SOUTHFIELD

VULNERABILITY ASSESSMENT

JULY 2025

Photo Credit: City of Southfield

Acknowledgements

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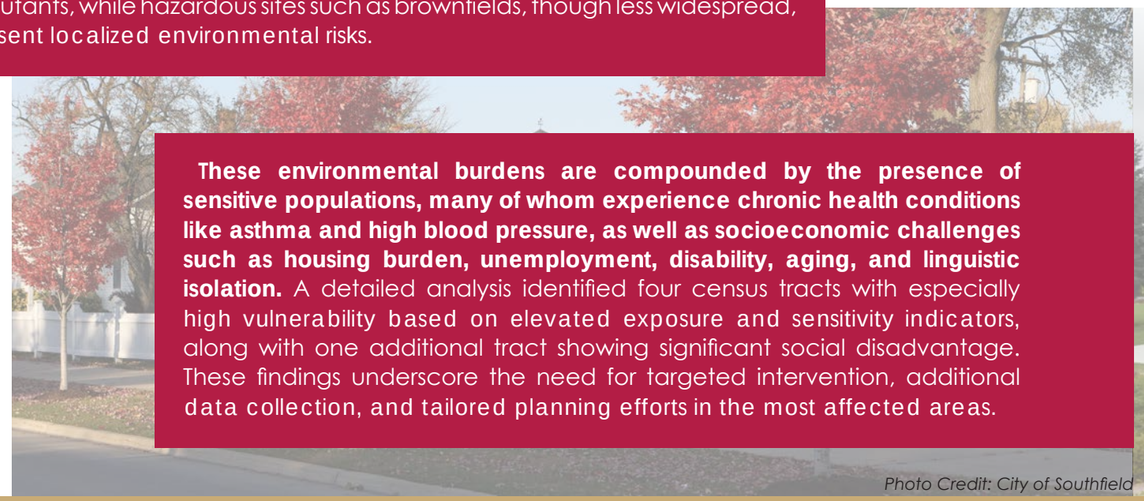
EXECUTIVE SUMMARY

The City of Southfield, Michigan, has actively pursued sustainability through the *Sustainable Southfield Initiative*, but significant environmental and health-related vulnerabilities persist for many of its communities. This report provides a high-level assessment of these vulnerabilities to inform future planning, environmental justice, and sustainability initiatives.

Photo Credit: City of Southfield

Using state and national screening tools (MiEJScreen and the U.S. Climate Vulnerability Index), alongside demographic data from SEMCOG, this study analyzed around 40 indicators of environmental exposure and community sensitivity. Findings show that Southfield's vulnerability stems primarily from **air pollution**, **heavy traffic density**, **health risks,** and **socio-economic factors that limit residents' capacity to adapt and recover from hazards**.

Southfield faces significant environmental and social vulnerabilities that affect the health and well-being of its residents. **Nearly all census tracts show high levels of exposure to PM 2.5, hazardous air pollutants (HAPs), and traffic-related emissions, which pose serious risks to respiratory, cardiovascular, and developmental health.** The city's proximity to major roads and highways further increases exposure to noise, vibration, and pollutants, while hazardous sites such as brownfields, though less widespread, present localized environmental risks.



These environmental burdens are compounded by the presence of sensitive populations, many of whom experience chronic health conditions like asthma and high blood pressure, as well as socioeconomic challenges such as housing burden, unemployment, disability, aging, and linguistic isolation. A detailed analysis identified four census tracts with especially high vulnerability based on elevated exposure and sensitivity indicators, along with one additional tract showing significant social disadvantage. These findings underscore the need for targeted intervention, additional data collection, and tailored planning efforts in the most affected areas.

Photo Credit: City of Southfield

Photo Credit: City of Southfield

RECOMMENDATIONS FOR SOUTHFIELD

Investigate Air Quality: Conduct local air quality risk assessments and explore the feasibility of installing air monitoring stations to gather more precise data

Assess Traffic Impacts: Carry out traffic studies to understand the effects of traffic density on residents' health and mobility.

Prioritize Community Health: Adopt a Health in All Policies (HiAP) framework to integrate health equity into city decisions, with tailored outreach for Southfield's diverse population.

Expand Vulnerability Studies: Conduct an adaptive capacity study, climate change vulnerability assessment, and complete the city's Sustainable Action Plan (SAP) to guide holistic resilience planning.

Engage Communities: Use community asset mapping and robust public participation to ensure that planning efforts reflect residents' needs and strengths.

Photo Credit: City of Southfield

INTRODUCTION

Southfield, Michigan has been making strides to address sustainability in its communities. From enhancing pedestrian safety through placemaking to telling stories using public art, the city of Southfield has worked to embody the *Sustainable Southfield Initiative*. Like all cities, however, residents in Southfield face unique risks and circumstances that make them vulnerable to pollutant exposure, serious health conditions, and other risks. This vulnerability assessment aims to identify the specific environmental hazards affecting Southfield's communities and the population characteristics that heighten their susceptibility to these risks. This report will synthesize its findings to identify areas of concentrated vulnerability and conclude with recommendations as to how the city canr serve its vulnerable populations.

WHAT IS THIS REPORT?

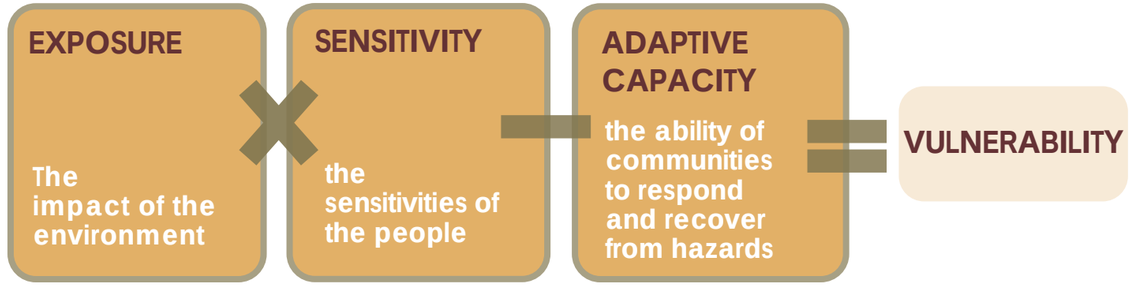
This report aims to assess the vulnerability of communities throughout Southfield in order to inform sustainability and environmental justice initiatives pursued by the planning department. **Environmental justice**, as defined by the state of Michigan, refers to ..the equitable treatment and meaningful involvement of all people, regardless of race, color, national origin, ability, or income, and is critical to the development and application of laws, regulation, and policies that affect the environment."[1] **Vulnerability**, as defined by the World Health Organization, refers to "the conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of an individual, a community, assets, or systems to the impacts of hazards."[2] Vulnerability is shaped by historical, cultural, political, institutional, and natural resource processes, and includes conditions such as "...living in disaster-prone areas or poor housing, ill-health, political tensions, or a lack of local institutions or preparedness measures."[2]

Photo Credit: City of Southfield

For city officials in Southfield, this vulnerability assessment will:

- Provide a high-level understanding of environmental hazards that may be present in the city
- Contribute to a holistic understanding of Southfield communities and the risks they may face
- Identify connections within existing data and highlight gaps where more information is needed
- Outline practical next steps the city can take to better address community vulnerabilities

UNDERSTANDING VULNERABILITY



Vulnerability is a function of sensitivity, exposure, and adaptive capacity data. **Sensitivity** refers to the physiological, socio-economic, and community design factors that increase susceptibility to hazards.[3] **Exposure** refers to how much or how little individuals, communities, and populations experience a certain hazard.[3] In short, sensitivity measures the way people are impacted by hazards, while exposure measures how the environment impacts people. **Adaptive capacity** is an evaluation of the ability to adjust, limit and cope with potential hazards or exposures.[3] It measures the way a community or system can respond and recover from hazards. Although adaptive capacity was beyond the scope of this assessment, it remains a key recommendation and is essential for a complete understanding of Southfield's vulnerability.

METHODOLOGY

This report uses data from **environmental justice screening tools**, which are geographic information system (GIS) tools that identify communities who may be disproportionately impacted by environmental hazards.[1] These tools utilize raw data to generate percentiles of exposure and sensitivity risk, providing high-level proxies of these variables. They are a useful first step in identifying communities that may be impacted by environmental hazards, but cannot determine the presence or absence of environmental justice concerns. Data from these tools can be used to inform future research and planning, target resources (such as distribution of funding or services), and foster discussion.

The two screening tools utilized for this report are **MiEJScreen**, developed and maintained by the Department of Environment, Great Lakes, and Energy (EGLE), and the **U.S. Climate Vulnerability Index (CVI)**, developed and maintained by the Environmental Defense Fund, Texas A&M University, and Darkhorse Analytics.

In addition to the screening tools, this report utilizes demographic data from the **Southeast Michigan Council of Governments (SEMCOG)**, a nonprofit organization of governments that supports regional planning through its technical, data, and intergovernmental resources. SEMCOG sources much of its demographic data from the American Census Survey (ACS), operated by the Census Bureau.

MiEJScreen

MiEJScreen is an environmental justice screening tool designed by EGLE to "...examine and map environmental, health, and socioeconomic indicators to identify communities in Michigan that may be disproportionately affected by environmental hazards."

The tool allows for comparison of exposure and sensitivity data across census tracts, counties, and regions in Michigan. Each indicator identified within the exposure and sensitivity categories is assigned a percentile based on a ranking of raw values or percentages from every census tract in the state compared to one another. MiEJScreen is the primary source of data for this report, as the percentiles calculated for the tool are determined at the state level, and are therefore specific to Michigan.

