

EXECUTIVE SUMMARY

# Local Policy Recommendations Addressing Environmental Hazards and Inequitable Health Risks in Houston’s Complete Communities

## Background

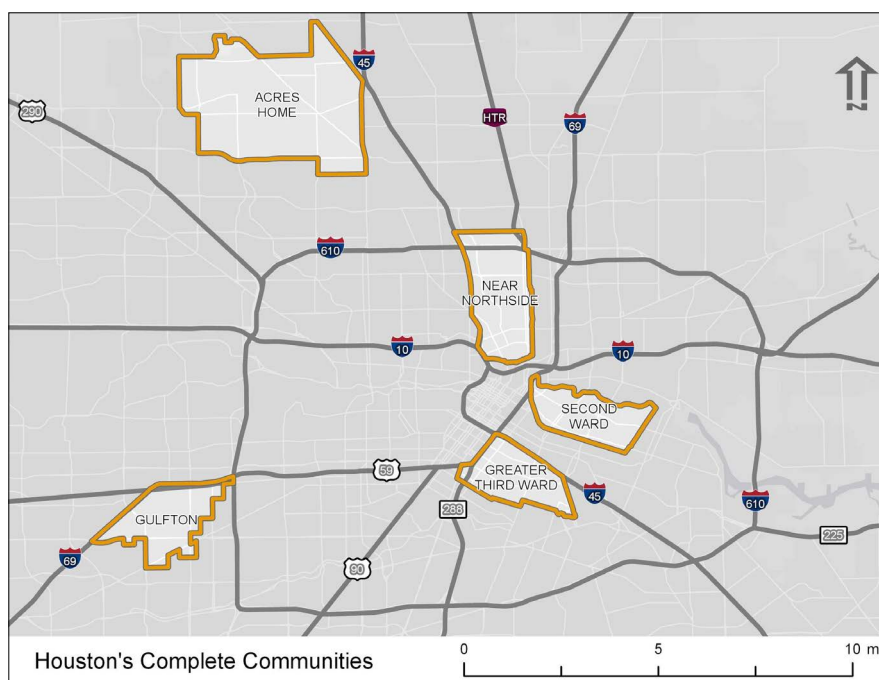
In April 2017, Houston Mayor Sylvester Turner launched the Complete Communities Initiative. The pilot program includes five communities — Acres Homes, Gulfton, Second Ward, Near Northside, and Third Ward — that were the initial focus of the city’s efforts to revitalize neighborhoods that have been historically underserved (Figure 1). The goals of the initiative are oriented toward addressing “the ever-increasing gap between the haves and the have-nots in Houston.” In many regards, the Complete Communities Initiative has been very effective in the effort to systematically evaluate the local conditions that lead to inequitable outcomes and identify the potential for improvement within communities.

Among the many essential priorities identified for inclusion in the scope of the Complete Community Initiative is the explicit goal of a community with “no unsafe environmental hazards” — an objective that speaks directly to the issues of environmental justice and equity that are of great relevance not only to these communities, but to many communities throughout the greater Houston area. In practice, however, the environmental issues as addressed in the finalized action plans are either reduced to generalizations (Acres Homes and Second Ward) or address specific environmental nuisances while neglecting to address more problematic land uses (e.g. auto body shops in Gulfton).

As part of this effort, the city initiated a community engagement process to obtain feedback from residents in each neighborhood that identified priority issues that need to be addressed to work toward making them more “complete.” The city planning department then incorporated that input into an action plan for each Complete Community. The action plans contain specific recommendations tailored to the needs of each community.

Following the completion of the action plans for the pilot Complete Communities, Mayor Turner named five additional communities to the program as Phase 2 of the effort in June 2019: Alief, Kashmere Gardens, Fort Bend Houston, Magnolia Park/Manchester, and Sunnyside.

**Figure 1: Phase 1 of the City of Houston’s Complete Communities**



The core beliefs of Air Alliance Houston (AAH) are that everyone has a right to breathe clean air and that where you live should not determine your health. These beliefs are informed by the established link between environmental health and social conditions and the conviction that a clean environment is fundamental to improving the opportunity for health, prosperity, and sustainability of residents and communities.

In April of 2018, AAH commissioned a review of hazardous sites in Houston's Complete Communities, conducted by the Kinder Institute for Urban Research, along with a legal review, conducted by ChangeLab Solutions, to inform the development of local policy recommendations to address long-standing environmental injustices in these neighborhoods. Like the Complete Communities project itself, Air Alliance Houston believes that these efforts to identify environmental justice issues and the opportunities to implement mitigative policies in the Phase 1 Complete Communities can be applied to these specific neighborhoods as well as the recently identified communities and more broadly throughout the Houston region.

## Regional Environmental Challenges

While our analysis focused on environmental hazards in Complete Communities, the context of the broader Houston region in terms of industrial pollution and social inequity is important to understand.

Data from at least one measure of environmental pollution shows the extent of the regional environmental challenges experienced in the Houston area. The Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) tracks annual industrial releases of over 650 toxic chemicals that have been determined to pose a threat to human health and the environment. The 2017 TRI found that industrial facilities in the Greater Houston area<sup>1</sup> emitted more toxic chemicals to the air in 2017 than the top five US metropolitan economies combined (Table 1). When other toxic releases to water bodies, landfills, spills, and leaks are considered, the region compares even more unfavorably. The 212 facilities within the city limits of Houston alone emitted 1.4 million pounds of TRI chemicals to the air to contribute to the 4 million total pounds of toxic releases in the city in 2017.

