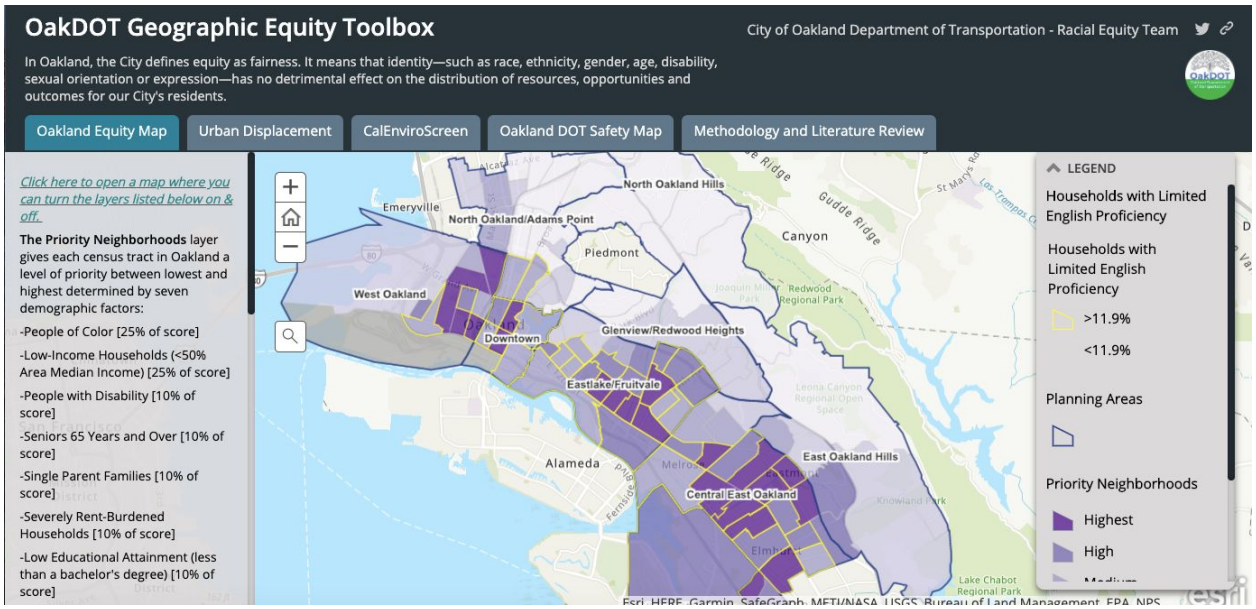
Oakland
Geographic Equity Toolbox and Equity Map Methodology and Literature Review

July 2020

Data Analytics Subcommittee of the Racial Equity Team
City of Oakland Department of Transportation

Table of Contents

Map



[Web Map App link]

[Map to turn layers on and off]

Introduction

"In Oakland, the City defines equity as fairness. It means that identity—such as race, ethnicity, gender, age, disability, sexual orientation or expression—has no detrimental effect on the distribution of resources, opportunities and outcomes for our City's residents."[1]

Oakland is one of the most ethnically and racially diverse cities in the country.[2] It is also a city of vast inequities. For instance, the Oakland Equity Indicators 2018 Report found that black Oaklanders are 12.95 times more likely to be arrested for a felony, 8.6 times more likely to be jailed and 23.68 times more likely to have force used against them by a law enforcement officer[3] compared to white Oaklanders. In addition, economic inequality throughout the city is striking and geographically isolated. As of 2017, the median household income of the lowest-earning census tract was approximately $19,000, while the highest was approximately $211,000[4], over ten times higher.

The City of Oakland Department of Transportation (OakDOT) Strategic Plan is built around the four pillars of Mayor Schaaf's vision for our city, one of which is 'equity.'[5] One of the central goals of the Strategic Plan is to "enhance use of data to guide equitable mobility and infrastructure investments."[6] Following the lead of the Oakland Equity Indicators 2018 Report and OakDOT's Strategic Plan, and given Oakland's diverse communities, the Oakland Geographic Equity Toolbox was created as a way for the City of Oakland to prioritize neighborhoods based on concentrations of people with demographic factors determined to have experienced historic and current disparities.

The goal of the Oakland Geographic Equity Toolbox is to inform our work and guide our investments to advance DOT's Racial Equity Goals and Citywide efforts. Recognizing that not everyone has the same needs, this tool is meant to leverage attention and funding to neighborhoods that may have been historically and currently overlooked by city services and planning processes.