Climate Vulnerability Index (CVI)

The Climate Vulnerability Index is a climate vulnerability screening tool, which focuses on "... visual[izing] how drivers of cumulative vulnerability disadvantage communities across the United States."[4] It seeks to provide a better understanding "...of the intersections between growing climate risks and pre-existing, long-term health, social, environmental, and economic conditions."[4]

The CVI functions similarly to MiEJScreen by providing percentile rankings of vulnerability for specific indicators of sensitivity and exposure. It also measures various risks related to climate change, which were not included in the scope of this report. The percentile rankings in this report were determined at the national level, making them less specific to Michigan. CVI data was used as a supplement to MiEjScreen, providing additional data whenever relevant.

SEMCOG Tools

This report utilizes demographic Wdata from two tools developed by SEMCOG: Demographic Emphasis Areas and Community profiles. Both tools use data from the American Community Survey, operated by the Census Bureau.

Demographic Emphasis Areas

The Demographic Emphasis Areas is an interactive tool that provides demographic information across seven counties in Southeast Michigan. The tool compiles important demographic indicators of vulnerability such as disability, minority population, and poverty level. It is a data source from which communities, government actors, and other stakeholders can easily access important socioeconomic information to assist in effective planning.

Community Profiles

The SEMCOG Community Profiles are detailed reports of demographic data and analysis spanning across Southeast Michigan. They cover a range of topics, including basic demographic information, economy and jobs, housing, transportation, environmental and land use.

High-Level Vulnerability: within the 80-99th percentile
Mid-Level Vulnerability: within the 75-80th percentile
Low-Level Vulnerability: under the 75th percentile

DATA SYNTHESIZATION

This report analyzes data across 39 separate indicators of exposure and sensitivity. In an effort to condense this data for better clarity and understanding, indicator percentiles were sorted into three categories of vulnerability: **high-level, mid-level, and low-level vulnerability**. High-level vulnerability refers to percentile scores between 80-100, mid-level vulnerability refers to percentile scores between 75-79, and low-level vulnerability refers to percentile scores under 75.

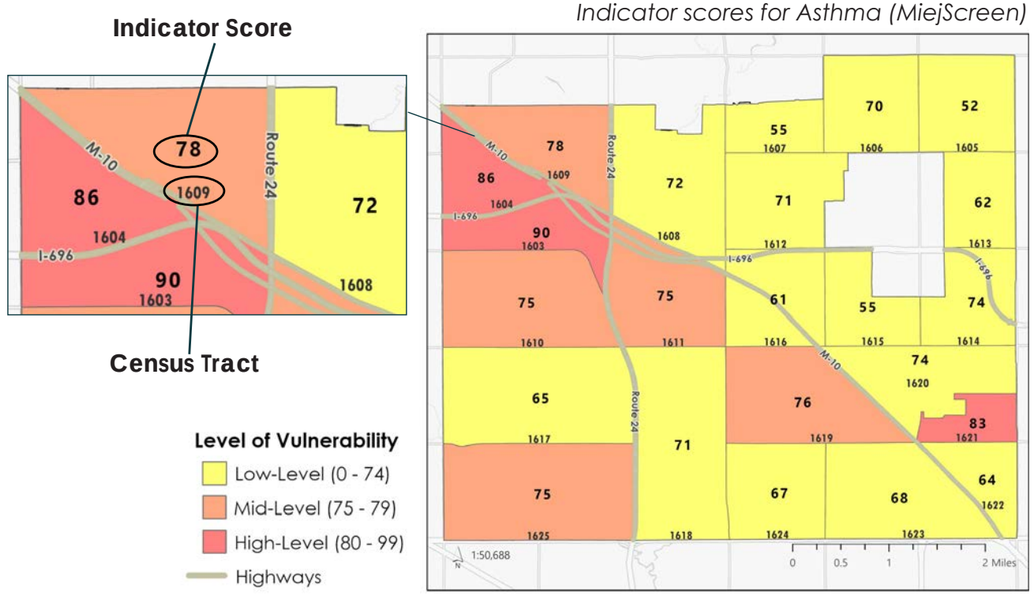
MAP INTERPRETATION

This report relies heavily on the use of maps. Mapping supports data analysis by presenting complex information in a clear, visual format that makes it easier to understand and interpret. Throughout this report, maps are used to visualize exposure and sensitivity data. This section of the report will review the key components of each map.

Indicator Scores: Percentile estimate of exposure or sensitivity data; this is the "rating" of risk.

Census Tract: Unique identification number given to a specific geographic area

Indicator scores for Asthma (MiejScreen)

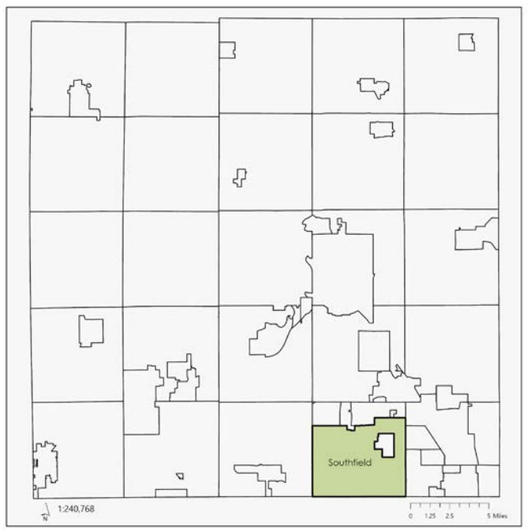


CONTEXT

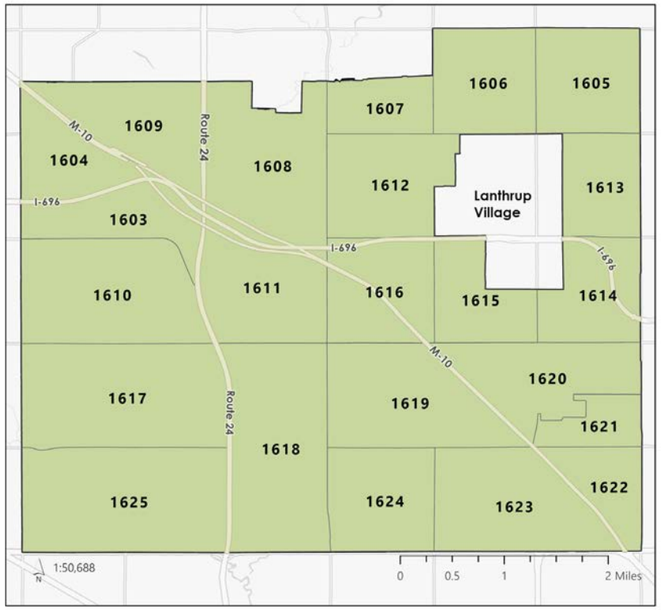
THE CITY OF SOUTHFIELD

The City of Southfield is a 26.6 square mile city in Oakland County, situated in the Metropolitan Detroit area. It sits atop the northern boundary of Wayne County, bordered by the community of Farmington Hills to the east, Beverly Hills and Franklin to the north, and Oak Park and Berkeley to its west.

Lathrup Village is a 1.5 square mile autonomous city that is located within the northeast corner of Southfield, encompassed by the city's borders. Southfield hosts over 800 acres of parkland, a large business district, and seven universities and colleges.



Area map of the City of Southfield in Oakland County



Census Tracts in Southfield, Michigan

Like many cities across Southeast Michigan, Southfield has been shaped by the region's history of highway expansion. Three major highways cut through the city: the I-696 running east-west, U.S. Route 24 running north-south, and M-10 running northwest-southwest. The city is also bordered by four major roads, including Inkster Road to the west, Eight Mile Road to the south, Greenfield Road to the west, and Thirteen Mile Road to the north, though Southfield's northern border does not follow the road exactly. These major roads and highways divide the city, reducing pedestrian access and walkability while contributing to air and noise pollution throughout Southfield.

DEMOGRAPHICS

Southfield has a residential population of 75,699 people, which rises to a daytime population of 175,000. The average household size is 2.14, with the most common household type being two or more individuals with no children. There are a total of 35,000 occupied housing units in the city. The median age is 47 years old, with about 19% of the population being under the age of 18, and 21% of the population being over the age of 65. The median household income in Southfield is $65,497, though income levels range greatly among census tracts.

Photo Credit: City of Southfield

Southfield is home to residents from a wide range of racial, cultural, ethnic and religious backgrounds. It is a Black majority city, with about 64% of the population being African-American. Significant populations of Armenian, Chaldean, Jewish and Russian residents also contribute to Southfield's diversity.

Southfield has twenty-three census tracts, as can be seen in the figure below. Census tracts are created and maintained by the U.S. Census Bureau, and aim to represent between 2,500 and 8,000 residents per tract. In Southfield, census tract populations range between 1,300 and 4,700.

CURRENT EFFORTS

Photo Credit: City of Southfield

The City of Southfield is working to address issues of environmental justice and sustainability through the efforts of their Sustainability Team. This is done through the **Sustainable Southfield Initiative**, which details several areas of focus including trails and parkways, green infrastructure, micromobility, public art and more.

Currently, the city is working on a Sustainability Action Plan (SAP) that will catalog its previous projects and hold the city accountable in implementing its sustainability goals. This plan identifies 10 areas of focus: Mobility, Energy, Materials Management, Technology, Economy, Government, Community, Quality of Life, Environment, and Infrastructure.

EXPOSURE
DATA ANALYSIS

Exposure refers to **how much or little individuals, communities, and populations experience a certain hazard.** In Southfield, exposure is largely a result of air pollutants from traffic on major highways and roads, as well as polluted sites such as brownfields and hazardous waste facilities. Communities in close proximity to areas of high traffic or contamination face recurring exposure to these hazards. Understanding where and why these hazards exist will help the city of Southfield better serve these communities' needs.

