Geographer, Ruth Gilmore, explains that "a geographical imperative lies at the heart of every struggle for social justice; if justice is embodied, it is then therefore always spatial" (Gilmore, 2002). This perspective takes a unique approach to racism, viewing it through many geographical themes. Her view of race as a spatial entity defines the issue in terms of its physical, social, and cultural surroundings. Racism is in fact impacted by each of these issues and should be treated as such to be broken down and targeted correctly. Gilmore also explains that "Geographers should develop a research agenda that centers on race as a condition of existence and as a category of analysis...The political geography of race entails investigating space, place, and location as simultaneously shaped by gender, class, and scale" (Gilmore, 2002). With an understanding of space and race developed, we can then understand the importance and connection of slow violence.

The connection between race and space is an integral part of environmental racism studies. Specifically, this framework targets the economic and social impacts of racially structured policies. In other words, to enhance our understanding of racism, we must recognize

its inherently geographic nature. Race is shaped by spaces, and spaces are shaped by the racist policies in that location. Geographer George Lipsitz comments that, “The lived experience of race has a spatial dimension, and the lived experience of space has a racial dimension” (Lipsitz, 12). This idea is crucial in furthering an understanding of environmental racism, as minority communities are shaped by political and geographic decisions that make their living spaces uninhabitable and unhealthy. Alongside these ideas, there are also important historical pieces that shape the current living opportunities for many racial groups. For example, “segregated schools and neighborhoods provide whites with privilege” (Lipsitz, 12). These historic divides allow further insight into the systems present in our society today. Furthermore, Lipsitz cites the lens of the white imaginary, “an analytic category that refers to the structured advantages that accrue to whites because of past and present discrimination. Not all people who are white consciously embrace that white spatial imaginary, but all whites profit equally from their whiteness” (Lipsitz, 13). Lipsitz’s incorporation of the white spatial imaginary is equally significant in developing an understanding of environmental racism. To understand why some racial communities experience racism and unequal living conditions, it is important to question the other side of this spectrum: who is benefitting from and designing this system? As Lipsitz mentions, while not all whites actively participate in the so-called “imaginary”, they still profit off of their racial identities. In other words, an impoverished Black community is significantly more likely to experience environmental racism than an impoverished white community due to the power dynamics associated with the color of their skin. Overall, Lipsitz presents essential ideas for understanding environmental racism through historical and social lenses. Much of the early focus in environmental justice scholarship was on Black communities in the United States. However,

more recently, a great deal of work has applied the interventions discussed above to other minority communities.

Indigenous Environmental Racism

This form of thinking is applied to Indigenous Communities. Due to the pressures and nature of globalization, indigenous lands experienced their own forms of environmental racism through the destruction of their lands. For years, communities such as the Navajo or Sioux tribes have experienced environmental racism through the destruction of their water sources and the industrialization of their lands (Snider and Nielson, 2020). In recent years, these practices gained significant traffic and media attention through the protests at the Dakota Access Pipeline. The Sioux Tribe has been fighting against the plans for the Dakota Access Pipeline because it travels underneath of their primary drinking water source, the Missouri River (Worland, 2016). Patterns of environmental racism, such as the one described in the Dakota Access Pipeline, continue to be harmful to indigenous groups. Thus, the scholarly frameworks surrounding environmental racism towards Black communities can also be helpful and applicable towards Indigenous communities as well.

International Environmental Racism

Environmental racism is a controversial and harmful issue both in the United States and globally. Due to the structure of our capitalist system, focusing on mass profit and mass consumption, nations in the Global South have suffered at the expense of economic development in the Global North. This harm takes many forms such as the dumping of trash in x, the dumping of chemicals in y, and the pollution of waters in z. Furthermore, environmental racism has

several community costs because “exporters and importers tend to ignore hazardous external costs, or externalities, associated with transboundary shipments of hazardous waste. These costs include local environmental and public health dangers; dangers inherent in the transportation of hazardous waste; and global concerns” (Marbug, 1995). The dangers raised by Marburg (1995) are still present today. Specifically, there are many environmental hazards in the global south concerning agriculture and the dumping of toxic materials. This is one of the externalized costs of capitalism as overconsumption of resources by richer, primarily white nations, leave poorer, nations primarily with people of color, depleted. The environmental racism involved in our economic system is also intertwined in global politics. The North American Free Trade Agreement between the United States, Canada, and Mexico not only permits but creates pathways for further exploitation and environmental racism toward Black and brown communities (Vasquez, 1993). Unfortunately, the cycle of environmental racism is still very much present in the international sphere as well as in the United States. Furthermore, there is an uneven burden of uneven wealth. For example, the wealthiest people create the most waste and environmental destruction but suffer the least consequences. This uneven development occurs internationally, as this scholarship demonstrates (cite 1, cite 2, cite 3), but also the same pattern can be observed within the US.

Urban Environmental Racism

The study of urban environmental racism is particularly connected to the study of this thesis. Environmental racism is very often found in urban areas because of the high presence of factories, plants, and traffic routes. These industries and roadways are most commonly placed near impoverished and minority communities. In the South Bronx in New York City, there is an

area referred to as “Asthma Alley” because its residents are much more likely to get asthma than those who live in other parts of New York City (Colarossi, 2020). In connection to this thesis and the city of Baltimore, the neighborhood of Curtis Bay suffers from heavy exposure to toxins and pollution because of the number of factories and incinerators near it. There is even an area in the neighborhood called “Vinegar Road” because of its presence of strong toxic smells. These pollutants and toxins have severe and life-threatening effects on the communities and families within these neighborhoods, which I will explore further in this thesis.

Rural Environmental Racism

While environmental racism is often thought to be an urban issue, environmental racism can also be manifest in rural communities, which are often overlooked. In the Southern United States, many rural minority communities suffer from proximity and exposure to toxic chemicals. In Louisiana, minority and impoverished families living along the river corridor are exposed to the harmful effects of the toxins that pollute the water by their homes (Meiners, 2019). The area is typically referred to as “Cancer Alley” because its residents are more likely to be diagnosed with cancer than their fellow Americans (Colarossi, 2020). In a small town in Florida called Pahoke, residents also face rural environmental racism because their area is polluted each year with soot. Not surprisingly, the community is primarily black, and the chemicals found in this suit are connected to several respiratory diseases. Environmental racism is a sad reality for many communities all over the United States. It is not an issue of rural areas, urban areas or even suburban- it is about racism and socioeconomic status. Even further, there is an interesting analysis of the history of space, health, race, and economic status of an area. The collision of

these three realms creates intersectional populations who are vulnerable to the power of white corporations.

Environmental (In)Justice

The “Father of Environmental Justice”, Robert Bullard, an American academic, began the discussion on the environment by studying the connection between racism and environmental toxins. The combination of the two, prompts the need for environmental justice and a movement for community equality, regardless of race (Bullard, 1993). Bullard’s research is also unique in that it focused on the Southern United States, a historically, racially controversial area as it was the past hub of slavery. In Bullard’s work, the relationship and history of race is crucial, digging deeper to examine the past inequalities of race that have led to inequities in the south. On this note, Bullard argues that “Black communities still suffer from institutionalized discrimination. Discrimination, thus, involves a "process of defending one group's privilege gained at the expense of another...Black communities and their inhabitants must defend themselves against hostile external forces that shape land-use decisions and environmental policies” (Bullard, 1990). Bullard situates himself in this understanding of environmental racism by tracing back the uneven development of the south generally. This perspective draws the connection that because of racist policies and laws that limited Black participation in certain sectors of the labor and housing market, Black communities were marginalized and pushed to the side. As a result, white communities began to thrive and achieve higher levels of economic engagement and success (Bullard, 1990). This racism in the housing market stems from the idea that black communities were “were ripe for exploitation” (Bullard, 1990). The establishment of these ideas was crucial in furthering understanding and support for the environmental justice movement.

Spatial and racial thinking was also used to specifically understand the impact of environmental toxins on minority communities. This was a revolutionary push for an investigation, citing that minority communities were impacted by environmental toxins at higher rates than their white counterparts (Bryant and Mohai, 1992). A well-developed understanding of environmental justice is a multistep process as one must question: who is being impacted, why are they being impacted, and how are they being impacted? Addressing each of these concerns allows for policy changes to further protect minority communities impacted by these toxins. To do so, President Bill Clinton established the Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, an Environmental Protection Agency Taskforce in 1994 (Environmental Protection Agency 1994). The creation of this task force marked a turning point in environmental justice history, and the sense jumped from the pages of scholarly works to the forefront of the United States public policy work.

With support from President Clinton and the Environmental Protection Agency, scholarly work on environmental justice issues gained further interest (Mohai, Pellow, Roberts 2009). Environmental justice studies were even furthered by the health community, citing the impact of environmental toxins and public health. In communities living near environmental toxins, there was evidence that these pollutants were causing negative health impacts for the people in those communities. The combination of environmental justice and health studies was an important moment for furthering the understanding and greater impacts of this racism. Minority communities that lived near environmental hazards were not just living in an unfavorable community, they were living among toxins that were harmful to themselves and their children (Institute of Medicine: US Committee on Environmental Justice). By advancing the

conversation, there was a greater development of the connections between the entities of environmental justice and public health.