**Table 1: Top 6 MSAs by GDP, 2017 and Toxic Release Inventory Emissions, 2017**

Metropolitan Statistical Area	GDP (millions of dollars)	Number of TRI Facilities	TRI Air Emissions (millions of lbs)	TRI On-site Disposal or Release: Air, Water, Land (millions of lbs)
<b>New York – Newark – Jersey City</b> NY – NJ – PA	\$1,444,484	408	1.6	4.7
<b>Los Angeles – Long Beach – Anaheim</b> CA	\$904,899	490	2.7	3.6
<b>Chicago – Naperville – Elgin</b> IL – IN – WI	\$583,137	715	9.2	46.2
<b>Dallas – Fort Worth – Arlington</b> TX	\$479,678	440	1.9	2
<b>Washington – Arlington – Alexandria</b> DC – VA – MD – WV	\$460,026	119	0.7	1
<b>Total</b>	<b>\$3,872,244</b>	<b>2,172</b>	<b>16.1</b>	<b>57.5</b>
<b>Houston – The Woodlands – Sugar Land</b> TX	<b>\$436,369</b>	<b>517</b>	<b>16.8</b>	<b>79.6</b>

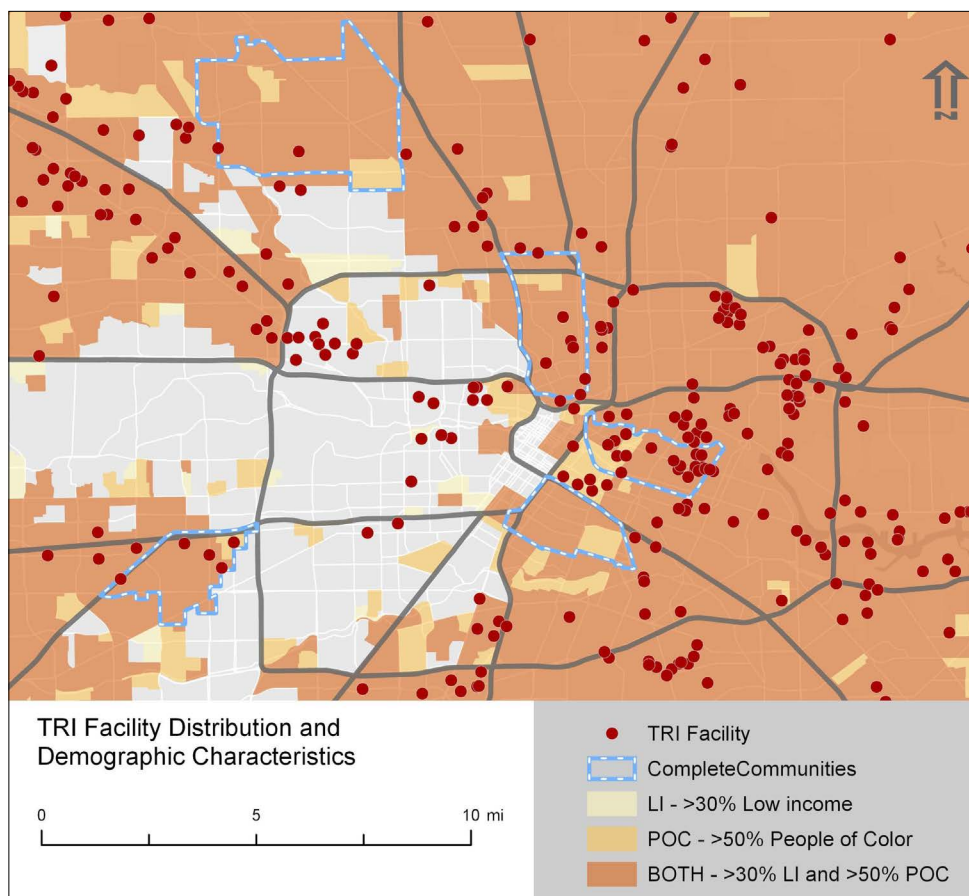
Sources: Bureau of Economic Analysis, [www.bea.gov/data/gdp/gdp-metropolitan-area](http://www.bea.gov/data/gdp/gdp-metropolitan-area)  
EPA Toxic Release Inventory Program, [www.epa.gov/toxics-release-inventory-tri-program](http://www.epa.gov/toxics-release-inventory-tri-program)

<sup>1</sup> The Houston-Woodlands-Sugar Land MSA is comprised of the following Texas counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.

Compounding the regional saturation of these environmental hazards in the Greater Houston area is the localized concentration of these facilities in and near Houston's communities of color and low-income. This phenomenon, which represents a significant indicator of community marginalization, also contributes significantly to the inequities that degrade communities. This can be demonstrated by displaying the distribution of TRI facilities within the City of Houston with Census estimates of areas in which the majority of residents are people of color (POC)<sup>2</sup> or where more than 30% of households are considered low-income<sup>3</sup> (Figure 2). The proximity of hazardous industrial facilities to these residential areas is of primary concern due to the obvious risk to public health and safety. However, this jarring mismatch of land use also has the effect of depressing residential and commercial property values, stressing transportation infrastructure with heavy traffic, and discouraging critical public and private investments that are essential to sustaining a functional community (e.g. banking, retail, supermarkets, parks). The disproportionate presence of these facilities is therefore an indicator of and a contributor to racial and economic inequities in health and other life outcomes.