Exposure data is divided into two categories: **environmental exposure** and **environmental effects.**

Environmental exposure refers to the **"...interaction of individuals or populations with a substance due to its presence in or movement through the environment (air, water, food, soil)..."**[1] while **environmental effects** refers to **"...adverse environmental factors that may contribute to poor environmental quality."**[1]

Exposure Indicators

NATA Air Toxics Cancer Risk	Proximity to Cleanup Sites
NATA Respiratory Hazard Index	Proximity to Hazardous Waste Facilities
NATA Diesel Particulate Matter	Impaired Water Bodies
Particulate Matter (PM 2.5)	Proximity to Solid Waste Sites and Facilities
Ozone	Lead Paint Indicators
Traffic Density	Proximity to RMP Sites
Vehicles Miles Traveled*	Wastewater Discharge Sites
Vehicle Proximity and Volume*	Proximity to TSCA Facilities*
Noise Pollution*	
Pollutants that Impact Liver Health*	
Pollutants that Impact Developmental Health*	
Pollutants that Impact Reproductive Health*	
Pollutants that Impact Kidney Health*	
Pollutants that Impact Immunological Health*	

**These indicators are sourced from CVI.*

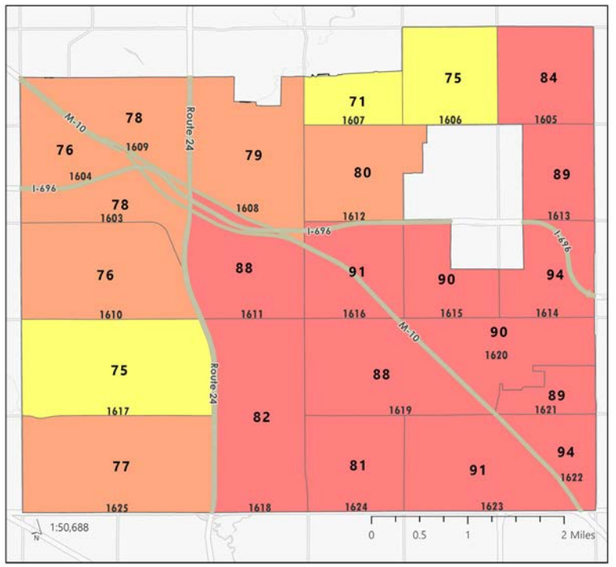
Environmental exposure shows contaminants and toxics commonly associated with air pollution, while environmental effects generally shows proximity to hazardous sites.

The figure below displays all individual indicators that make up these categories. All indicators are sourced from MiEJScreen, unless otherwise marked. See **Table A1** and **A2** for all exposure data indicator scores.

ENVIRONMENTAL EXPOSURE
DATA ANALYSIS

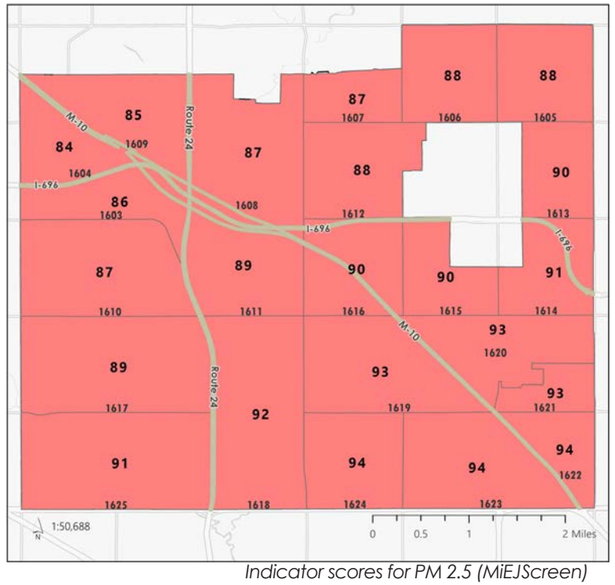
Environmental exposure primarily describes exposure to air pollutants. The map featured on the right shows the composite scores generated for all environmental exposure indicators in Southfield. Composite scores provide a generalized understanding of the level of exposure a community may be facing.

61% of census tracts in Southfield fall into high vulnerability for composite scores of enivronmental exposure, with an additional 35% in mid-level vulnerability. With a majority of the city falling into significant levels of vulnerability, it is highly likely that Southfield is impacted by poor air quality.



Composite Indicator scores for Environmental Exposure (MiEJScreen)

AIR POLLUTANTS



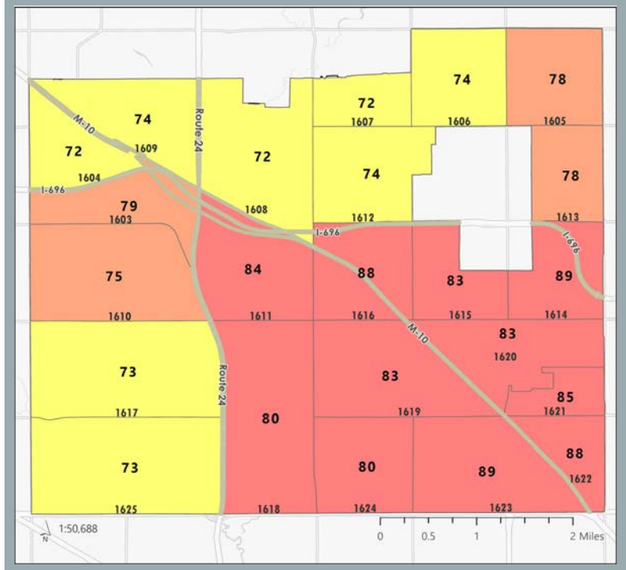
Indicator scores for PM 2.5 (MiEJScreen)

High exposure to air pollutants can result in serious health impacts. Significant numbers of census tracts in Southfield fall into high vulnerability for exposure to a variety of air pollutants.

By far, Southfield residents are most at risk of exposure to PM 2.5. 100% of tracts fall into high vulnerability for exposure to this pollutant. PM 2.5 - particulate matter 2.5 micrometers or less in diameter - can cause short-term irritation to the nose, throat, and lungs, as well as long-term respiratory and cardiovascular issues.

Similarly, a pronounced number of tracts fall into high vulnerability for exposure to hazardous air pollutants (HAPs). The NATA Air Toxics Cancer Risk, NATA Respiratory Hazard Index, and NATA Diesel Particulate Matter

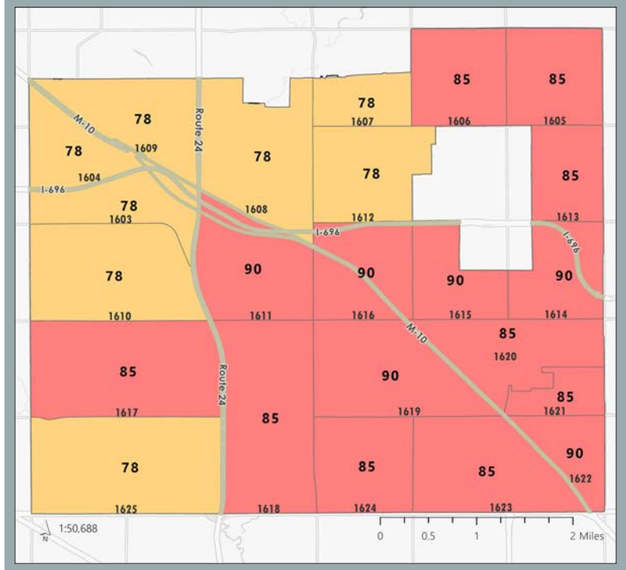
indicators are all measures of HAPs. Statewide, 48% of tracts fall into high vulnerability for cancer risk, 91% fall into high vulnerability for respiratory hazard, and 86% fall into high vulnerability for diesel particulate matter. Exposure to HAPs can increase the risk of developing cancer and other serious health effects such as reproductive, immunological, neurological, developmental, and respiratory health problems. Communities are primarily exposed to HAPs through polluted air, but some toxics can be deposited into soils or surface water, where they may be ingested by animals or taken up by plants and magnified through the food chain. It is particularly hazardous for populations with existing health issues such as asthma, and heart or lung disease, which can be aggravated or even lead to premature death.



Indicator scores for NATA Cancer Risk (MiEJScreen)

HEALTH EFFECTS

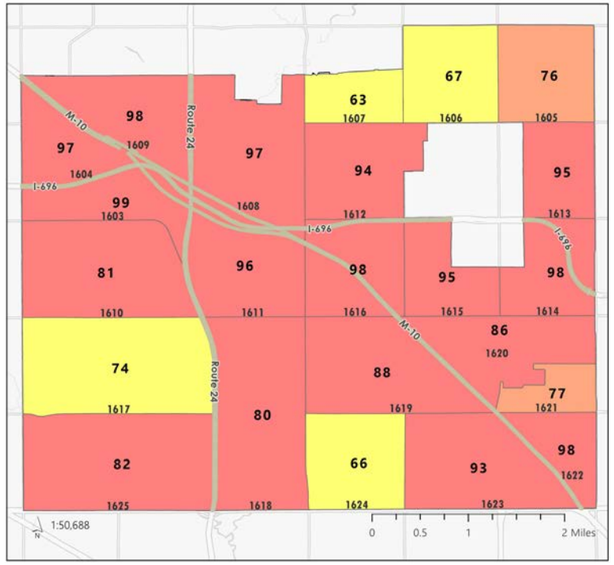
As mentioned previously, exposure to air pollutants can have harmful effects on human health. Specific pollutants can pose elevated risks to various body systems and organs. Tracts in Southfield are in high vulnerability for exposure to pollutants that impact developmental, reproductive, and kidney functions. Compared to the nation, 91% of tracts are in high vulnerability for exposure to pollutants that impact reproductive health and kidney health respectively, and 65% of tracts are in high vulnerability for exposure to pollutants that impact developmental health. Refer to **Table A1** to see all pollutant-related health indicators and their associated scores. Understanding the specific health risks these pollutants can pose will help Southfield shape initiatives and campaigns tailored to alleviate and respond to community health needs.