Furthermore, scholars advanced the conversation by examining larger spaces in need of environmental justice. Just as Bullard situated environmental racism in the South, Bolin, Grineski, and Collins (2005) draw parallels between the historical development of space and the resulting impacts of environmental racism in Arizona. By following a community, there is a greater understanding of the significance of racism within environmental, social, and economic sectors. By studying environmental justice in Phoenix, there is a greater connection to the large-scale spatial impacts of racism and power. The authors write, “Second, “African Americans and Latinos historically lacked the political and economic power to effectively contest the degradation of their neighborhoods” (Bolin, Grineski, Collins, 2005). The unequal power dynamics in Phoenix illustrate the historical and systematic presence of racism, in the area. Ultimately, minority communities are vulnerable to societal exploitation because of their limited power in society.

Similarly, to the application of environmental racism works discussed earlier, environmental justice practices can also be used in connection to indigenous communities. Early environmental justice movements challenged the placement of a toxic waste incinerator near an Indigenous water supply in the 1980s (Snider and Nielson, 2020). Since then, other scholars and indigenous communities have used the lens of environmental justice in examining and combatting racism and toxins impacting their communities. Ultimately, the use of these frameworks by an indigenous population highlights important themes in environmental justice in the United States. Overall, there is a dependence and exploitation of black and brown bodies,

lands, and resources for white profit. This was true during the era of colonialism for Indigenous and African people and remains true today for Indigenous tribes and Black and brown Americans. With a greater understanding of this history and the complexities still present today, we can present a stronger case for the need to further study environmental justice to end the cycles towards these oppressed communities.

Environmental justice theories are still being used in scholarly works today to describe a global network of social movements fiercely critical of the disparities and depredations caused by the unchecked expansion and neocolonial logic of fossil fuel-driven modern industrial development” (Chiro, 2016). This is made possible by the expansion of white projects for-profit and the disregard of minority communities. Today there is an even greater expansion and analysis regarding environmental justice.” prompting readers to reconsider the biases that are associated with this word. We must consider: who is allowed to live in a healthy environment and why? These questions shape the way that environmental racism plays out in society and relates to the historical and structural entities that have allowed for the development of dangerous environments near minority neighborhoods. Finally, there is a more substantial connection in scholarly works between intersectionality and environmental justice. The connection of these themes was first pushed during the 1991 First National People of Color Environmental Leadership Summit in Washington, DC. During the conference, activists worked to highlight examples of environmental racism and illustrate the ways that their multiple identities increased their likelihood of experiencing environmental racism. Chiro writes, “the EJ principles embraced an analysis of interconnectedness and strove to dismantle the oppressive binary systems that construct divisions between “local and global,” “economic and ecological,” and “human and

environmental” (Chiro, 2016). This idea is critical in developing a greater understanding of both environmental justice and environmental racism.

However, even today, there is still a significant gap in our understanding of these materials. While minority communities are more likely to live near toxic environments, specific minority communities are at higher risk than others. Thus, the need for further examination of the role of space and geography is necessary to advance understanding and support for these minority communities.

Racial Capitalism

Frameworks surrounding racial capitalism can be key in advancing the understanding of environmental racism. The discussion around racial capitalism began with Professor Cedric Robinson as he drew connections between racism, nationalism, and capitalism (Robinson, 1983). Robinson first defined racial capitalism as “the tendency of European civilization through capitalism was thus not to homogenize but to differentiate—to exaggerate regional, subcultural, and dialectical differences into “racial” ones” (Robinson, 1983). Robinson’s term racial capitalism was and still is, very important in the study of environmental racism in the United States. His perspectives opened up further connections between scholars to identify even more ways that Black and brown bodies are exploited for the benefit of white profit (Leroy and Jenkins, 2021). Furthermore, scholars continued to push and expand on the definition of racial capitalism. Professor Lisa Lowe expanded the study of racial capitalism, defining it as “Racial capitalism captures the sense that actually existing capitalism exploits through culturally and

socially constructed differences such as race, gender, region and nationality and is lived through those uneven formations” (Lowe 2015). The term was applied to geographic analysis by Laura Pulido used racial capitalism to examine the interconnections between race and capitalism in Flint, Michigan. This is an important application of racial capitalism because it illustrates that it is the consequence and cause of many other geographic themes such as environmental racism or environmental justice (Pulido, 2016). In terms of this thesis, this is a critical recognition that allows us to further analyze the relationship between capitalism, environmental racism, and burdened minority communities.

Slow Violence

Furthermore, the relationship between the terms listed above can culminate into slow violence, a new term for analyzing structural violence. The idea of slow violence, first described by Robert Nixon, can be defined as “violence that occurs gradually and out of sight; a delayed destruction often dispersed across time and space” (Nixon, 2011). Geographer Thom Davies furthers the conversation on structural violence by connecting it to racism. He explains that “To name something ‘violent’ emphasizes two key characteristics: the presence of brutality, and the notion of intent” (Davies, 2019). This idea emphasizes the importance of studying both structural violence and slow violence. Because the idea of violence has an underlying impact of intent, it is crucial to consider who is indirectly targeting minority communities, and how has this brutality continued over so many generations? By broadening the conversation, Davies gains a greater insight into the impacts of these entities and the ways in which these violence shape minority communities. In particular, he explains that “slow violence provokes us to delve into the past to

unearth the violent structures of inequality that saturate contemporary life, and may well lay waste to the future.” (Davies, 2019). Furthermore, Davies explains that there is a tight connection between slow violence and structural violence. He illustrates the idea that the structural violence of racism evolved into forms of slow violence. This is an incomplete analysis because slow violence is a part of the larger umbrella of structural violence. In thinking about it this way, it is easier to target the factors written into policy and legislation that lead to racism. Only then, is it possible to examine which type of structural violence relates to the issue at hand. In connection to environmental racism, Davies describes that “environmental risks are commonly placed in the path of the least resistance, near communities with the smallest reserves of political, economic, and social capital” (Davies, 2019). This point perfectly summarizes the toxicity and complexity of environmental racism. Environmental toxins and fossil-fuel-producing plants are often built next to minority communities, continuing the pattern of silencing socially-less powerful voices. Because these communities are less socially, economically, and politically less connected, they are frequently helpless to the power of major corporations or politicians who push for the development of areas that are susceptible to exploitation. There is also a connection between slow violence and environmental racism. Communities that live near environmental toxins, slowly and over time, face the repercussions of their living conditions. Most environmental hazards do not impact peoples’ health overnight- it is a gradual and generational process of trauma (Davies, 2017). Slow violence has typically been referred to as the “the normalized quiet of unseen power” (Cahill and Pain, 2019). I appreciate the relation between this quote and populations silenced by toxins and gentrification. Furthermore, it is crucial to illustrate that there is a special aspect to slow violence. In other words, slow violence can occur and thrive within

toxic spaces (Davies, 2019). The evident relationship between slow violence and environmental racism furthers the severity of these structural violence practices.

Health Disparities

Historically, in the United States, there have been strong patterns of health inequalities based on race. This trend intertwines with the theme of structural racism and racial capitalism, highlighting the various factors that impact the lives of Black and Brown individuals. Specifically, physician Galea Sandro studied the intense discrepancies between Black and White health care and the steps necessary to close or lessen, the gap for equity and equality. To begin, Galea cites the significant life expectancy differences between Black and white individuals and, specifically, pregnant mothers. In the United States, Black mothers are three times more likely to die during pregnancy than white mothers. These numbers are significant not only because of their frequency but because of the historical, social, and cultural contexts that they represent. This leads me to the topic of disability. Geographers have coined the term “disposable” to identify populations who are disposable to the community. In other words, these populations are deemed less powerful and less valuable. People within these populations often live near areas with toxic environmental hazards or work jobs that put their health and safety at risk. Poor Black and Brown communities have consistently and historically experienced this pattern. Their health was disregarded for profit, and their neighborhoods were destructed for production. For example, “This work shows that forces that shape our societal structures — including power, money, and access to resources — inevitably become embodied in health and will continue to shape health patterns unless they are addressed” (Galea, 2020). Galea’s point illustrates the importance of intersectionality in public health and the various factors that influence one’s access to quality

healthcare. The racist structures in United States society have and still do impact Black Americans' health care, thus explaining health epidemics in Black communities.

In the United States, Black African Americans are more likely to suffer from chronic health conditions. This is a result of several factors, including but not limited to increased exposure to environmental toxins. As mentioned by Galea, it is important to understand these discrepancies to best address public health for African Americans today. "Eliminating these disparities will require culturally appropriate public health initiatives, community support, and equitable access to quality health care" (Department of Health and Human Services Centers for Disease Control and Prevention). The analysis of environmental toxins and intersecting them health outcomes, calls for a change in public policy and a push for equality. By expanding our definitions and view of vulnerable populations, we can create further and more extensive public health policies that address the convergence of environmental toxins on minority communities. Overall, it is clear that there have long been discrepancies in care and access to medical services for minority communities.