This tool is not meant to replace community outreach, but rather provide a data-driven context for how disparities play out spatially across Oakland. Priority neighborhoods should receive more in-depth community outreach in order to consider the specific needs of populations of people with demographic factors determined to have experienced historic and current disparities.

This document provides a map as well as the methodology and literature review for the Oakland Equity Map of the Oakland Geographic Equity Toolbox.

[1] Oakland Equity Indicators (City of Oakland, 2018), 8.
[2] America's Most Racially Diverse Big Cities (U.S. News & World Report, 2020)
[3] Oakland Equity Indicators, 106, 107, 114
[4] Household Income in the Past 12 Months (U.S. Census Bureau, 2017)
[5] Department of Transportation's Strategic Plan – January 2020 Update (City of Oakland, 2016)
[6] City of Oakland Department of Transportation Strategic Plan (City of Oakland, 2016), 11

This Oakland Equity Map differs from other geographic equity maps, like the Metropolitan Transportation Commission's Communities of Concern map, in that this tool is Oakland specific. Our methodology is distinct in three ways: this tool uses similar, but not identical, factors to MTC's COC maps; our prioritization is a scale (from lowest to highest) instead of a binary of yes/no; and every Census tract's data is compared to citywide data. These aspects of our methodology provides us with more granular data which is helpful for Oakland-scale analyses rather at a regional scale. The chart below explains the difference in more detail:

Tool	**Purpose**	**Factors**	**Prioritization Process**
Metropolitan Transportation Commision (MTC) - Communities of Concern (COC) Map	Regional Bay Area Planning Tool	8 Factors: ● Minorities ● Low-Income (200% Federal Poverty Level) ● People with Disability ● Seniors 75 Years and Over ● Single Parent Families ● Rent-Burdened Households ● People Limited English Proficiency ● Zero-Vehicle Households	Census tracts are considered Communities of Concern (COC) if they: 1. Have a concentration of BOTH minority AND low-income households, OR 2. Have a concentration of 3 other factors AND low-income households. Community of Concern (COC) Census tracts are categorized into high, higher, and highest based on the mean percentage of regional data.
Oakland Department of Transportation (OakDOT) - Oakland Equity Map	Local Planning Tool Customized for Oakland	7 Factors: ● People of Color ● Low-Income (50% Area Median Income) ● People with Disability ● Seniors 65 Years and Over ● Single Parent Families ● Severely Rent-Burdened Households ● Low Educational Attainment	Every Census tract in Oakland receives a score, which are then scaled from lowest to highest. Each Census tract's data is compared to Oakland citywide data. See below for more detailed information.

A layer with MTC's Communities of Concern label by census tract is available to view on the map where you can turn layers on and off.

A more detailed breakdown of racial and ethnic categories by census tract is also available to view on the map where you can turn layers on and off.

How the Oakland Geographic Equity Toolbox Works

The Oakland Geographic Equity Toolbox has four tabs, each of which add information to provide a data-driven context for how disparities play out spatially in Oakland. OakDOT staff are encouraged to use these tabs to make data-informed decisions about where to prioritize policies, programs, projects, and funding.

The Oakland Equity Map is the first tab. This includes the **Priority Neighborhoods layer,** in which seven demographic factors were used to give each census tract in Oaklanda level of priority between lowest and highest. The methodology for determining priority scores as well as a literature review of each factor are below. All factors use American Community Survey (ACS) Data 2017 5YR Estimates. This tab also includes **Planning Areas layer**, which aggregates priority neighborhood Census tract information into Oakland's nine planning areas. The methodology for planning area calculations is also below. Finally, this tab also includes a **Limited English Proficiency (LEP) layer**, which highlights census tracts where the percentage of households with limited English proficiency is greater than the percentage of households with limited English proficiency in the City of Oakland as a whole (11.9%). LEP was not included in the calculation of the Priority Neighborhoods score due to a relatively high level of uncertainty and error in the underlying data.[7] LEP is included as a layer to highlight the unique community engagement needs of people with low English proficiency.