Indicator scores for Pollutants that Impact Developmental Health (CVI)

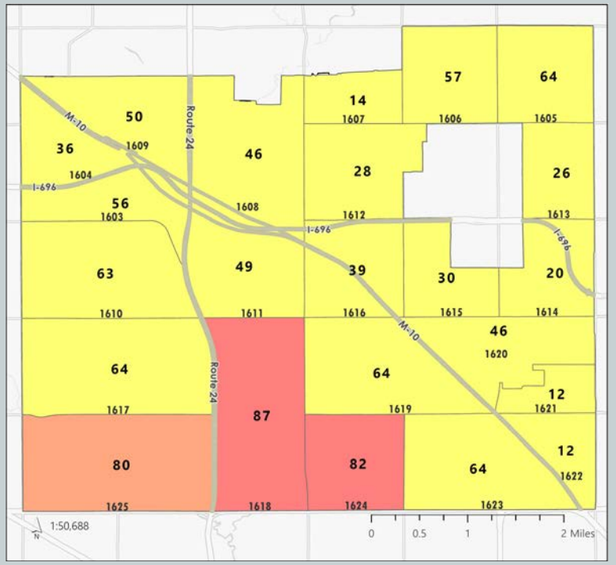
PROXIMITY TO TRAFFIC

Several major highways and roads cut through Southfield, exposing communities to high levels of traffic density, pollution, noise, vibration, and other disturbances that can lead to a lower quality of life. Additionally, the large commuter population - indicated from Southfield's day time population of 175,000, more than double its residential population - suggests that a large volume of cars regularly passes through the city. Relative to Michigan, 70% of all census tracts in Southfield are within high vulnerability for proximity to high levels of traffic density. When compared to the rest of the country, 61% of tracts are within high vulnerability for proximity to large volumes of traffic. While this percentage drops to 56% when compared to the rest of the nation, it shows that over half of census tracts in Southfield could be experiencing health impacts associated with living in proximity to high traffic areas.



Indicator scores for Traffic Density (MiEJScreen)

ENVIRONMENTAL EFFECTS
DATA ANALYSIS



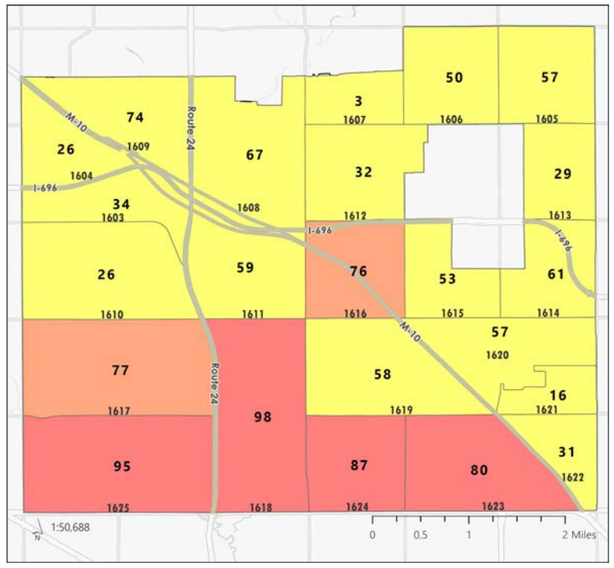
Composite Indicator Scores for Environmental Effects (MiEJScreen)

Environmental effects are defined by MiEJScreen as "...adverse environmental factors that may contribute to poor environmental quality,"[1] and generally describes proximity to hazardous sites. Overall, Southfield is not highly impacted by environmental effects.

The map to the left displays composite scores for all environmental effects indicators. Three adjacent census tracts fall within the high vulnerability range, indicating a concentrated area of potential risk within the community. Hazardous sites may still be present in other areas of the city, however, and could pose a potential threat to residents' health.

PROXIMITY TO HAZARDOUS SITES

About 26% of census tracts in Southfield are within high or mid-level vulnerability for proximity to a clean up site. 17% of tracts are within high vulnerability, with an additional 13% in mid-level vulnerability. A cleanup site is one that has suffered environmental degradation by hazardous substances, and must be cleaned in order to be safe and usable. These substances can pollute the surrounding environment through volatilization, groundwater contamination, or dust travel. They are associated with higher levels of pesticides and toxic metals in blood and house dust found in populations with close proximity to cleanup sites. Solid waste sites can release carbon dioxide, methane and other greenhouse gases for up to a decade after closure, and proximity to these sites is associated with risks to reproductive health, increased rates of birth defects, and exposure to hydrogen sulfide which correlates to increased mortality and morbidity from respiratory disease. Additionally, about 52% of tracts in Southfield are within the high vulnerability range nationwide for proximity to TSCA facilities. These are sites that make or process chemicals that pose a significant risk to human health.



Indicator scores for Proximity to a Cleanup Site (MiEJScreen)

Additional contaminated sites exist in Southfield, as shown on MiEJScreen. These are sites that have been identified by or must report to EGLE or the EPA. This includes sites of environmental contamination, brownfields, water discharge points, leaking underground storage tanks, and sites of toxic releases. Though the identification of these sites does not equate to an active threat to environmental or human health, their influence should be accounted for when assessing environmental health in Southfield.

Photo Credit: City of Southfield

SENSITIVITY

DATA ANALYSIS

Sensitivity refers to **the physiological, socio-economic, and community design factors that increase susceptibility to hazards.**[3] In Southfield, sensitivity is largely shaped by populations facing chronic health issues, difficulties in transportation access, and socioeconomic or demographic factors that increase the impact of environmental hazards on populations' wellbeing. This section provides an overview of the various factors that make up Southfield residents' sensitivity.

Similar to exposure data, sensitivity data is divided into two categories: **sensitive populations** and **socioeconomic factors.**

Sensitive populations refer to **"...human populations that experience increased susceptibility to environmental health risk factors."**[1] In the context of this report, it primarily refers to the health risks that communities in Southfield may be experiencing. **Socioeconomic factors refer to the social and economic conditions that influence a community's wellbeing and health.**

Overall, sensitivity in Southfield is more strongly shaped by socioeconomic factors than sensitivie population data. **Table 3B** displays indicator scores for all sensitivity data.

An Important Note

Race was not analyzed as a key variable in this report because MiEJScreen only provides a broad indicator for "Person of Color (POC)" populations rather than detailed race-specific data. As a result, this indicator would not reveal whether certain racial groups experience disproportionate hazards. However, race remains central to environmental justice and should be more closely examined in future vulnerability studies.

Sensitivity Indicators

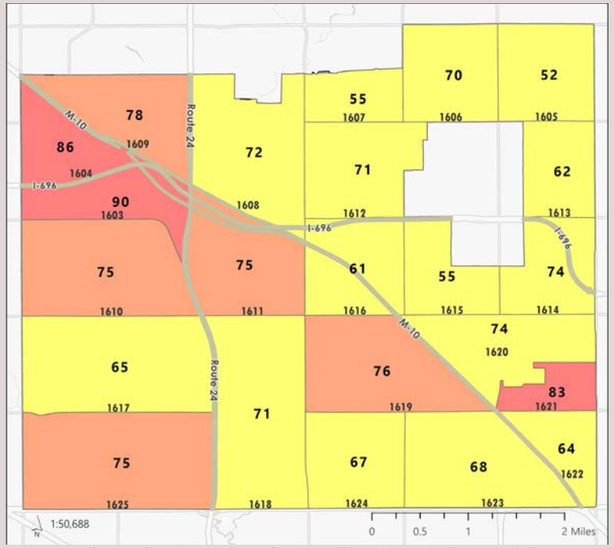
Sensitive Populations	Socioeconomic Factors
Asthma	Low-Income
Cardiovascular Disease	POC
Low Birth Weight Infants	Educational Attainment
Blood Lead Level	Linguistic Isolation
Life Expectancy	Population Under Age 5
Diabetes*	Population Over Age 64
Stroke*	Unemployment
High Blood Pressure*	Housing Burden

**These indicators are sourced from CVI.*

SENSITIVE POPULATIONS
DATA ANALYSIS

Sensitive populations refer to "...human populations that experience increased susceptibility to environmental health risk factors."[1] The map of composite scores for sensitive population indicators reveal specific areas of concentrated concern rather than widespread risk, helping to identify where these vulnerable populations are located.

13% of census tracts fell into high vulnerability for their composite scores, with an addition 22% in mid-level vulnerability.