Methods and Maps

Research Questions and Unit of Analysis

After spending time researching the intersections of environmental racism and public health in Baltimore, I wanted to take my research a step further. The next portion of the honors thesis visually illustrates the themes discussed so far in this honors thesis. After grounding myself in the foundational research from the introduction and lit review sections, I wanted to analyze and answer the following questions through mapping:

- What is the role of space and neighborhoods in studying environmental hazards and health outcomes in Baltimore?
- Do the neighborhoods that experience the highest levels of environmental hazards also experience the worse health outcomes?
- Did neighborhoods with high levels of environmental toxins experience higher levels of death by COVID-19 than neighborhoods with lower levels of environmental toxin exposure?

To further develop an analysis of the various social and environmental factors in Baltimore City, the next section includes maps created with ArcGIS Pro, a Geographic Information System (GIS) software package from ESRI. There are nine maps, each showcasing different overlapping toxins and health factors. Initially, I wanted to find environmental health

outcomes, and COVID-19 data at the census level tract to examine these issues on small scale communities in Baltimore.

While I found this data for the environmental and health outcome variables, I was not able to find COVID-19 data at smaller scales. The COVID-19 data sets available offered COVID-19 data by zip code and county level. However, these levels of aggregation were still too large for me to examine the small-scale communities that I hoped to focus on through mapping. Thus, given the time restraints on my project, I settled on data from 11 Baltimore City hospitals that illustrated the average sum of adult patients each week hospitalized with COVID-19.

It is important to preface that people do not necessarily use the hospitals closest to them. Thus, I was only able to illustrate the COVID hospitalizations per hospital in Baltimore City rather than the COVID hospitalizations of each neighborhood in Baltimore City. I had hoped to originally show this data at a neighborhood level because I wanted to look for intersections between neighborhoods that were impacted by environmental toxins to see if they experienced higher rates of death by COVID-19. I suspected that there would be higher rates of death by COVID-19 in these neighborhoods because of their predisposition to exposure to environmental toxins. with limited COVID-19 data available, I decided to change my project a bit to examine if the high level of environmental toxins in areas impacted by environmental racism reflected higher health outcomes as a result. again, I changed my project in this way because COVID-19 data case information was not available add the census tract or block group level which greatly impacted my ability to complete the study under those variables. Nevertheless, I still think that it

is very important to compare those variables and hope that future studies will do so when more COVID-19 data is available.

Data sources and final variables

After searching through many websites, I chose to use data from the U.S. Environmental Protection Agency (EPA), the Centers for Disease Control (CDC), the State of Maryland, Baltimore Metropolitan Council, and The U.S. Department of Health & Human Services for my GIS analysis. I chose my final data providers based on where I could find the most relevant variables at an aggregation that was small enough to analyze my research questions on environmental toxins, health outcomes, and COVID-19 impacts in Baltimore City.

Environmental Hazard Indicators

The environmental hazards data is from the United States Environmental Protection agency. The data, entitled EJ Screen, downloaded on February 17th, 2022, has variables that estimate environmental hazards risks at the Census tract level. There are 139 variables compiled by EPA for Environmental Justice screening & reporting purposes. From these variables, I selected the variables of Cancer Risk, Respiratory Risk, Proximity to National Priority List Sites, and Proximity to Treatment Storage and Disposal Facilities, and Proximity to Ozone Risk. I selected these variables because of their connections to air pollution. Since part of my study was focused on the intersection with COVID-19, I wanted to select some variables that impacted respiratory functions and others that impacted overall health conditions. The explanations and units for each of the variables are shown in the table below (Figure 2).

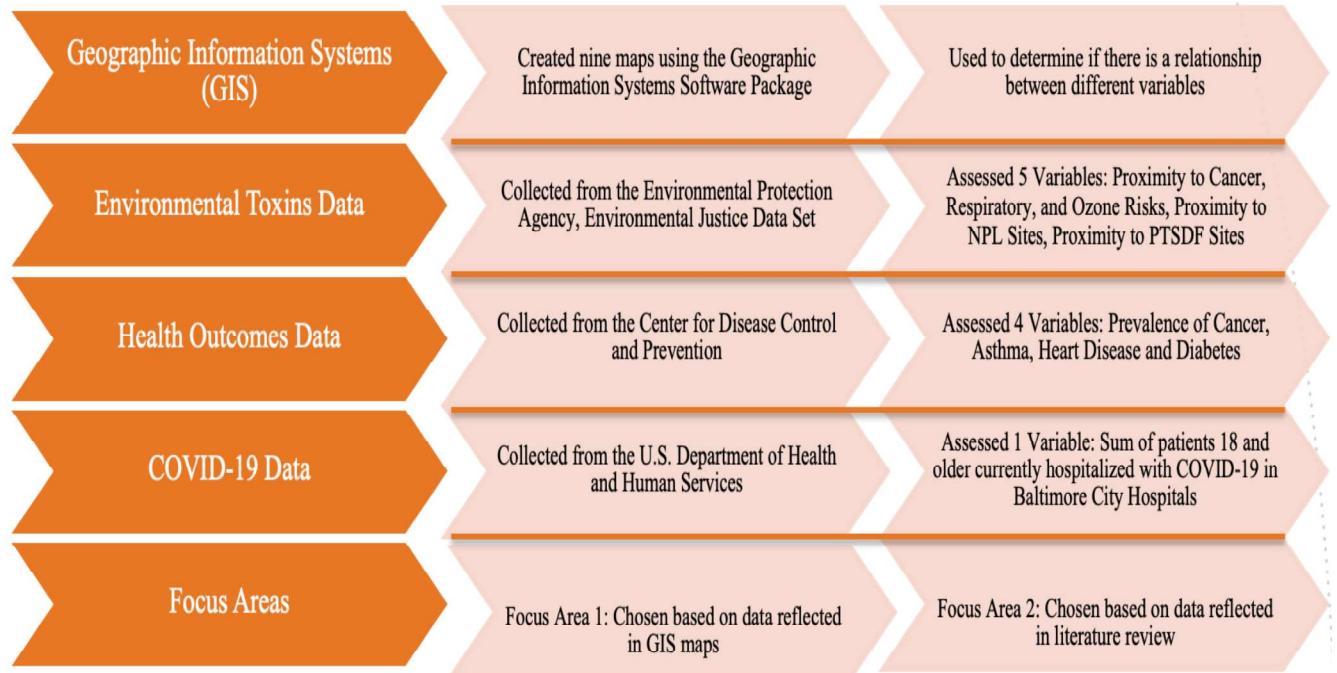
Health Outcome Indicators

The data for the health variables were collected from the United States Center for Disease Control and Prevention's PLACES program on February 17th, 2022. The data was compiled by a research initiative of CDC and Robert Wood Johnson Foundation. There 67 variables at the census tract level data on health outcomes for selected places in the United States. Of these variables, I selected the health outcomes that were most closely linked to environmental hazards. From my previous research I learned that those who live near environmental toxins are more likely to have asthma, diabetes, heart disease, and develop cancer. Thus, these are the variables that I chose for my project. The explanations and units for each of the variables are shown in the table below (Figure 2).

COVID-19 Indicators

The data for the COVID-19 variables was downloaded from The U.S. Department of Health & Human Services on October 27th, 2021. The dataset provides "facility-level data for hospital utilization aggregated on a weekly basis (Friday to Thursday)" (U.S. Department of Health and Human Services). The data is at the census-tract level and contains 109 variables. Of these variables, I only used one which was the Sum of Adult Hospitalizations shown in the table below (Figure 2).

Figure 2: Methods for Maps Section



*Methods for Maps section: Collection of Data and Choice of Focuses Areas

Data Prep and visualization

After downloading the datasets, I selected the data for Baltimore city and created a new feature class for environmental hazards, health outcomes and COVID-19 hospitalizations. Next, I created map layers for each of the final variables (shown above), imported it to the project geo database, and projected it using the WGS 1984 coordinate system. Finally, I visualized the different variables using Jenks natural breaks classification scheme with 5 classes.