Communities are much more than the physical infrastructure and design of places. They are also physical manifestations of the social, economic and racial hierarchy in the United States. For most people, where they live not only dictates access to opportunities such as education and employment, but to a great extent it can shape their thoughts about what opportunities exist and the extent to which those opportunities are attainable. Similarly, the communities in which we live shape our opportunities for good health, particularly for people with low incomes. [Research indicates](#) that an

**Figure 2: TRI locations derived from the EPA's Facility Registry Service**



Source: [www.epa.gov/frs](http://www.epa.gov/frs). Socioeconomic data from the US Census Bureau 2016 American Community Survey block group estimates.

individual's zip code is a stronger predictor than genetics of how long they will live. Because public policies shape the racial and socioeconomic profiles of neighborhoods and, by extension, the health-promoting opportunities and constraints that exist within them, health is also intimately tied to income and race.

Neighborhoods with a high concentration of poverty and people of color often have more environmental hazards, limited economic opportunities, unsafe housing, higher rates of crime and incarceration, less access to healthy food and outlets for physical activity and lower performing schools. Consequently, residential segregation is [consistently cited](#) as a fundamental cause of racial differences in health. [Houston communities](#)

2 People of color - in this context - encompasses all Hispanic/Latinx groups and excludes only the "Non-Hispanic White" racial classification.

3 Low-income is defined as households with annual earnings less than 200% of poverty-level annual earnings.

follow this pattern of segregation along racial and economic lines. Because Houston has an extensive history of environmental injustice, there is a need to develop explicit strategies to work toward eliminating the disproportionate siting of hazardous industrial facilities in communities of color and low-wealth.

## Environmental Hazards in Complete Communities

The Kinder Institute's analysis included a review of sources of air pollution, wastewater, hazardous waste, and Superfund sites and their proximity to sensitive land uses such as homes, schools, and parks in each of the Complete Communities. While the analysis performed by the Kinder Institute focuses on the Phase 1 Complete Communities, it should be stressed that these communities are representative of many neighborhoods throughout the Houston region, and are not necessarily the most atypically problematic examples of the interface between industrial activity and residential communities in the Greater Houston area. Their status as Complete Communities, however, presents an opportunity to rethink the environmental health impacts of industrial land-use on social equity in the region.

Key findings include:

- There are at least 300 facilities operating with 376 pollution permits inside or within 1 mile of the five Complete Communities.
- Inside or near the Complete Communities, there are 1,320 sensitive public and private facilities within 1 mile of a hazardous site. These facilities (schools, parks, churches, etc.) serve populations, such as children and older adults, which are particularly vulnerable to the health impacts of air pollution.
- Inside or near the Complete Communities, 848,221 people live within or adjacent to a census block group that contains a hazardous site. Excluding block groups that fall outside of the city's limit, this is roughly 32 percent of the city's population.
- Every Complete Community has at least two concrete batch plants within its boundaries. Near Northside has the most with eight.
- Every Complete Community has at least two metal recyclers within its boundaries. Second Ward and

Near Northside have the most with 17 each.

- There are more than 90 oil wells within 1 mile of Acres Homes.
- The residents of block groups with hazardous sites tend to be lower-income and non-white residents. Renters tend to live in block groups with hazardous sites at a greater rate than homeowners.
- Issues with air emissions and other hazardous sites add major health risks on top of other challenges — poverty, lack of mobility and unsafe homes — already faced by Complete Communities residents.

## Health Inequities in Complete Communities

Although not explicitly stated in the goals of the Complete Communities program, most — if not all — of the initiative's efforts are aligned with reducing health inequities in these five communities. Working toward health equity explicitly involves addressing the structural consequences of racial and ethnic discrimination and socioeconomic marginalization that prevents all communities from equitable access to the opportunities that enable them to live healthy lives. It requires remedial actions such as improving access to healthcare, offering good jobs with fair pay, providing quality education opportunities, ensuring secure housing and safe streets, and reducing exposure to adverse environmental conditions — all of which aligns with the goals of the Complete Communities Initiative.

It is important to note that the focus of the Kinder Institute study — exposure to environmental pollution — is but one factor among many that may influence the health of a community. However, health indicator data for the Houston-area underscores the vulnerability of these communities to the adverse environmental conditions that are disproportionately present in neighborhoods of color and low-income in the Houston area. Census Tract-level data from the 500 Cities Project — a collaborative project of the Robert Wood Johnson Foundation and the Center for Disease Control<sup>4</sup> — estimates the prevalence of several adverse health outcomes in Complete Communities at a significantly higher rate than the

4 Robert Wood Johnson Foundation and CDC Foundation, 500 Cities Project, [www.cdc.gov/500cities/about.htm](http://www.cdc.gov/500cities/about.htm)



overall Houston average. While there is variation among and within the Complete Communities, the average for each health indicator among the Complete Communities indicate the general trend<sup>5</sup>:

- **Asthma** prevalence in adults is estimated to be 9.7%. This is 9.6% higher than the Houston average of 8.8%.
- **Coronary Heart Disease** prevalence is estimated to be 6.5%. This is 16.1% higher than the Houston average of 5.6%. Near Northside ranks the highest among the Complete Communities with a prevalence of 7.4%.
- **Chronic Obstructive Pulmonary Disease** prevalence is estimated to be 6.7%. This is 18.3% higher than the Houston average of 5.7%. Acres Homes ranks the highest among the Complete Communities with a prevalence of 7.8%.
- The prevalence of adults reporting **Poor Physical Health** for more than 14 days is estimated to be 16%. This is 22.5% higher than the Houston average of 13.1%. Second Ward ranks the highest among the

Complete Communities with a prevalence of 17.8%.

- The prevalence of adults reporting **Poor Mental Health** for more than 14 days is estimated to be 14.5%. This is 17.7% higher than the Houston average of 12.3%. Gulfton ranks the highest among the Complete Communities with a prevalence of 15%.
- Finally, as reflected in many of the Complete Community Action Plans, the average estimated **Lack of Health Insurance** among adults was 34.7%. This is 25.2% higher than the estimated Houston average of 27.7%. Gulfton ranks the highest among the Complete Communities with an estimated 42.8% of adults lacking basic health insurance coverage.

500 Cities incidence estimates for specific Census Tracts within the Complete Communities illustrate an even sharper divergence from the City of Houston health indicator averages. In addition to the City of Houston and Complete Community averages, Table 2 includes the highest estimated incidence rate among Census Tracts within Complete Communities.

**Table 2: 500 Cities Health Indicator Averages for the City of Houston, Complete Communities, and Highest Value Within Complete Communities**

Metropolitan Statistical Area	City of Houston Average	Complete Communities Avg.	% Difference from Houston Average	Highest Census Tract-level incidence rate within Complete Communities	% Difference from Houston Average
Adult Asthma	8.8%	9.7%	+9.6%	13.2%	+50%
Coronary Heart Disease	5.6%	6.5%	+16.1%	10.2%	+82.1%
Chronic Obstructive Pulmonary Disease	5.7%	6.7%	+18.3%	11.0%	+93%
Poor Physical Health	13.1%	16.0%	+22.5%	22.5%	+71.8%
Poor Mental Health	12.3%	14.5%	+17.7%	18.9%	+53.7%
No Health Insurance	27.7%	34.7%	+25.2%	61.6%	+122.4%

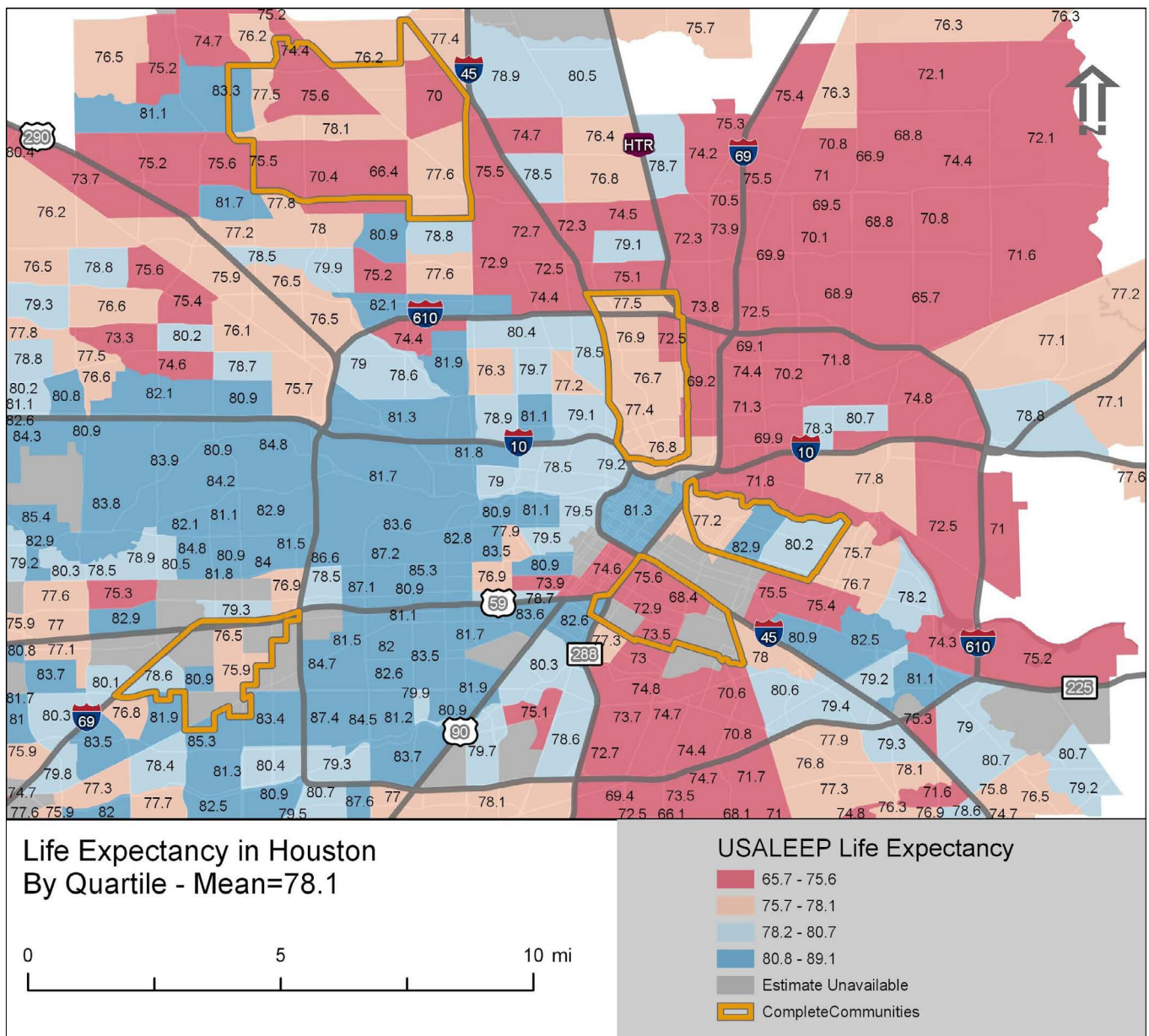
Source: Robert Wood Johnson Foundation and CDC Foundation, 500 Cities Project, [www.cdc.gov/500cities/about.htm](http://www.cdc.gov/500cities/about.htm)