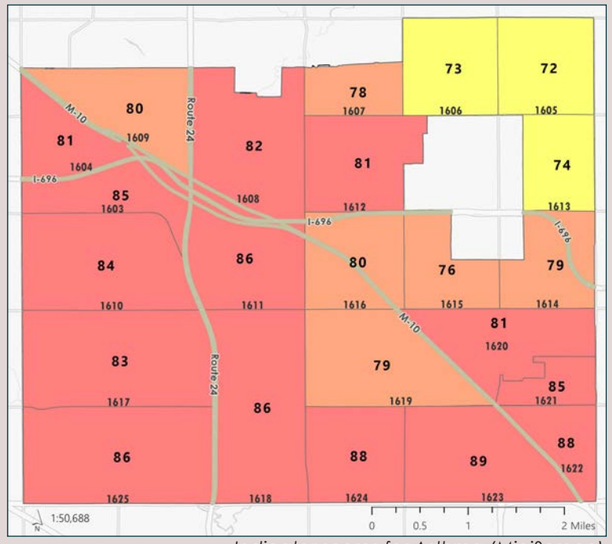


Composite Indicator scores for Sensitive Populations (MiejScreen)

HEALTH RISKS

Sensitive populations in Southfield are largely made up of those living with chronic or serious health conditions. Most prominent is the presence of asthma and high blood pressure.

Statewide, 70% of census tracts in the city are within high vulnerability for asthma rates. Asthma is a chronic disease that impacts an individual's ability to breathe, and is associated with a higher rate of comorbidity regarding respiratory and cardiovascular illnesses among others. Additionally, 70% of tracts are in the highest vulnerability range for high blood pressure compared to the rest of the country.

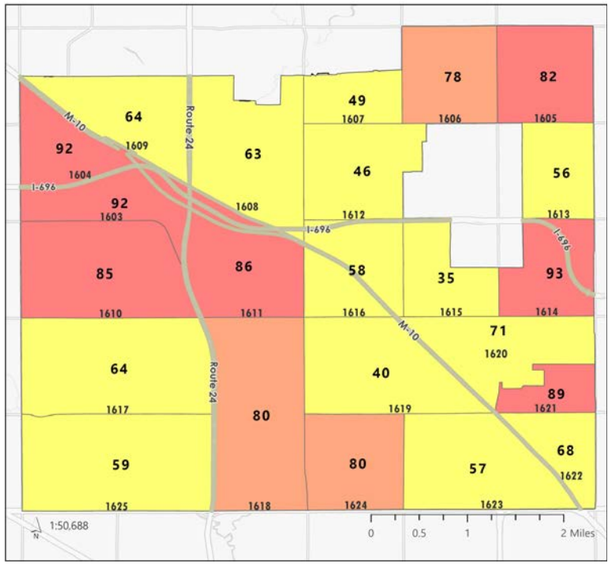


Indicator scores for Asthma (MiejScreen)

Other significant health risks in Southfield include the presence of cardiovascular disease, low birth weights, chronic disease, diabetes, and stroke. Refer to **Table 3B** for a complete list of indicator scores for each health risk. The presence of chronic diseases and other health risks in Southfield makes communities more sensitive to poor air quality, especially if they are also in high proximity to traffic density. This highlights the importance of air quality monitoring in the city, since a significant portion of the population may be especially vulnerable to the harmful effects of air pollution.

SOCIOECONOMIC FACTORS
DATA ANALYSIS

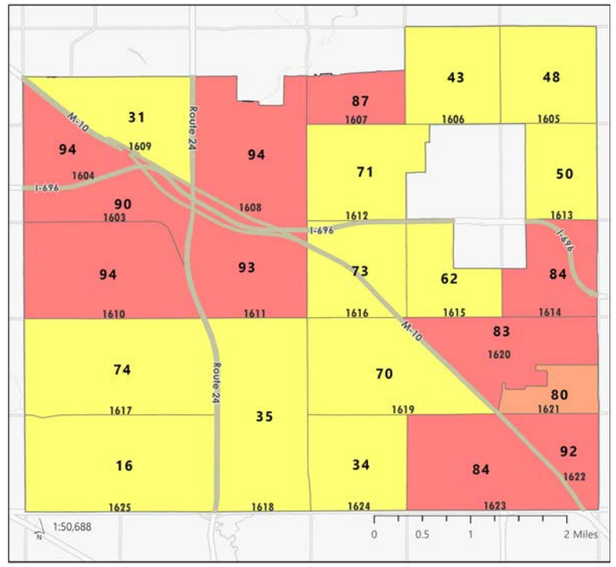
Socioeconomic factors refer to the social and economic conditions that influence a community's wellbeing and health. A significant percentage of census tracts in Southfield have a composite score for socioeconomic indicators that fall into high vulnerability—about 39%. An additonal 3% fall into mid-level vulnerability. From the map on the right, we can see these tracts with high vulnerability are concentrated in specific areas.



Composite Indicator scores for Socioeconomic Facors (MiEJScreen)

ELDER AND DISABLED POPULATIONS

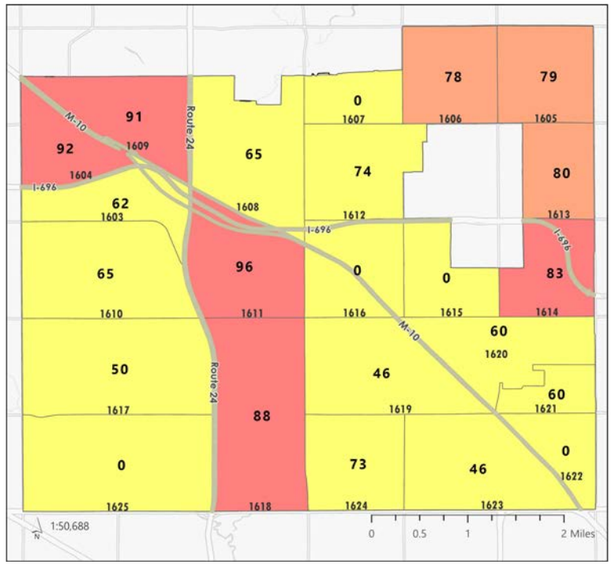
Compared statewide, nearly half of census tracts in Southfield fall within high vulnerability for populations over 64. Additionally, in seven census tracts of the city, at least 20% of the population is disabled. Both elders and disabled individuals may have limited employment options, increased expenses, a heightened vulnerability to severe illness from infection, and a greater likelihood to be socially isolated. They may also have greater difficulty relocating due to physical or financial constraints. Factors that impact these groups, such as financial implications and accessibility, should inform efforts to address vulnerability in Southfield. For example, engagement campaigns should have both in-person and digital options to allow for greater participation opportunities.



Indicator scores for Populations over Age 64 (MiEJscreen)

LINGUISTIC ISOLATION

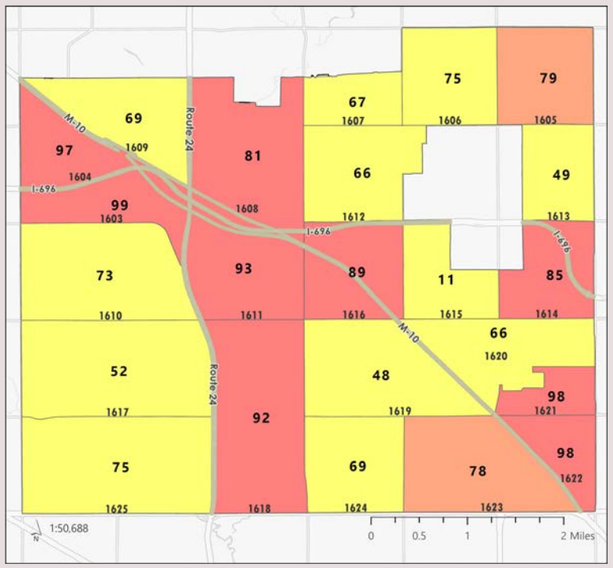
Linguistic isolation is defined as living in a household in which all members 14 years and older speak a non-English language, and also speak English less than "very well." In Southfield, over one quarter (26%) of census tracts are in high vulnerability for linguistic isolation. In Michigan, the primary languages spoken other than English are Spanish, Arabic, and Chinese. Populations that are linguistically isolated may have a limited ability to participate in civic engagement efforts, which may lead to disparities in the type and amount of services they receive.



Indicator scores for Linguistic Isolation (MiEJScreen)

HOUSING BURDEN AND UNEMPLOYMENT

When compared statewide, 39% of census tracts are in the high vulnerability range for housing burden. The ACS provides detailed data regarding this indicator. In seven census tracts of the city, around 40% of the population is housing burdened; in an additional five tracts, the number rises to over 50%. Households that are "housing burdened" spend over 30 percent of their income on housing costs, and may have difficulty affording necessities such as food, clothing, transportation, or medical care. Housing is an integral component to improved health, better education, and more stable economic conditions for communities.



Indicator scores for Housing Burden (MiEJScreen)

Additionally, 22% of census tracts statewide have a high vulnerability for unemployment, with an additional 22% in mid-level vulnerability. Unemployment is defined as the percentage of the population over the age of 16 that is unemployed and eligible for the labor force. Unemployment can signal a lack of access; for example, unemployed or low-income individuals may only be able to find affordable housing in areas with high pollution. Similar to housing, employment is a baseline need for stability and health.

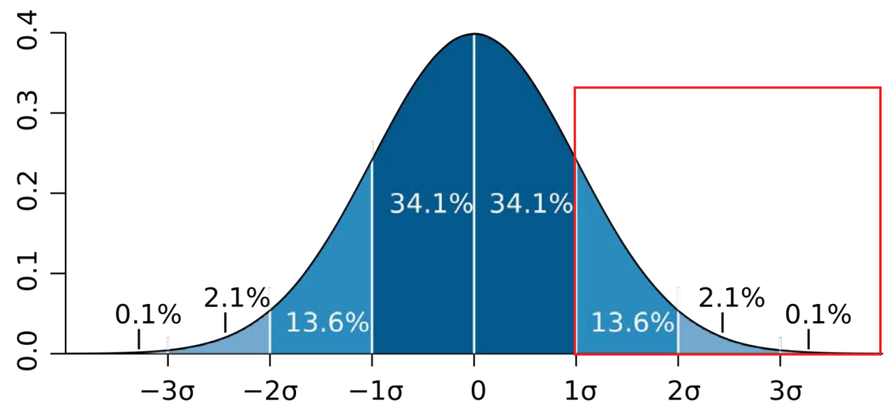
AREAS OF ESPECIALLY HIGH VULNERABILITY

Areas of "especially high vulnerability" are census tracts that display vulnerability across indicators. They highlight areas in which hazards may be concentrated and communities may be particularly vulnerable. The identification of these areas was done on the census tract level, in alignment with the data utilized to evaluate exposure and sensitivity in Southfield.