To put my maps together, I added the data to my map and visualized them using the Jenks Natural Breaks classification scheme with 5 classes. Then I outlined an area of interest to

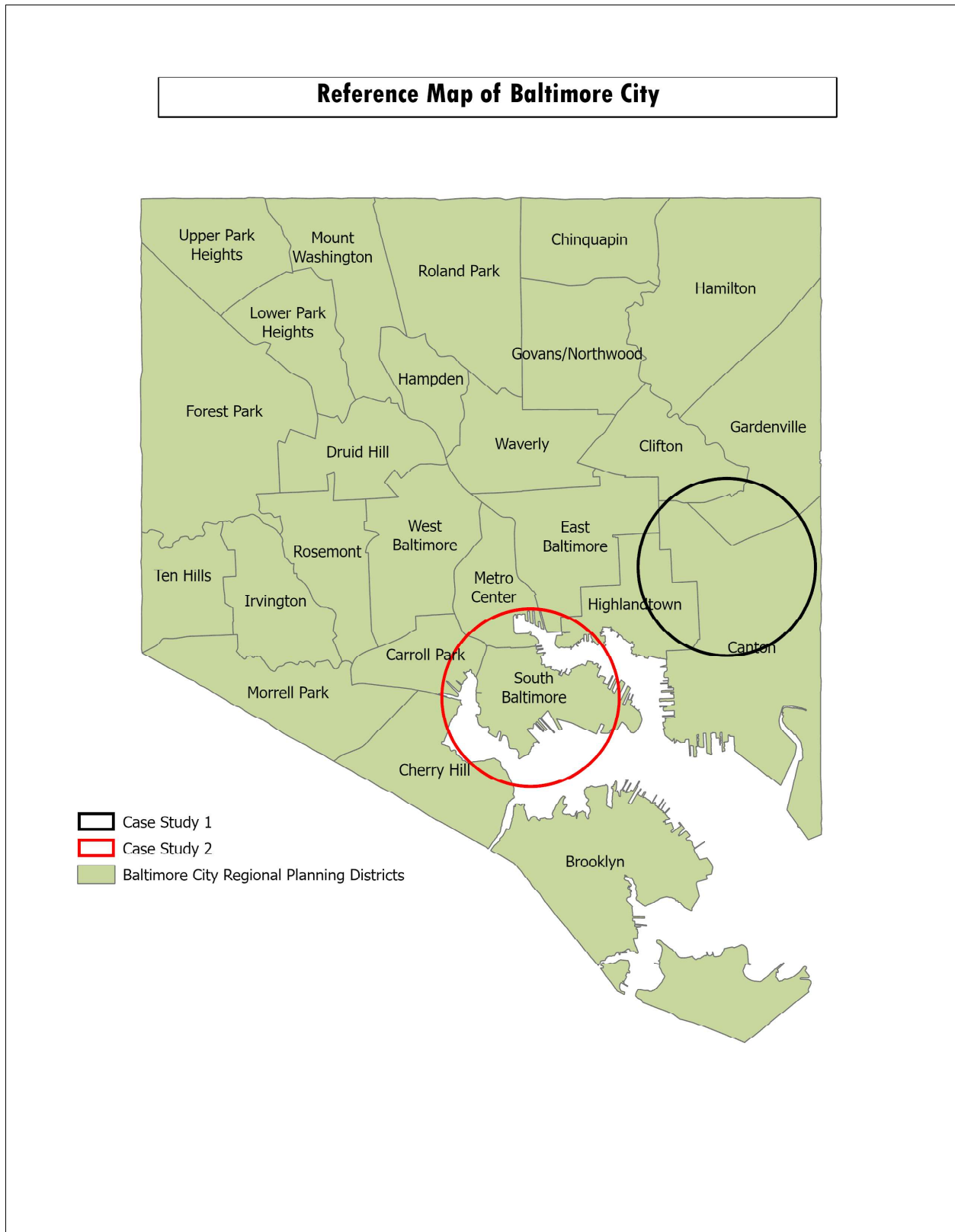
indicate the neighborhoods in Baltimore that consistently showed the highest levels of environmental burden and negative health outcomes.

I inserted the Environmental Justice Screen Data and the CDC data into the map and sorted each of them by the desired variable. Then, I inserted my Area of Interest to bring the map together and the Regional Planning Districts to create labels for each region in the city. I outlined two specific areas of interest South Baltimore and West Baltimore which stood out in the literature and data as having significant environmental and health burdens.

Background: Reference Map of Baltimore City

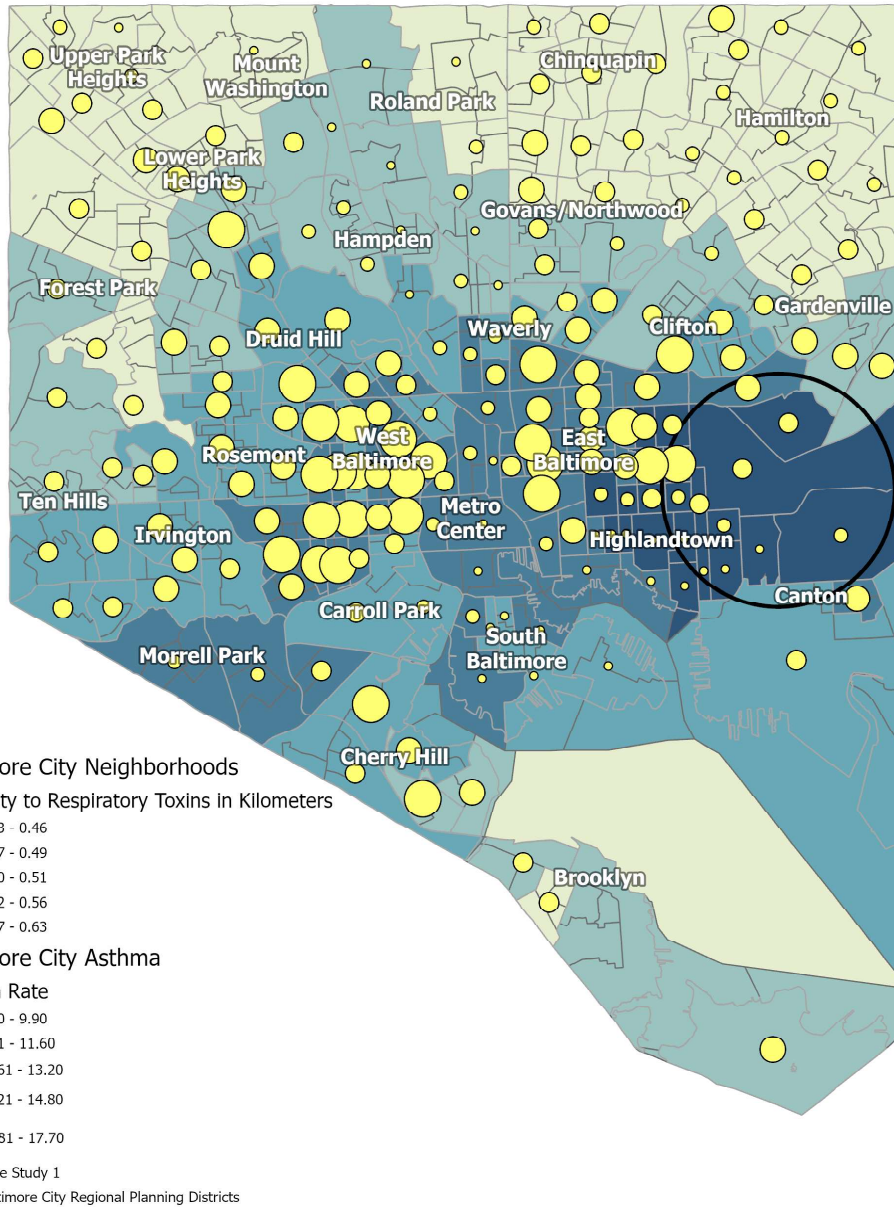
Map 1 is a reference map of Baltimore City. The map highlights the city of Baltimore by Regional Planning Districts created by the Baltimore Metropolitan Council. The two circles on the map represent the Areas of Interest for the purpose of this honors thesis study. The red circle illustrates the original area of interest for the project. After a thorough review of the history and literature reviews of Baltimore City, the area in and around South Baltimore was chosen as my primary Area of Interest based on the proximity and population of toxic factories in the area. However, after making the maps and analyzing the interconnections between toxic pollution and health outcomes, there is a much stronger correlation of these variables in the areas in and around the black circle (Area of Interest 1). After seeing this trend across several maps, I decided to broaden my attention to the Highlandtown area given the striking pattern revealed by the maps. While I recognize that the area of South Baltimore experiences high levels of environmental racism and vile environmental toxins, the area around East Baltimore and Highlandtown have the highest rates of environmental pollution and health issues. This is most likely due to the Curtis Bay Medical Waste Facility in the area that burns medical waste, releasing chemicals toxins into the air such as lead, mercury, and dioxins. While there have not been many studies on the intersection of environmental toxins and health outcomes in East Baltimore, this data presents a clear need for further research that includes more analysis on the health and environmental impacts of the waste facility in this area. Overall, this map can be used as a helpful resource and base map for analysis and understanding