<sup>5</sup> Averages for the individual Complete Communities represent the mean value among the Census Tracts that intersect or are encompassed by the outline of the Complete Community. Similarly, the values representing the average among all of the Complete Communities are derived from the average value of these Census Tracts for all five communities.

In addition to these specific health outcome indicators, evaluation of data from the U.S. Small-area Life Expectancy Estimates Project (USALEEP)<sup>6</sup> reveals familiar patterns of inequity in mortality rates for the City of Houston (Figure 3). The USALEEP project produced estimates of life expectancy at birth — the average number of years a person can expect to live — for many of the Census tracts in the City of Houston.

The average estimated life expectancy within the city is 78.1 years, which is marginally higher than the Texas state average (77.9), and not far from the national average of 78.3. The range of the values for the City of Houston, however, reflects inequities in the projected life expectancy for the City of Houston which closely align with the socioeconomic and demographic characteristics previously outlined in this summary.

**Figure 3: Available USALEEP data for the Census Tracts within the City of Houston, symbolized by quartile**



<sup>6</sup> The U.S. Small-area Life Expectancy Estimates Project (USALEEP) is a partnership of the National Center for Health Statistics (NCHS), CDC, the Robert Wood Johnson Foundation (RWJF), and the National Association for Public Health Statistics and Information Systems (NAPHSIS). [www.cdc.gov/nchs/nvss/usaleep/usaleep.html](http://www.cdc.gov/nchs/nvss/usaleep/usaleep.html)

According to USALEEP, life expectancy ranges from 65.7 to 89.1 years — **a disparity of nearly twenty-three and a half years between neighborhoods in Houston**. Although the data for the Complete Communities is incomplete in some areas, the lowest provided life expectancy estimate within the Complete Communities is in Acres Homes: 66.4 years. There are also significant variations of life expectancy estimates within the Complete Communities. These differences in life expectancy highlight that there is an intricate web of complex factors that shape community health outcomes.

## Health Risks in Complete Communities

The Kinder Institute analysis also made use of the EPA's EJSCREEN to show how proximity to hazardous uses and health risk interact. The EJSCREEN is a tool that provides environmental and demographic data for Census block-groups<sup>7</sup> that attempts to quantify the potential level of exposure, risk and proximity to adverse environmental pollution sources that local residents may experience compared to everyone else in the country. The tool also focuses on specific potential risks from an environmental pollutant and takes the vulnerabilities of certain demographic profiles into account. For every block group, the EJSCREEN calculates an EJ Index for 11 environmental indicators (including cancer risk, respiratory hazards and particulate matter among others). The EJ Index is higher if a block group has high potential for exposure to pollution sources and a sociodemographic profile that indicates other measures of vulnerability such as high percentages of low-income and minority populations as well as statistically higher elderly populations, children or people who speak English with limited proficiency, persons living in overcrowded homes, and other circumstantial factors that may amplify risk to environmental health exposures.

Evaluation of the EJ Index indicators makes it clear that there is a disparity in the potential environmental risks faced by residents across Harris County (Figure 4) and among the Complete Communities (Figure 5). The area to the west of downtown, which is a predominantly wealthier area with lower percentages of people of color, face significantly fewer potential environmental health risks than much of the rest of the county. Overall, people living in block groups with severe potential health risks

<sup>7</sup> A block group is an area defined by the Census Bureau that usually has in the range of 600-3,000 people living in it. The US is divided into more than 200,000 block groups.

based on the presence of all 11 EJ Index indicators are at significantly lower income levels than those with significantly lower risk. The average median annual salary of the 842 block groups where no indicator reaches the 90th percentile is \$96,161, whereas the average median annual salary for the 29 block groups with the highest number of EJ Index indicators at or above the 90th percentile is \$31,598.