METHODOLOGY

These tracts were identified by analyzing all indicators under both exposure and sensitivity. Because the purpose of this analysis was to identify vulnerability indicators that are above the average for Southfield, composite scores of exposure and sensitivity were not considered. The average score for each vulnerability indicator and its corresponding standard deviation were calculated across all tracts in Southfield. If an indicator score fell above one standard deviation of the mean, its census tract displayed *heightened exposure* or *heightened sensitivity*.

Values within this range represent the top 16% of data, and are relatively high compared to the average. **Census tracts that met this threshold for three or more indicators in exposure and three or more indicators in sensitivity qualified as especially vulnerable.** A full list of all tracts, calculations, and indicators displaying heightened exposure or heightened sensitivity is available in the Appendices.



Bell curve graph of standard deviation. The red box represents the range of data captured by the analysis.

ANALYSIS OVERVIEW

A total of fifteen census tracts featured more than three indicators displaying heightened exposure or heightened sensitivity. Not all tracts met the threshold to qualify as especially vulnerable, though they do reveal which indicators may be shaping vulnerability the most.

EXPOSURE

Analysis of exposure data revealed that a total of eleven census tracts had three or more indicators signifying heightened exposure. The indicators most frequently identified were "pollutants impacting immunological health," with seven census tracts experiencing heightened exposure, followed by "pollutants that impact developmental health" and "PM 2.5," which were respectively identified in six census tracts. Tracts 1614 and 1622 had the greatest number of indicators displaying heightened exposure, signifying a concentration of environmental hazard in these areas. The figure showcases all census tracts identified with three or more indicators displaying heightened exposure.

MOST FREQUENTLY IDENTIFIED INDICATORS

- pollutants impacting immunological health
- pollutants impacting developmental health
- PM 2.5

SENSITIVITY

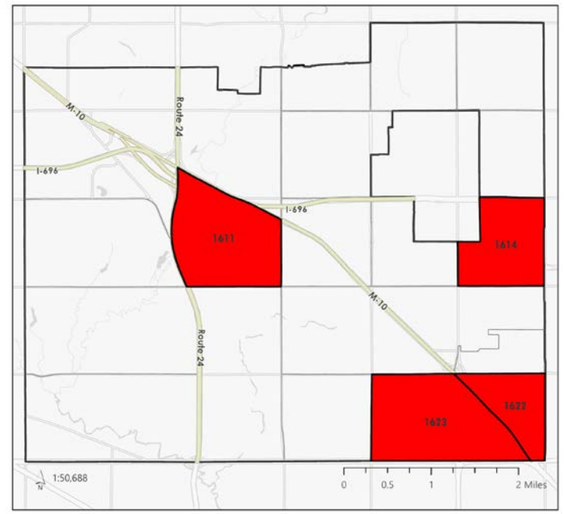
Analysis of sensitivity data showed that a total of eight census tracts had more than three indicators displaying heightened sensitivity. The indicators most frequently identified were "cardiovascular disease," "low birth weight infants," and "housing burden." Tract 1604 had the greatest number of indicators displaying heightened sensitivity, signaling that communities in this tract may be particularly susceptible to the impacts of environmental hazards.

MOST FREQUENTLY IDENTIFIED INDICATORS

- cardiovascular disease
- low birth weight infants
- housing burden

CENSUS TRACTS WITH ESPECIALLY HIGH VULNERABILITY

A total of four census tracts displayed three or more indicators with heightened exposure and three or more indicators with heightened sensitivity. Below are profiles detailing the indicators that make up these tracts' status as especially high vulnerability. In addition to analyzing the indicators collected from MiEJScreen and CVI, data from the SEMCOG Demographic Emphasis Areas provides additional considerations for vulnerability, including variables such as transit dependence, no-car households, and households in poverty.



Especially Vulnerable Census Tracts

Tract 1611

Tract 1611 is located in close proximity to the city center and the M-10 and I-696 highways. It has a population of 3,293 and a median household income of $42,465. This tract displays heightened exposure to three indicators: **noise pollution, pollutants that impact developmental health, and proximity to hazardous waste facilities**. It also experiences heightened sensitivity with regard to five indicators: **cardiovascular disease, stroke, high blood pressure, linguistic isolation, and populations over age 64.** Populations in this tract, which display a heightened likelihood of serious health conditions, may be especially impacted by proximity and exposure to air pollutants. Tract 1611 may be a good site of study for data collection on the aforementioned health risks.

Additional considerations for vulnerability in this tract include transit dependence, no-car households, households in poverty, and percentage of disabled populations. Respectively, 25% of the population in tract 1611 are transit dependent or live in a no-car household. 25% of the population is disabled, and 27% of households are in poverty. **These factors may contribute to feelings of isolation for community members in this tract, as lack of access to cars or other transit limits their mobility, and because disabled individuals are already at a higher risk of social isolation.**

Tract 1614

Tract 1614 sits at the eastern border of Southfield, next to Lathrup Village, and is bisected by the I-696 highway. It has a population of 4,081 and a median household income of $43,713. This tract displays heightened exposure to six indicators: **NATA cancer risk, NATA respiratory hazard, vehicle proximity and volume, noise pollution, pollutants that impact developmental health, and pollutants that impact immunological health.** Additionally, it experiences heightened sensitivity to six indicators: **diabetes, stroke, high blood pressure, educational attainment, low-income, and population under age 5.** Though levels of low-income and populations under age 5 do not fall into high or mid-levels of vulnerability in Southfield overall, they are high in this tract as compared with the rest of the city. Tract 1614 appears to be highly exposed to a variety of air pollutants, as well as large volumes of traffic. This may make it a good site for data collection on air quality.

Additionally, a little over a quarter of the households in tract 1614 are in poverty. **These households may struggle to move away from areas of exposure or afford protective measures like indoor air filtration systems, which can be expensive.**

Tract 1622

Tract 1622 is located in the southeastern corner of Southfield, bordered on one side by the M-10 highway. It has a population of 1,319 and a median household income of $49,063. This tract displays heightened exposure to seven indicators: **NATA cancer risk, NATA respiratory hazard, NATA diesel particulate matter, PM 2.5, pollutants that impact liver health, pollutants that impact developmental health, and pollutants that impact immunological health.** This tract also experiences heightened sensitivity to three indicators: **asthma, low birthweight infants, and housing burden.** This tract appears to experience high exposure to almost all of the air pollutants included in this report, which has serious health implications for the communities living there. Like tract 1614, it may act as an appropriate site of data collection on air quality in Southfield.

Additionally, 25% of the population in this tract is transit dependent. Similar to tract 1611, **this may contribute to feelings of isolation for populations in this tract.**

Tract 1623

Tract 1623 is also located at the southeastern corner of Southfield and bordered by the M-10 highway. It has a population of 3,971 and a median household income of $67,837. It experiences heightened exposure to five indicators: **NATA cancer risk, NATA respiratory hazard, PM 2.5, pollutants that impact liver health, and pollutants that impact immunological health**. This tract also experiences heightened sensitivity to three indicators: a**sthma, high blood pressure, and low birthweight infants**. Like tracts 1614 and 1622, **communities in this tract may face elevated health risks and greater challenges managing chronic conditions due to sustained exposure to harmful air pollutants.**

There are no additional considerations for vulnerability in this tract.

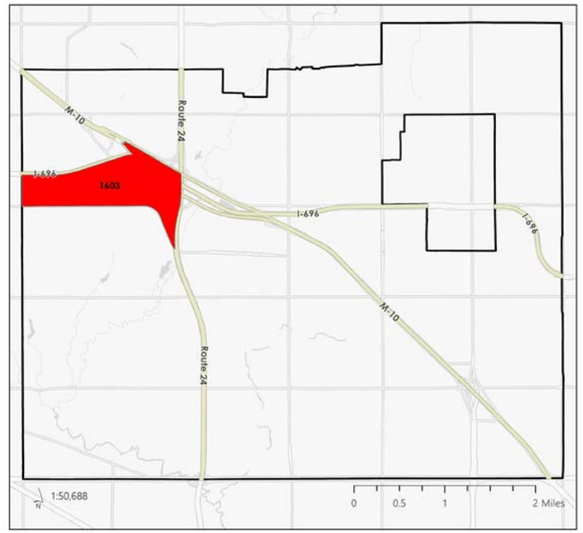
Making Space for Nuance

In recognition of the nuanced realities of community vulnerability, one additional census tract has been identified as especially vulnerable. Although this tract did not meet the previously defined thresholds, it exhibits significant levels of vulnerability based on various demographic factors, particularly the SEMCOG indicators discussed earlier.