Map 1: Reference Map of Baltimore City

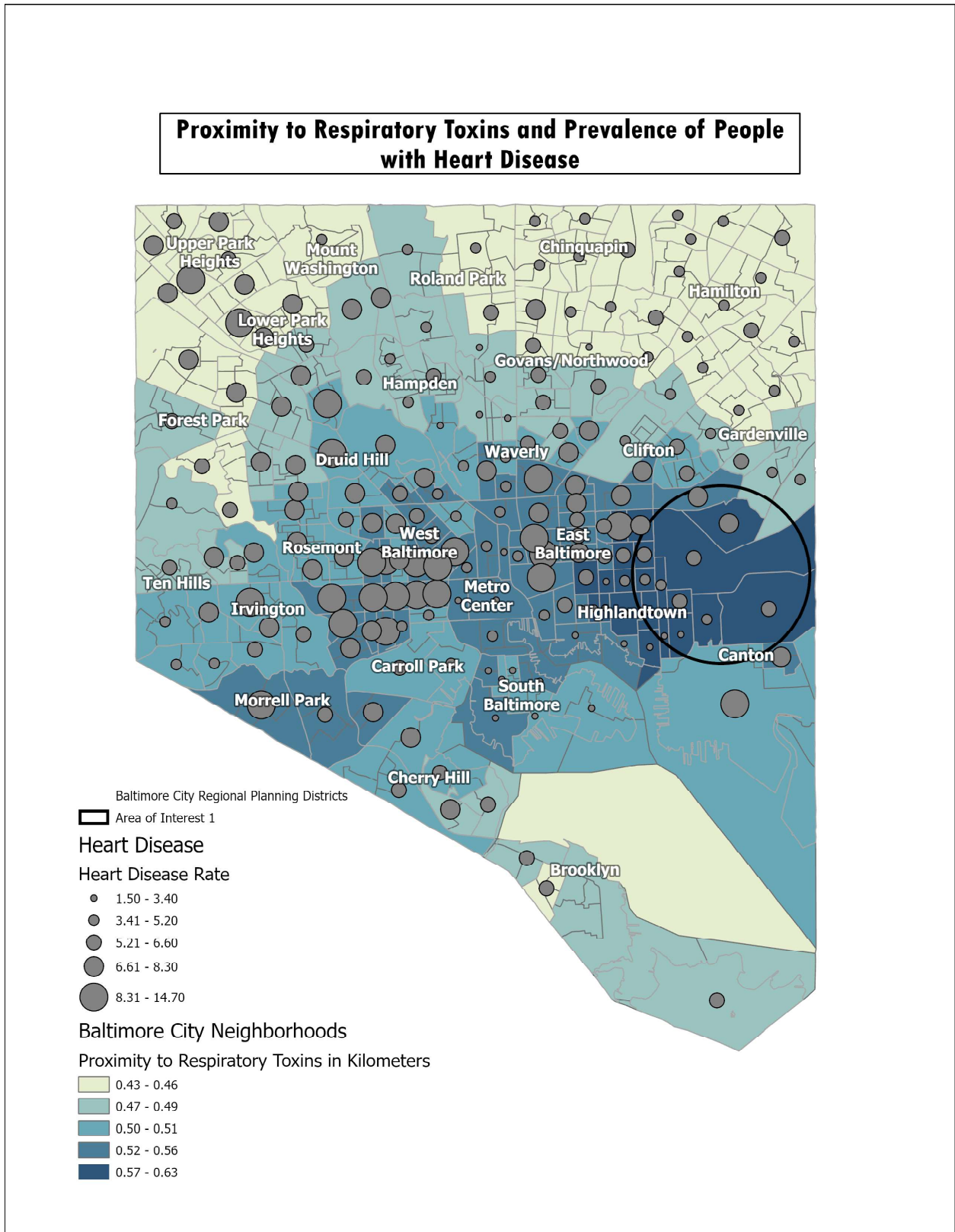


Map 2: Proximity to Respiratory Toxins and Prevalence of People with Asthma

Proximity to Respiratory Toxins and Prevalence of People with Asthma

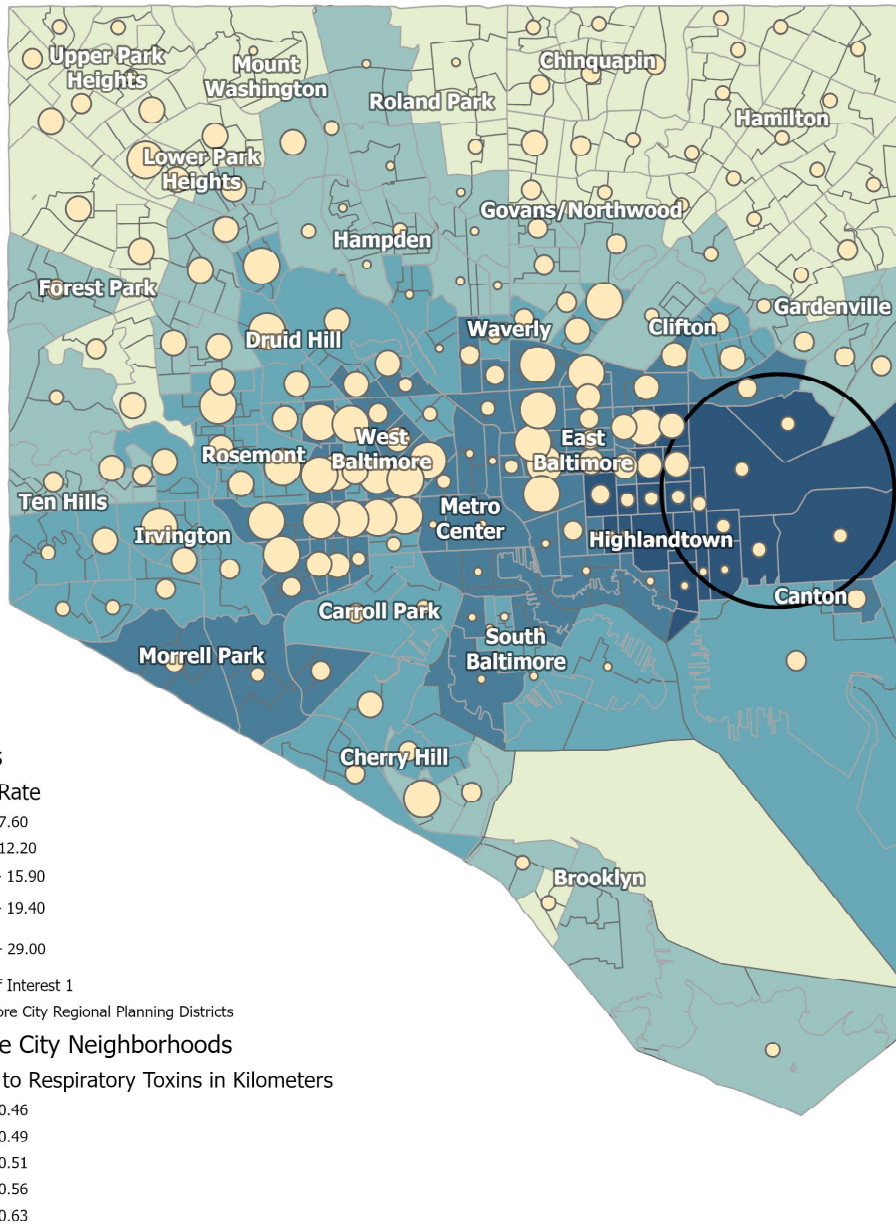


Map 3: Proximity to Respiratory Toxins and Prevalence of People with Heart Disease