## Summary of EJSCREEN Findings for the Complete Communities

**Acres Homes** — of the 124 block groups within an adjacent area of air emission sources in Acres Homes, 86 percent of them have at least one EJ Index indicator at the 90th percentile. Almost half have between six and 10 EJ index indicators at or above the 90th percentile. Some of the major health concerns in this neighborhood and its surrounding area are related to potential exposure to PM 2.5 level in the air (54 percent), waste (TDSF) facilities (54 percent) and diesel particulate matter (52 percent).

**Near Northside** — of the 147 block groups within an adjacent area of air emission sources in the Near Northside, there are five block groups where all EJ index indicators are at the 90th percentile. These are all located adjacent to the neighborhood's boundary, including some inside the Second Ward. Overall 80 percent of block groups have at least one EJ index at the 90th percentile. Of all block groups, 36 percent have six to 10 indicators at the 90th percentile. Some of the major health concerns in this neighborhood and its surrounding area are related to potential exposure to Superfund NPL sites (72 percent), lead paint (56 percent) and RMP facilities (50 percent).

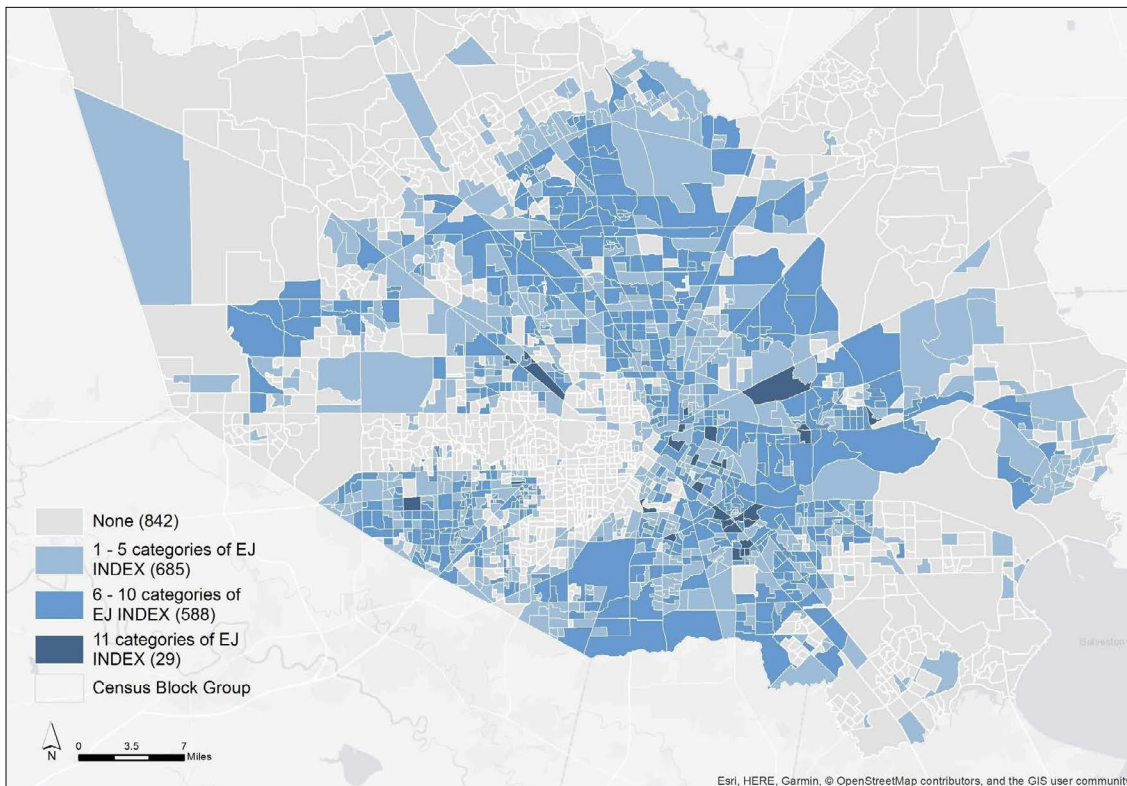
**Second Ward** — of the 130 block groups within the adjacent area of air emission sources in Second Ward, there are five block groups with all EJ index indicators at the 90th percentile. Overall 63 percent of all block groups have at least one EJ Index at the 90th percentile, and 48 percent of all block groups have six to 10 EJ Index indicators at the 90th percentile. Some of the major health risks of this neighborhood and its surrounding areas are related to potential exposure to cumulative direct discharge (75 percent), closeness to Superfund NPL sites (75 percent) and lead paint (65 percent).

**Third Ward** — of the 95 block groups within the adjacent area of air emission sources in Third Ward, there are five block groups with all 11 EJ Index indicators present.