Tract 1603

Tract 1603, located in the northwestern corner of Southfield and bordered by both the M-10 and I-696 highways, does not qualify as especially vulnerable. While it does experience heightened sensitivity to five indicators - **cardiovascular disease, low birthweight infants, life expectancy, low-income, and housing burden** - it only experiences heightened exposure for only two indicators: **traffic density and vehicle proximity and volume.**

However, additional variables made this tract stand out as particularly vulnerable. 25% of the population is transit dependent and 30% live in no-car households. 30% of the population in this tract is disabled, and 28% of households are in poverty. It also has the lowest median household income of all census tracts in Southfield at $32,737. **Similar to previous tracts, communities in tract 1603 may experience increased isolation, have difficulty relocating, and struggle to obtain protective measures to offset exposure to environmental hazards.**



Census Tract 1603

RECOMMENDATIONS

Recommendations exist to ensure this work moves beyond analysis and into action. They provide clear, practical actions the city can take to reduce community vulnerability. Outlining next steps will help turn findings into real progress for Southfield's residents and guide the use of resources and focus of initiatives.

Focus I: Further Investigation

This report provides a high-level overview of what hazards might exist in Southfield, where they might be located, and which communities may be the most heavily impacted. However, as mentioned previously, it utilizes data from screening tools which only provide approximate understandings of exposure and sensitivity. The city of Southfield can take a variety of actions, outlined below, to further pursue issues of air quality, traffic density, and health risks in their communities.

Recommendation I: Assess Air Quality

Air quality appears to be a large contributor of environmental hazard in Southfield. An assessment of air quality would provide vital information about environmental and human health in the city.

Action: Perform an Air Quality Risk Assessment

An air quality risk assessment, which aims to understand the particular pollutants, sources, and impacts of air pollution in Southfield will reveal the true extent of vulnerability present in the city. Resources such as the **Toxic Release Inventory (TRI) Toxics Tracker** can provide information about specific sources and types of pollutants; four industrial sites in Southfield have reported to the TRI Tracker since 2022.

Recommendation II: Traffic Analysis

Major roads and highways divide Southfield neighborhoods while contributing to air pollution and reducing pedestrian access within the city. An assessment of traffic conditions in Southfield would provide the city with information about resident experience, environmental hazards, and opportunities to improve mobility, safety, and neighborhood connectivity.

Action: Conduct a Traffic Study

To better understand the effects of traffic and support the ongoing work being done by the Sustainable Southfield Initiative, the city should pursue traffic studies of its roads and highways. These studies should engage Southfield residents to pursue information about pedestrian experience, isolation, and car dependence.

Recommendation III: Prioritize Community Health

A variety of chronic or serious health issues appear to be present among Southfield communities, making them vulnerable to environmental hazards. Efforts to further investigate these health conditions, their causes, and impacts will improve resilience in Southfield.

Action: Adoption of a Health in All Policies (HiAP)

Good health is a foundational component of thriving communities. **Health in All Policies** is a "..collaborative approach to improving health outcomes by incorporating health and health equity into decision-making across sectors."[5] It aims to bring a variety of stakeholders together, including government agencies, community members, policy makers and health advocates to design holistic policies that address health disparities. HiAP can inform Southfield's approach to public health campaigns that pursue the health risks discussed in this report.

Focus II: Additional Vulnerability Studies

This report is a first step in understanding vulnerability in Southfield. Additional vulnerability studies, such as an adaptive capacity study, climate vulnerability assessment, and sustainable action plan will provide the city of Southfield with the tools to adequately and holistically address vulnerability. The following recommendations also highlight the importance of community engagement, which provides residents with the opportunity to strengthen and shape the future of their city.

Recommendation I: Conduct an Adaptive Capacity Study

Adaptive capacity refers to "an evaluation of a community's ability to adjust, limit and cope with potential hazards or exposures."[3] An adaptive capacity study will allow the city to take stock of the skills, networks, resources, and other assets that currently exist in Southfield, and learn about how their communities respond to hazards and threats.

Action: Community Asset Mapping

Community asset mapping is a process of documenting the resources of a community while viewing it as a place with strengths to be protected, rather than weaknesses to be remedied. It also offers an exciting opportunity for residents to take the lead in community planning. There are many approaches to community asset mapping, some of which are summarized in this study. All methods discussed in **this study** emphasize the importance of community-led mapping.

Recommendation II: Climate Change Vulnerability Assessment

Climate change presents unique considerations for vulnerability such as rising temperatures and extreme weather events, and the impacts they can have on human health, infrastructure, and ecosystems. Assessing factors such as heat and flood risk, tree canopy, the age and quality of infrastructure, and more can provide a more holistic understanding of vulnerability in Southfield. The ICLEI - Local Governments for Sustainability has created a **climate change vulnerability toolkit** that can guide this assessment.

Recommendation III: Publish and Implement a Sustainable Action Plan (SAP)

A Sustainable Action Plan (SAP) is a strategic roadmap that defines the actions a municipality will take to meet its sustainability goals and hold itself accountable. For the City of Southfield, implementing its SAP is essential to addressing the environmental and socio-economic vulnerabilities highlighted in this report. Publishing a comprehensive SAP will ensure that the City's sustainability vision directly targets these risks by linking its focus areas—such as mobility, quality of life, and community—to equity-centered solutions.

Photo Credit: City of Southfield

REFERENCES

[1] Kruse, Katie, et al. "MiEJScreen1.0 Michigan Environmental Justice Mapping and Screening Tool Technical Report." Michigan Department of Environment, Great Lakes, and Energy, July 2024.

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[3] Harris County Public Health. "Climate & Health Vulnerability Assessments." Harriscountytx.gov, 2024, publichealth.harriscountytx.gov/Divisions-Offices/Offices/Office-of-Epidemiology-Surveillance-Emerging-Diseases/Non-Communicable-Diseases/Climate-Program/Climate-Health-Vulnerability-Assessments.

[4] Texas A&M University, et al. "Climate Vulnerability Index." The U.S. Climate Vulnerability Index, map.climatevulnerabilityindex.org/map/cvi_overall/usa?mapBoundaries=Tract&mapFilter=0&reportBoundaries=Tract&geoContext=State.

[5] Michigan Department of Health and Human Services. "Health in All Policies." Michigan.gov, 2019, www.michigan.gov/mdhhs/inside-mdhhs/legislationpolicy/2022-2024-social-determinants-of-health-strategy/health-in-all-policies.

APPENDIX A

Table 1: Indicator Scores for Environmental Exposure Data

Census Tract	Environmental Exposure	NATA Cancer Risk	NATA Respiratory Hazard	NATA Diesel Particulate Matter	PM 2.5	Traffic Density	VMT (CVI)	Vehicle Proximity and Volume (CVI)	Noise Pollution (CVI)	Ozone	Pollutants That Impact Liver Health (CVI)	Pollutants That Impact Developmental Health (CVI)	Pollutants That Impact Reproductive Health (CVI)	Pollutants That Impact Kidney Health (CVI)	Pollutants That Impact Immunological Health (CVI)
1603	78	79	86	83	86	99	97	97	88	33	68	78	80	80	74
1604	76	72	82	87	84	97	96	97	97	34	68	78	73	62	74
1605	84	78	86	89	88	76	63	77	89	61	68	85	85	80	74
1606	75	74	78	82	88	67	55	73	58	57	68	85	80	80	74
1607	71	72	74	76	87	63	62	76	23	49	68	78	80	80	74
1608	79	72	77	83	87	97	87	84	82	40	68	78	80	80	74
1609	78	74	82	89	85	98	83	97	60	37	68	78	73	62	74
1610	76	75	82	82	87	81	75	67	71	31	68	78	80	80	74
1611	88	84	96	96	89	96	95	93	93	34	68	90	85	80	74
1612	80	74	78	82	88	94	43	69		44	68	78	80	80	74
1613	89	78	88	91	90	95	44	87	26	59	68	85	80	80	74
1614	94	89	97	96	91	98	89	97	95	57	68	90	85	80	87
1615	90	83	95	97	90	95	91	92	90	46	68	90	85	80	74
1616	91	88	97	97	90	98	96	96	98	40	68	90	85	80	87
1617	75	73	84	87	89	74	74	38	85	28	68	85	80	80	74
1618	82	80	94	96	92	80	85	83	28	30	68	85	85	80	74
1619	88	83	97	98	93	88	95	86	18	36	68	90	85	80	87
1620	90	83	95	98	93	86	89	87	21	48	92	85	85	80	87
1621	89	85	96	98	93	77	43	76	25	51	92	85	85	80	87
1622	94	88	98	98	94	98	97	85	19	48	92	90	85	80	87
1623	91	89	97	97	94	93	93	94	82	38	92	85	85	80	87
1624	81	80	95	97	94	66	84	62	64	31	68	85	85	80	74
1625	77	73	81	88	91	82	79	71	38	26	68	78	80	80	74

Data highlighted in green represents indicators that display heightened exposure. All indicators are sourced from MiEJScreen unless otherwise labeled.

Definitions

Definitions of indicators can be found in the MiEJScreen Technical Report or at the Climate Vulnerability Index website.

APPENDICES

APPENDIX A

Table 1.1: Percentage of Tracts in High, Mid, or Low-Level Vulnerability For Environmnetal Exposure Data

Levels of Vulnerability	Environmental Exposure	NATA Cancer Risk	NATA Respiratory Hazard	NATA Diesel Particulate Matter	PM 2.5	Traffic Density	VMT (CVI)	Vehicle Proximity and Volume (CVI)	Noise Pollution (CVI)	Ozone	Pollutants That Impact Liver Health (CVI)	Pollutants That Impact Developmental Health (CVI)	Pollutants That Impact Reproductive Health (CVI)	Pollutants That Impact Kidney Health (CVI)	Pollutants That Impact Immunological Health (CVI)
Percentage of Census Tracts in High-Level Vulnerability	61%	48%	83%	96%	100%	74%	61%	61%	43%	0%	17%	65%	91%	91%	30%
Percentage of Census Tracts in Mid-Level Vulnerability	35%	30%	17%	4%	0%	13%	13%	13%	0%	0%	0%	35%	0%	0%	70%
Percentage of Census Tracts in Low-Level Vulnerability	4%	35%	4%	0%	0%	17%	30%	26%	52%	100%	83%	0%	9%	9%	70%

All indicators are sourced from MiEJScreen unless otherwise labeled.