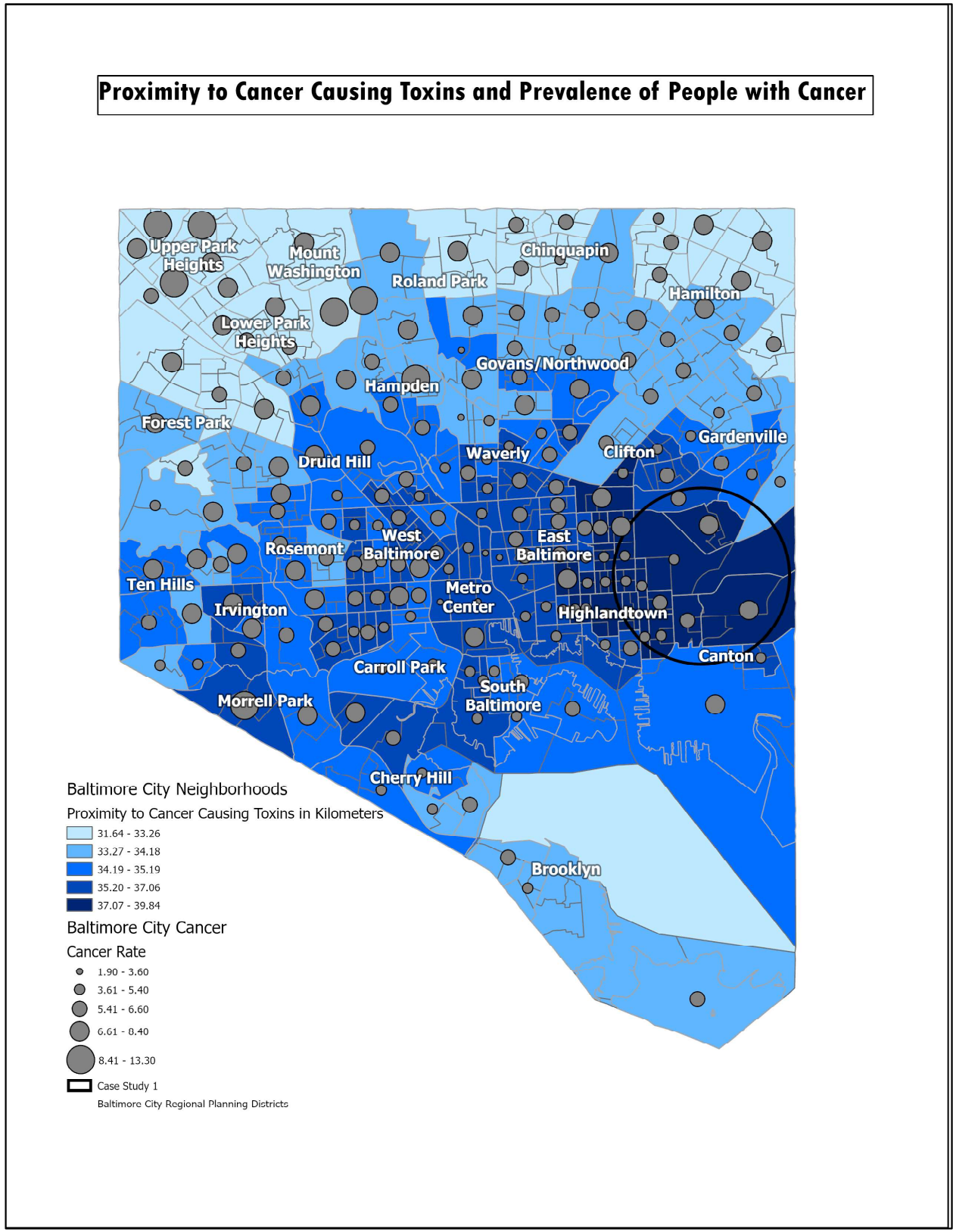


Map 4: Proximity to Respiratory Toxins and Prevalence of People with Diabetes

Proximity to Respiratory Toxins and Prevalence of People with Diabetes

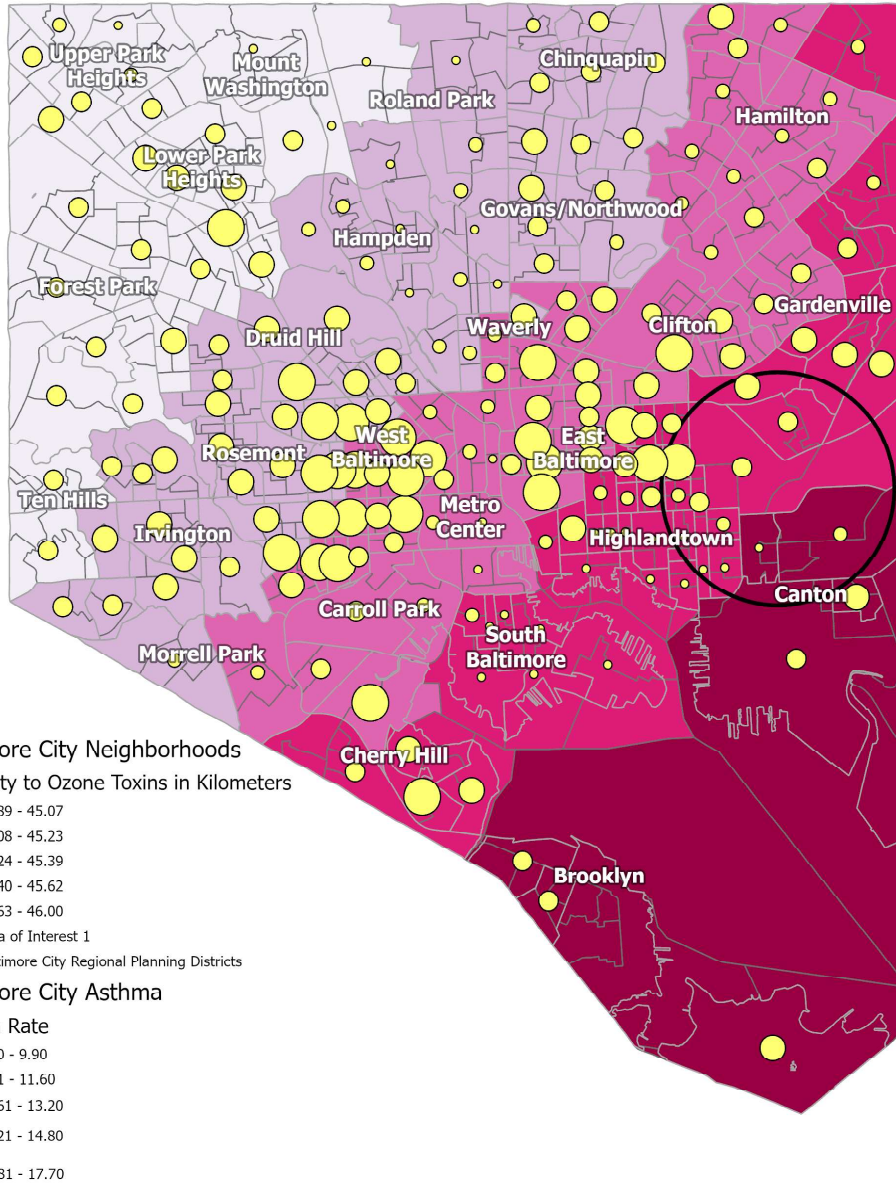


Map 5: Proximity to Cancer-Causing Toxins and Prevalence of People with Cancer



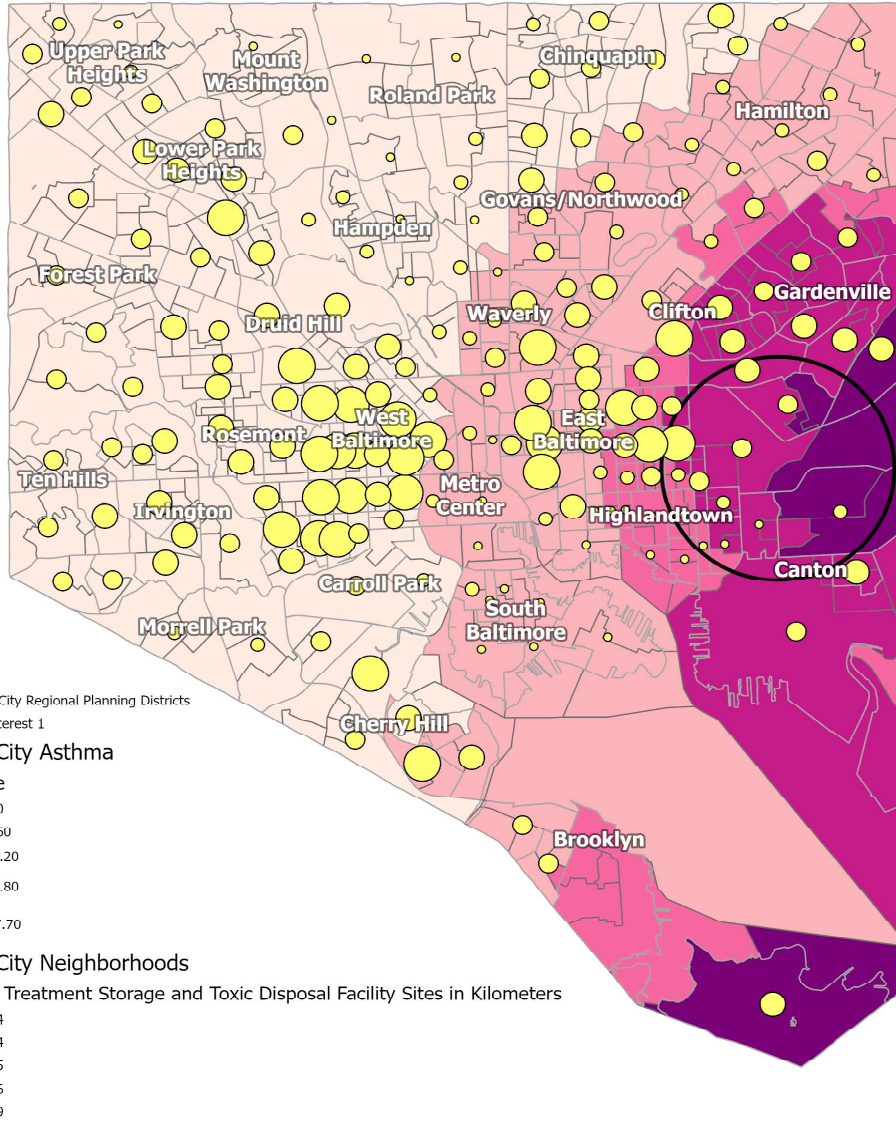
Map 6: Proximity to Ozone Toxins and Prevalence of People with Asthma