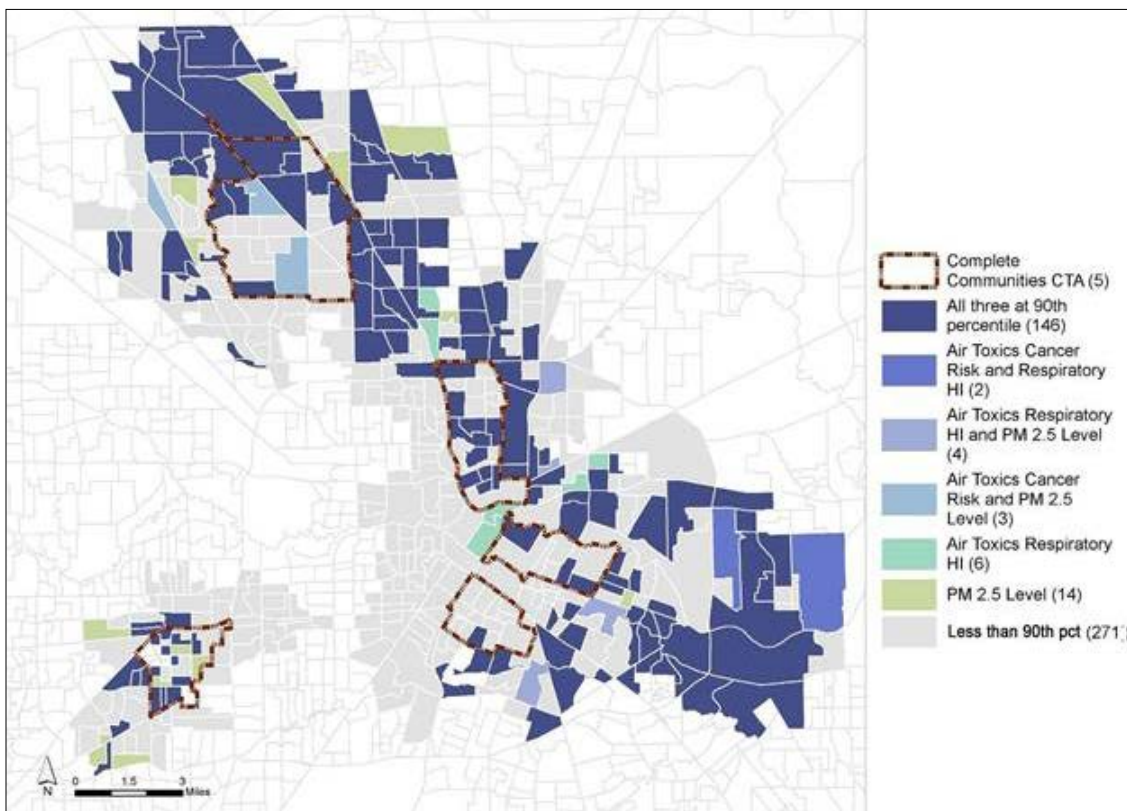
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**Figure 4: EPA EJ Screen EJ Index data for Harris County featured in the Kinder Institute report**



**Figure 5: The presence within and adjacent to Complete Communities of three key environmental indicators identified in EPA’s EJ Screen EJ Index — as featured in the Kinder Institute report**





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Approximately 21 percent of block groups have at least five and up to 10 EJ Index indicators present. Some of the major health risks of this community are related due to potential exposure to cumulative direct waste discharge (44 percent), closeness to TSD facility (42 percent) and Superfund NPL sites (40 percent).

**Gulfton** — of the 80 block groups within the adjacent area of air emission sources in Gulfton, there is one block group where all EJ Index indicators are at the 90th percentile. About 49 percent of all block groups have at least one EJ Index indicator at the 90th percentile. Some of the major health risks of this neighborhood and its surrounding area are related to potential exposure to PM 2.5 level in the air (33 percent), traffic (31 percent) and diesel particulate matter level in the air (30 percent).

The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes in EJSCREEN reflecting the 11 environmental indicators.

The 11 EJ Index names are:

1. National Scale Air Toxics Assessment  
Air Toxics Cancer Risk
2. National Scale Air Toxics Assessment  
Respiratory Hazard Index
3. National Scale Air Toxics Assessment  
Diesel PM (DPM)
4. Particulate Matter (PM<sub>2.5</sub>)
5. Ozone
6. Lead Paint Indicator
7. Traffic Proximity and Volume
8. Proximity to Risk Management Plan Sites
9. Proximity to Treatment Storage and Disposal Facilities
10. Proximity to National Priorities List Sites
11. Proximity to Major Direct Water Dischargers

Source: [www.epa.gov/ejscreen/environmental-justice-indexes-ejscreen](http://www.epa.gov/ejscreen/environmental-justice-indexes-ejscreen)

## Legal Review and Policy Recommendations

Houston is unique among large metropolitan cities in that it is the only major city in the United States that lacks formal zoning. The next most populated municipality to forgo a formal zoning regimen is the neighboring city of Pasadena, which is home to a population one-sixteenth the size of Houston; a fact which attests to the rarity of unzoned development among municipal planning departments. In the absence of this nearly universal land use tool, ChangeLab Solutions was engaged to evaluate plausible alternative regulatory mechanisms that could be formulated at the local level to control the siting of polluting facilities near sensitive land uses such as schools, parks, and homes.

Because prior efforts by the City of Houston to enact ordinances that regulate the siting of air-polluting facilities were recently invalidated by the Texas Supreme Court<sup>8</sup>, ChangeLab concluded that it is unlikely the City may adopt a local ordinance that directly regulates the siting or operation of facilities that have obtained an operating permit from the Texas Commission on Environmental Quality (TCEQ). An attempt to implement an ordinance to directly regulate these facilities would likely lead to an aggressive effort by the state to preempt the ordinance. ChangeLab evaluated alternative land use tools such as buffer requirements, density-based restrictions, and overlay districts and concluded that although these mechanisms are currently deployed in some capacity within the City, the precedent set by the recent Supreme Court rulings suggests that any attempt to formulate and enforce local regulatory requirements on facilities that have been granted a permit from TCEQ would be at similar risk of invalidation by the Texas Supreme Court.