Table 1.2: Threshold Values to Determine Heightened Exposure

	Environmental Exposure	NATA Cancer Risk	NATA Respiratory Hazard	NATA Diesel Particulate Matter	PM 2.5	Traffic Density	VMT (CVI)	Vehicle Proximity and Volume (CVI)	Noise Pollution (CVI)	Ozone	Pollutants That Impact Liver Health (CVI)	Pollutants That Impact Developmental Health (CVI)	Pollutants That Impact Reproductive Health (CVI)	Pollutants That Impact Kidney Health (CVI)	Pollutants That Impact Immunological Health (CVI)
Threshold Value For "Heightened Exposure"		85.35131602	96.53414277	97.67531613	92.68707602	98.62581828	97.25056845	96.32591612	91.8900425	52.20769249	81.47519435	88.69661351	85.72948936	83.62065579	84.07265733

All indicators are sourced from MiEJScreen unless otherwise labeled. Scores that fell above the threshold values shown in the table qualified as displaying heightened exposure. Composite scores were not included in this analysis.

APPENDIX A

Table 2: Indicator Scores for Environmental Effects Data

Census Tract	Environmental Effects	Proximity to Clean Up Sites	Proximity to Hazardous Waste Facilities	Impaired Water Bodies	Proximity to Solid Waste Sites and Facilities	Lead Paint Indicator	Proximity to RMP Sites	Wastewater Discharge Indicator	Proximity to TSCA Facilities (CVI)
1603	56	34	60	61	80	13	37	61	89
1604	36	26	40	61	56	21	25	51	80
1605	64	57	28	73	84	32	43	54	0
1606	57	50	25	73	80	34	28	57	0
1607	14	3	29	73	0	16	15	57	73
1608	46	67	56	73	0	21	29	68	85
1609	50	74	40	61	53	8	33	56	79
1610	63	26	73	73	74	32	31	60	91
1611	49	59	73	73	0	21	35	65	93
1612	28	32	42	73	0	19	26	57	80
1613	26	29	21	0	82	69	42	0	0
1614	20	61	29	0	55	38	34	0	67
1615	30	53	33	73	0	42	18	36	78
1616	39	76	56	73	0	20	17	49	88
1617	64	77	73	73	0	56	35	61	92
1618	87	98	84	73	45	36	55	0	92
1619	64	58	57	73	78	47	18	42	88
1620	46	57	34	73	77	40	34	0	76
1621	12	16	32	0	86	27	24	0	0
1622	12	31	31	0	83	16	23	0	0
1623	64	80	42	73	68	70	40	0	75
1624	82	87	63	73	78	70	19	48	86
1625	80	95	76	85	0	47	60	67	89

Data highlighted in green represents indicators that display heightened exposure. All indicators are sourced from MiEJScreen unless otherwise labeled.

Definitions

Definitions of indicators can be found in the MiEJScreen Technical Report or at the Climate Vulnerability Index website.

APPENDICES

APPENDIX A

Table 2.1: Percentage of Tracts in High, Mid, or Low-Level Vulnerability For Environmnetal Effects

Levels of Vulnerability	Environmental Effects	Proximity to Clean Up Sites	Proximity to Hazardous Waste Facilities	Impaired Water Bodies	Proximity to Solid Waste Sites and Facilities	Lead Paint Indicator	Proximity to RMP Sites	Wastewater Discharge Indicator	Proximity to TSCA Facilities (CVI)
Percentage of Census Tracts in High-Level Vulnerability	13%	17%	4%	4%	26%	0%	0%	0%	52%
Percentage of Census Tracts in Mid-Level Vulnerability	0%	13%	4%	0%	17%	0%	0%	0%	17%
Percentage of Census Tracts in Low-Level Vulnerability	87%	74%	91%	96%	61%	100%	100%	100%	30%

All indicators are sourced from MiEJScreen unless otherwise labeled.

Table 2.2: Threshold Values to Determine Heightened Exposure

	Environmental Effects	Proximity to Clean Up Sites	Proximity to Hazardous Waste Facilities	Impaired Water Bodies	Proximity to Solid Waste Sites and Facilities	Lead Paint Indicator	Proximity to RMP Sites	Wastewater Discharge Indicator	Proximity to TSCA Facilities (CVI)
Threshold Value For "Heightened Exposure"		80.05766044	66.85630025	87.50528557	83.49286037	53.03097461	42.96915716	65.77413532	101.0610948

All indicators are sourced from MiEJScreen unless otherwise labeled. Scores that fell above the threshold values shown in the table qualified as displaying heightened exposure. Composite scores were not included in this analysis.

APPENDIX B

Table 3: Indicator Scores for Sensitivity Data

Census Tract	Sensitive Populations	Asthma	Cardiovascular Disease	Low Birth Weight Infants	Life Expectancy	Diabetes (CVI)	Stroke (CVI)	High Blood Pressure (CVI)	Socioeconomic Factors	Low-Income	POC	Educational Attainment	Linguistic Isolation	Population Under Age 5	Population over Age 64	Unemployment	Housing Burden
1603	90	85	98	94	83	76	80	80	92	72	88	52	62	41	90	81	99
1604	86	81	93	73	73	91	92	92	92	72	91	38	92	38	94	64	97
1605	52	72	64	65	34	67	68	71	82	52	82	64	79	25	48	88	79
1606	70	73	46	71	35	72	68	75	78	39	85	21	78	84	43	77	75
1607	55	78	63	87	14	81	73	89	49	5	87	20	0	30	87	78	67
1608	72	82	85	17	61	82	80	91	63	24	87	13	65	20	94	43	81
1609	78	80	84	75	63	40	35	50	64	40	87	59	91	15	31	41	69
1610	75	84	88	96	59	88	87	93	85	46	90	77	65	11	94	81	73
1611	75	86	91	74	74	86	90	94	86	48	87	57	96	7	93	63	93
1612	71	81	62	83	40	71	58	82	46	18	89	12	74	17	71	20	66
1613	62	74	62	39	46	58	51	70	56	51	84	17	80	6	50	63	49
1614	74	79	77	68	58	96	97	95	93	67	83	86	83	78	84	24	85
1615	55	76	71	33	63	76	64	84	35	14	89	28	0	42	62	80	11
1616	61	80	64	68	49	63	61	68	58	45	87	42	0	35	73	37	89
1617	65	83	69	85	43	82	73	85	64	45	89	32	50	17	74	76	52
1618	71	86	77	68	74	82	76	84	80	61	89	53	88	23	35	69	92
1619	76	79	68	78	31	74	68	75	40	31	88	40	46	4	70	78	48
1620	74	81	76	80	45	91	87	92	71	43	87	39	60	65	83	22	66
1621	83	85	66	80	86	83	78	87	89	50	98	55	60	49	80	74	98
1622	64	88	78	99	10	86	83	91	68	45	94	52	0	12	92	57	98
1623	68	89	81	97	24	89	83	94	57	13	91	24	46	4	84	66	78
1624	67	88	75	68	55	79	73	78	80	67	88	21	73	69	34	87	69
1625	75	86	71	82	86	79	76	85	59	58	87	62	0	40	16	73	75

Data highlighted in green represents indicators that display heightened sensitivity. All indicators are sourced from MiEJScreen unless otherwise labeled.

Definitions

Definitions of indicators can be found in the MiEJScreen Technical Report or at the Climate Vulnerability Index website.

APPENDICES

APPENDIX B

- 3.1: Percentage of Tracts in High, Mid, or Low-Level Vulnerability For Sensitivity Data

Vulnerability Levels	Sensitive Populations	Asthma	Cardiovascular Disease	Low Birth Weight Infants	Life Expectancy	Diabetes (CVI)	Stroke (CVI)	High Blood Pressure (CVI)	Socioeconomic Factors	Low-Income	POC	Educational Attainment	Linguistic Isolation	Population Under Age 5	Population over Age 64	Unemployment	Housing Burden
Percentage of Census Tracts in High-Level Vulnerability	13%	70%	30%	43%	13%	52%	39%	70%	39%	0%		4%	26%	4%	48%	22%	39%
Percentage of Census Tracts in Mid-Level Vulnerability	22%	17%	22%	9%	0%	17%	13%	13%	4%	0%		4%	9%	4%	0%	17%	17%
Percentage of Census Tracts in Low-Level Vulnerability	65%	13%	48%	48%	87%	30%	48%	17%	57%	100%		91%	65%	91%	52%	61%	43%

All indicators are sourced from MiEJScreen unless otherwise labeled.

Table 3.2: Threshold Values to Determine Heightened Sensitivity

	Sensitive Populations	Asthma	Cardiovascular Disease	Low Birth Weight Infants	Life Expectancy	Diabetes (CVI)	Stroke (CVI)	High Blood Pressure (CVI)	Socioeconomic Factors	Low-Income	POC	Educational Attainment	Linguistic Isolation	Population Under Age 5	Population over Age 64	Unemployment	Housing Burden
Threshold Value for "Heightened Sensitivity		86.3971762	86.48643148	93.1917429	74.2393403	90.3333825	88.0841165	93.7541666		62.7492172	91.532364	62.6163876	89.18132	55.741947	92.82604765	83.8711843	94.984674

All indicators are sourced from MiEJScreen unless otherwise labeled. Scores that fell above the threshold values shown in the table qualified as displaying heightened sensitivity. Composite scores were not included in this analysis.