Proximity to Ozone Toxins and Prevalence of People with Asthma

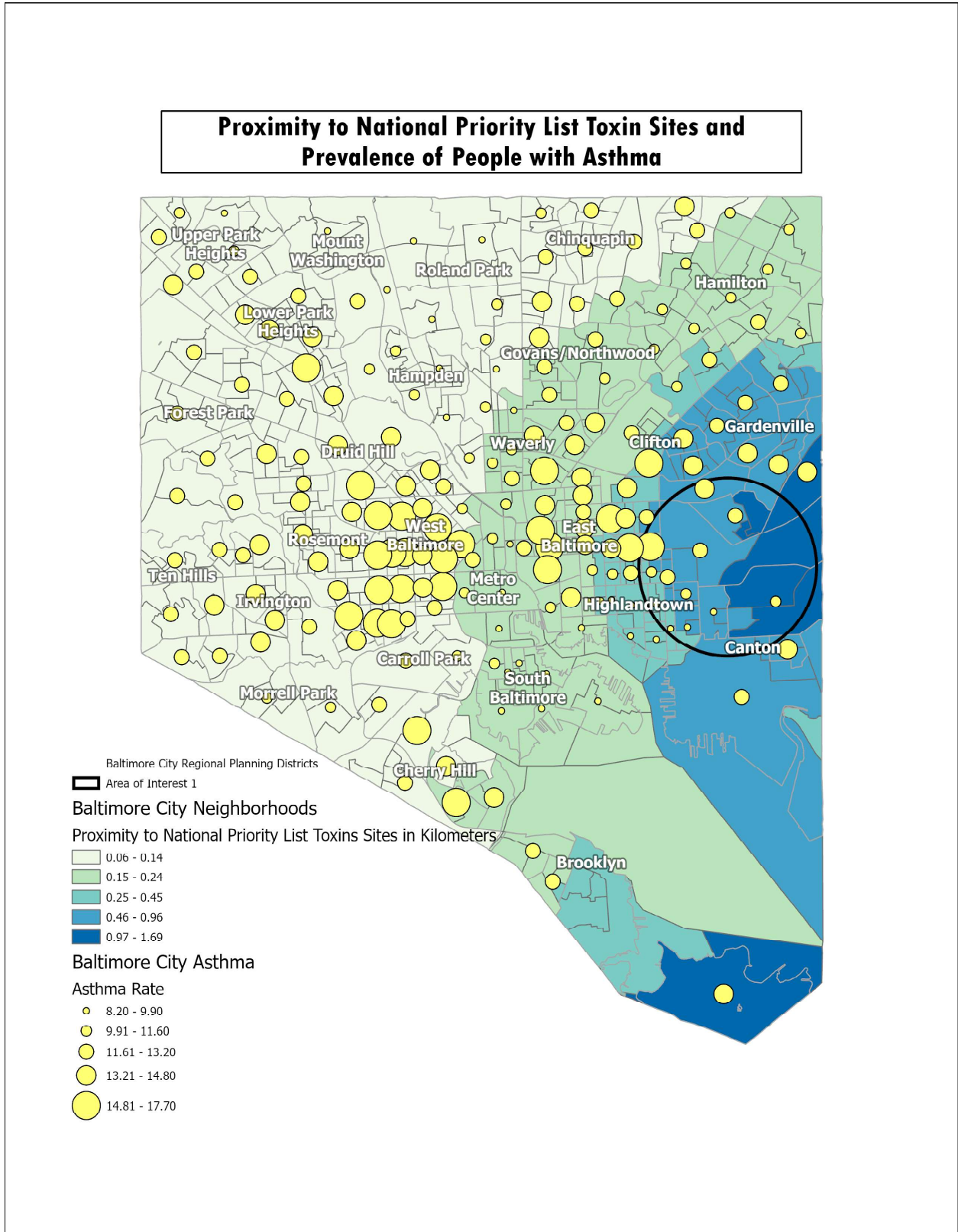


Map 7: Proximity to Treatment Storage and Toxic Disposal Facility Sites and Prevalence of People with Asthma

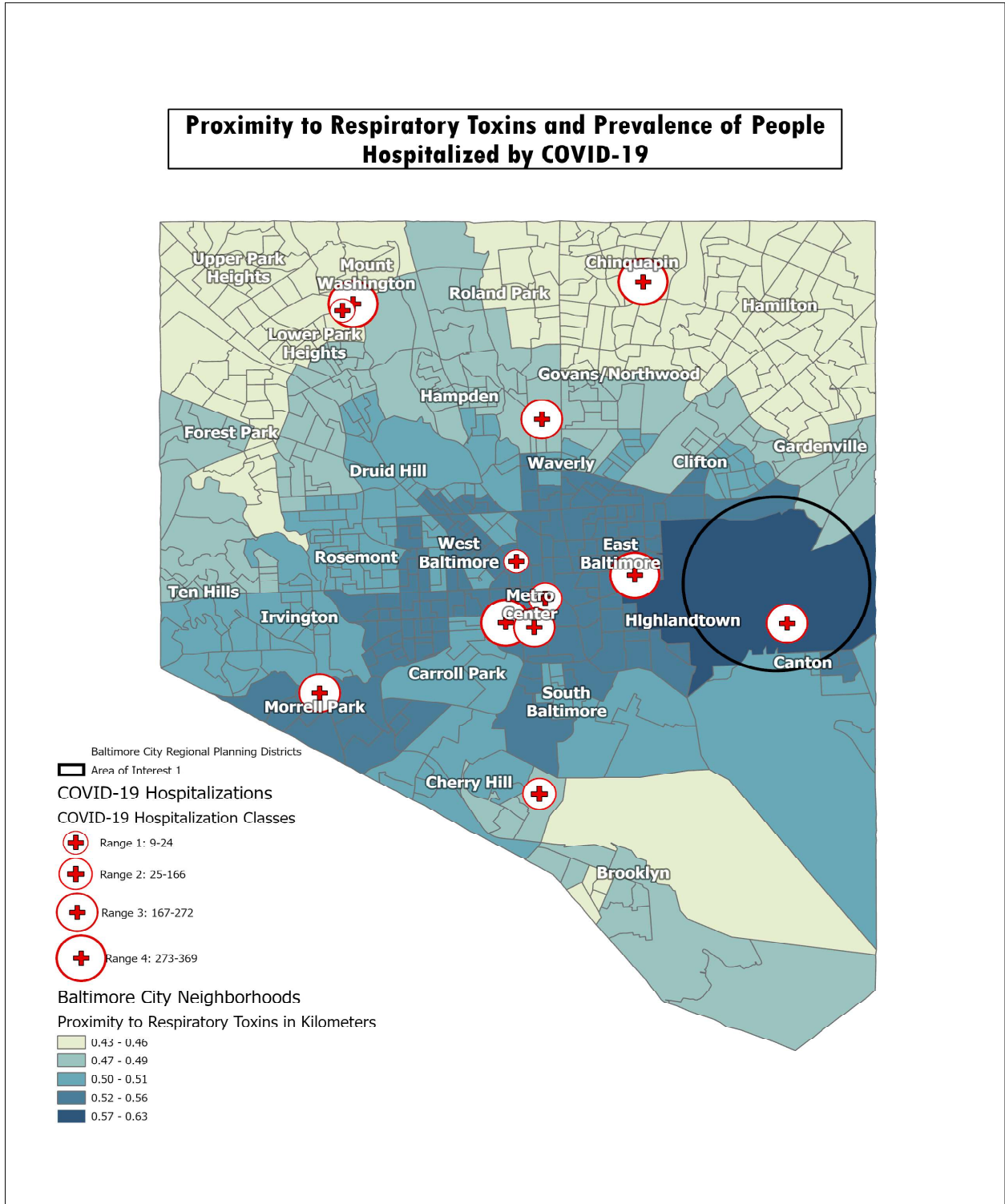
Proximity to Treatment Storage and Toxic Disposal Facility Sites and Prevalence of People with Asthma



Map 8: Proximity to National Priority List Sites and Prevalence of People with Asthma



Map 9: Proximity to Respiratory Toxins and Prevalence of People Hospitalized by COVID-19



Map Conclusions:

Overall, these maps both supported and challenged my original thesis about the intersections between proximity to environmental toxins and health outcomes. On several of the maps, there was confirmation of the relationship between proximity to environmental toxins and higher rates of asthma. However, in some of the more specific Maps such as proximity to respiratory toxins and heart disease, diabetes, and cancer, there was less of a correlation. I hypothesize that part of this discrepancy lies in the differences in medical care available to different populations. As discussed earlier in this paper, minority populations have not always had access to or felt comfortable seeking out medical assistance. It would be interesting to conduct further research to understand what percentage of people within these neighborhoods regularly attend medical appointments. I wonder if many of the people who live in these neighborhoods have not actually been tested for these diseases, and thus they are not being recorded. In some ways, this may be skewing the data, but it provides opportunities for future research to innovatively contextualize public health policy on a smaller scale that can be more responsive to individual and neighborhood needs. If we can redirect our focus to smaller scale sections such as looking at neighborhoods and their needs, we can better support the public, especially those populations who are already vulnerable.