<sup>8</sup> Southern Crushed Concrete, LLC v. City of Houston, and BCCA Appeal Group, Inc. v. City of Houston

## Recommendations to Advance Environmental Justice

Because local policy-making authority is limited pertaining to state-regulated sources of air pollution, a first step for the city is to establish an Environmental Justice Advisory Committee (EJAC). The members of the Committee would be appointed by the Mayor and other key stakeholders. The purpose of the Committee would be to:

- develop a local definition of an environmental justice (EJ) community that would serve to trigger 1) a health impact assessment (HIA)<sup>9</sup> if the permit meets certain criteria (to be determined) in coordination with relevant City agencies, 2) community engagement of residents that will be impacted by the proposed development, and 3) prioritize communities for funding to mitigate air pollution,
- provide guidance to City staff regarding EJ issues,
- inform the development of a city wide environmental justice plan that guides city agencies in how to best integrate EJ considerations into city-wide decision-making processes,
- work to establish a resident notification system that informs residents that reside or schools that are located within a specified distance (e.g. one mile) of permit applications for hazardous land uses to facilitate the opportunity for them to engage in the public comment process early on,
- establish a staff position(s) that serves as a community advocate to help residents navigate the state regulatory permit process (and any local decision-making processes that are relevant), and,
- establish an air quality fund to ensure that resources are set aside to develop and implement a community air protection program, including community air monitoring and the identification of mitigations, especially when new developments are being planned in neighborhoods already experiencing cumulative impacts. The establishment of community air monitoring networks would also require the establishment of a protocol that triggers government action when pollutants reach defined thresholds considered harmful to human health.

## Recommendations to Strengthen Enforcement

- identify a source of funding or other support to enable the City to strengthen proactive inspections of air polluting facilities and initiate enforcement actions following the procedures established by the TCAA. Such inspections may have a deterrent effect if facility operators know they could be inspected at any time and could lead to the generation of data about local emissions that could help to draw public attention to a problem, provide necessary evidence for lawsuits, or create leverage to demand state or federal action, in conjunction with proactive investigations, the Houston City Council could adopt a resolution specifically authorizing the City Attorney's office to exercise its statutory authority to civilly enforce the TCAA. Upon adoption of such a resolution, an air pollution task force could be established within the City Attorney's office, which would cooperate with health inspectors and municipal police officers to vigorously pursue enforcement actions when violations of the TCAA are identified,
- advocate at the state level for amendments to the TCAA that would create more stringent distance limitations or setbacks or expand local authority to regulate air-polluting facilities,
- increase participation of City leadership and the general public in TCEQ rulemaking proceedings by petitioning for the adoption of stronger regulations to control the siting of air-polluting facilities or commenting on proposed regulations.

<sup>9</sup> The HIA would determine the range of potential adverse impacts and identify mitigation strategies that would be required to be a part of the plan before the development would be approved. Based on the results of the legal review, this requirement could not currently apply to industrial facilities that have been granted permits from the state environmental regulatory agency. However, it could apply to other types of development and facilities (e.g. metal recyclers). For example, the most recent Kinder Institute survey indicates that traffic is the most pressing concern for residents (however this is probably not due to air quality concerns from traffic). The HIAs could primarily focus on impacts of concern to City residents (e.g. traffic, flooding, etc.). The city can regulate traffic (per ChangeLab's analysis) so truck routing ordinances could be leveraged to reduce traffic impacts and subsequently reduce residents' exposure to air pollution from mobile sources.

## Recommendations to Reduce Exposure to Air Pollution

- the City may consider adopting a local ordinance or program that uses incentives such as expedited permitting or tax incentives to encourage businesses to adopt cleaner practices,
- submit public comments on individual air quality permit applications to advocate for increased buffers or other conditions that will protect nearby residents who will be affected by the construction of the facility,
- integrate green infrastructure into policies and plans affecting public land and facilities,
- adopt a local ordinance to improve indoor air quality in buildings located in close proximity to freeways and industrial sources through mitigative strategies such as the installation of high-efficiency filters, building sealants, and the strategic placement of barriers and vegetation,
- adopt a local truck route ordinance to minimize the impact of emissions from mobile sources and preclude the establishment of businesses that depend on heavy trucking, conduct a review of existing sensitive land uses that are located within a defined number of feet of a highway and/or located in a defined distance from an existing hazardous land use and develop recommendations for the installation of air filters, low-cost community air monitoring networks, and/or water and soil testing for developments in EJ communities.

## Conclusion

The results of this analysis support the extensive body of research which demonstrates that health and place are inextricably linked. The health and safety risks in Houston's Complete Communities are not only a product of inadequate land-use policies but also structural racism. To move forward toward environmental justice, these issues will need to be integral to the dialogue about how to effectively dismantle the policies and practices that have led to the disproportionate siting of environmental hazards in communities of color and low-wealth. These program and policy recommendations could be piloted in the Complete Communities and then expanded to other areas in Houston to address long standing environmental injustices to ensure all residents have the opportunity to live a healthier life in Houston.