By analyzing environmental toxins and intersecting them with health outcomes, I hoped to push the boundary of our current understanding of public health and open doorways to further opportunities for the expansion and inclusion of vulnerable populations in public health policy. There are clear indications that populations impacted by environmental toxins suffer in terms of health, socioeconomic status, and in life-expectancy. But when combined with a global pandemic, how did these populations fare? Were they at a greater disadvantage because of their

previous health conditions and previous years of exposure to harmful respiratory toxins? While there is not yet extensive COVID-19 data available, I used data from the United States Department of Health and Human Services that represented hospitals and the number of adult patients hospitalized for confirmed COVID-19. It is important to note that I cannot draw connections between the number of COVID hospitalizations in each hospital and the environmental conditions in the neighborhood because the people hospitalized in a specific hospital were not necessarily from the area surrounding that hospital. However, this map helps to create preliminary understandings between number of people hospitalized in an area and the surrounding environmental toxins. Thus, Map 9 reflects the respiratory toxins in the air and the number of hospitalized cases of COVID-19 during the week of January 8th to January 14th, 2021. This week was chosen because it was one of the highest weeks of COVID-19 positives in the state of Maryland. I wanted to choose a week in which there was a high rate of positive cases to see if that correlated with a high rate of hospitalizations within the city. However, there is not very many data that is readily available at the city or neighborhood level in Baltimore, Maryland. Nevertheless, the data necessitated a map that showed the populations of those hospitalized intersecting with the percent of respiratory toxins in the air to look for overlaps. As mentioned earlier, after conducting this research, more research must be done to elaborate on this relationship. Although I cannot draw a connection between environmental burdens and COVID hospitalizations, it is worthwhile to show the volume of patients hospitalized in Baltimore City hospitals at the height of the pandemic and contemplate what patterns we might see if we were able to get Census tract level data on persons hospitalized for COVID. Overall, those who experience higher rates of environmental toxins are vulnerable populations, and we must shape our public health policies around understanding and addressing these vulnerabilities.

Conclusion

Environmental racism is a critical issue that plagues many cities in the United States today. The populations that experience environmental racism, are primarily Black, and are much more likely to develop significant health issues including but not limited to heart disease, asthma, diabetes, and various forms of cancer. My research goal was to study environmental toxins at the scale of minority neighborhoods and demonstrate the relationship between such toxins and corresponding health outcomes in Baltimore City, Maryland. This research uncovered significant gaps in our knowledge at the neighborhood level and such lack of data contributes to further systematic racism. By examining areas previously ignored at a neighborhood level, we can create more inclusive public health policy and targeted urban planning. Through racial and geographical analyses, this research uncovered such vulnerable areas and indicates the need for further study.

Prompted by a desire to investigate public health policy, I was drawn to investigate the relationship between exposure to environmental toxins and death by COVID-19. While environmental racism was a well-known issue in Baltimore City, the pandemic highlighted the extreme vulnerabilities of Black and Brown communities. I would like to emphasize once again, that the pandemic did not create further economic or social gaps between Black and white communities. Instead, the pandemic ripped apart our societies, exposing the years of prejudice and racism towards Black communities that have left them more vulnerable to instances such as a global pandemic. In the United States as a whole, “Black people have died at 1.4 times the rate of white people” (The COVID Tracking Project, 2021). This statistic highlights the public health and medical inequalities between races in the United States. COVID-19 is horrible, but there are

disparate impacts on the way that it affects different peoples and communities. Maryland was no exception to this discrepancy. In April of 2020, Maryland releases a racial breakdown of coronavirus cases in the state. At that time, while only making up 29.5% of the population, 40% of the coronavirus deaths were African Americans (Miller, 2020). These statistics highlights the years of inequalities between Black and white populations.

As explored in the introduction, Baltimore has experienced systematic racism since the start of its economy in the 1800s. When Baltimore became colonized, it was used as a place for importing and exporting goods in which slaves were forced to work in the shipping docks. Later with the abolishment of slavery, red-lining laws were enacted to maintain separations between Black and white population. These laws lowered the property-value in Black neighborhoods and prevented black people from moving into the suburbs, forcing them to live in the city with higher property taxes. The combination of these factors made it more difficult for Black people to experience socio-economic growth.

Even further, the continuation of structural racism allows for environmental racism. When white policies define Black populations as disposable and invisible, they pave the way for environmental toxins to be poured into Black water supplies and for pollutants to infiltrate the air of Black neighborhoods. Environmental racism therefore is inherently a form of slow racism. Black populations that experience toxins over time slowly suffer from the impacts of their living conditions. Furthermore, the prolonged exposure to these toxins can create health problems for the people that live in these neighborhoods. Even before COVID-19, Black Americans experienced higher rates of sickness and death. These different forms of racisms build together to

create an epidemic of sickness and high death rates for black communities, specifically in neighborhoods that have been targeted by environmental racism. Thus, I wanted to intersect and examine environmental racism, health outcomes, and deaths by COVID-19 to understand the relationships between these three realms.

To build a strong understanding, I first grounded myself in the scholarly research on environmental racism, racial capitalism, and health disparities. To begin, I explored the different realms of environmental racism such as indigenous, international, urban, and rural environmental racism. While these communities each experienced environmental racism in different ways they all experienced the common denominator of being viewed as disposable. This mindset creates a hierarchy between different peoples. By analyzing whiteness, we can understand that there is an “other”, or groups that are lesser than in our society (Pulido, 2000). This leads into the other geographical concept I discussed earlier of racial capitalism which explores that capitalism is inherently racism, benefitting off the backs of minority populations (Gilmore, 2002). Similarly, this research illustrates that slow violence continues the pattern of silencing socially less powerful voices (Davies, 2019). The gaps in the data for these minority neighborhoods demonstrates the impact that such silencing can have on already vulnerable populations.

Ultimately, these various types of racism create health disparities between Black and white populations. As Black Americans are continuously oppressed in various realms this leads to health outcomes as well. In the United States, Black people are more likely to suffer from chronic health conditions. This is a result of several factors, including but not limited to increased exposure to environmental toxins. Thus, I wanted to create a visual understanding to

illustrate the various forms of oppression towards Black people that result in the environmental racism and unequal health outcomes present today.

By using the software package of Geographic Information Systems from ESRI, I was able to create nine different maps that illustrated different relationships between proximity to environmental toxins and prevalence of health outcomes. I also wanted to focus on creating maps that illustrated these variables at small scales to develop further analysis of the impact of environmental racism on different neighborhoods and communities. While I was not able to find substantive data at the neighborhood level, I was able to break it down to the census tract level.

In the map section, the most interesting analysis, was not in what I found, but what I didn't find. After conducting significant research on primary areas of environmental racism in Baltimore City, I chose to create an Area of Interest in the areas surrounding South Baltimore and West Baltimore. However, when I created my maps and then inserted my Area of Interest, the relationship between proximity to environmental toxins and prevalence of health outcomes in those areas were quite low. This was a surprising finding because it contradicted the previous literature I had encountered on prominent areas of environmental racism in Baltimore. Instead, the areas that illustrated the highest level of proximity to environmental toxins and a high prevalence of health outcomes was in Highlandtown and East Baltimore. Thus, it is critical to conduct further research on these areas to gain greater insights into their concerning levels of proximity to environmental toxins and high prevalence of health outcomes. If we can change our focus to smaller scale sections such as looking at neighborhoods and their needs, we can better support the public, especially those populations who are already vulnerable.

In the United States, racism has shaped our country since the beginning of its creation. This racism has continued to thrive through history and has evolved into structural violence, racial capitalism, slow violence, and most importantly for this honors thesis, environmental racism. The environmental racism in Baltimore City further exacerbates burdens on minority populations and makes them more vulnerable. The COVID-19 pandemic called attention to these vulnerabilities and highlighted those changes must be made. The future of these populations lies not only in battling structural violence but, in creating public health policies that are more inclusive and supportive of minority and vulnerable communities. While the themes of environmental toxins and public health are both important in examining these communities these are **not** independent entities. The intersection of these themes is what creates issues for communities. We **must** conduct further research understanding the intersection between these two realms at the neighborhood and even block-level scales. It is also crucial to examine COVID-19 data at these levels of aggregation. Even though I'm studying these neighborhoods in Baltimore City, this kind of study is applicable to larger systematic issues and gaps of knowledge in cities across the United States such as Phoenix, Philadelphia, or Los Angeles. By studying these things at the level that I am advocating, we can make more inclusive public policy decisions to better support vulnerable and minority populations.

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