Urban Displacement Project is used for the second tab, which is a tool that identifies neighborhood change by classifying patterns of gentrification and displacement.[8] This layer shows the 2017 Displacement and Gentrification Typologies, in which each census tract is either designated as Low Income tracts (not losing low-income households, at risk of gentrification or displacement, or ongoing gentrification/displacement of low-income households) or Moderate to High Income tracts (advanced gentrification, not losing low-income households, at risk of exclusion, ongoing exclusion/displacement of low-income households, or advanced exclusion). This layer is included in the Oakland Equity Map because gentrification and displacement have and continue to price Oakland's low-income households and households of color out of Oakland, especially Black households.[9]

CalEnviroScreen is used for the third tab, which is a tool that identifies California communities by census tract that are disproportionately burdened by, and vulnerable to, multiple sources of pollution. This layer shows the 2018 CalEnviroScreen's Pollution Burden Percentile, in which each census tract's pollution burden is ranked against other census tracts throughout the state. Pollution Burden is calculated from seven Exposure Indicators (ozone and PM2.5 concentrations, diesel PM emissions, drinking water contaminants, pesticide use, toxic releases from facilities, and traffic density) and five Environmental Effects Indicators (cleanup sites, impaired water bodies, groundwater threats, hazardous

[7] Limited English Proficiency data comes from American Community Survey (ACS) Data 2017 5YR Estimates Table S1602
[8] Mapping Displacement and Gentrification in the San Francisco Bay Area (Urban Displacement Project, 2017)
[9] Rose, Kalima, Oakland's Displacement Crisis: As Told by the Numbers (PolicyLink, 2016)

waste facilities and generators, and solid waste sites and facilities).[10] This layer is included in the Oakland Equity Map because historical land-use decisions that concentrated industrial facilities or highways in certain neighborhoods have disproportionately exposed some communities to pollutants and degraded environments which negatively impact residents' health.

The Oakland DOT Safety Map is the fourth tab and provides information on high-injury corridors and intersections where severe and fatal traffic crashes occur for all transportation modes.

[10] CalEnviroScreen 3.0 (Office of Environmental Health Hazard Assessment, 2017), 103. Indicators from the Environmental Effects component were given half the weight of the indicators from the Exposures component.

Methodology for Prioritizing Neighborhoods

This methodology uses seven factors to determine the level of priority for a census tract: **race, income, disability status, educational attainment, age, single parent households, and rent burden**. Factors were chosen using a survey of OakDOT Racial Equity Team members.

Race and income were selected as the top priorities of the department for considering the distribution of resources, opportunities, and outcomes for Oakland residents. As a result, the score developed in this methodology gives an increased weight to these two factors. The appendix includes the results of our statistical analysis showing the correlation between all other factors and race and income.

Tracts with scores above 1.0 have greater percentages of people to whom the factors apply relative to the city as a whole. Tracts with scores below 1.0 have lower percentages of people to whom the factors apply relative to the city as a whole.

Tracts are then mapped and divided into five categories using quantiles, meaning the same number of tracts are in each of the five categories. Oakland has a total of 113 census tracts, but three tracts had unavailable or unreliable data, so each quantile has 22 census tracts in it. Tract designation categories include: lowest, low, medium, high, and highest.

Below is an example of how we calculated the score of a tract:

<table>
<tr><td colspan="6">Tract 400100 | total population: 2,991</td></tr>
<tr><td></td><td>Tract %</td><td>City %</td><td>Ratio (relative to the city)</td><td>% of score</td><td>Score</td></tr>
<tr><td>People of Color</td><td>31%</td><td>71.6%</td><td>0.43</td><td rowspan="2">50%</td><td rowspan="8">0.58</td></tr>
<tr><td>Low Income People (>50% AMI)</td><td>14%</td><td>40.7%</td><td>0.35</td></tr>
<tr><td>People with Low Educational Attainment (> Bachelor’s degree)</td><td>19%</td><td>59.4%</td><td>0.31</td><td rowspan="5">50%</td></tr>
<tr><td>Single Parent Families</td><td>3%</td><td>20.6%</td><td>0.14</td></tr>
<tr><td>People Over 65</td><td>25%</td><td>12.5%</td><td>2.02</td></tr>
<tr><td>People with a Disability</td><td>9%</td><td>12.6%</td><td>0.70</td></tr>
<tr><td>Severely Rent Burdened Households</td><td>16%</td><td>26.0%</td><td>0.62</td></tr>
</table>

Methodology for Planning Areas

Planning Areas are a simple way of referring to different parts of Oakland that are smaller than Council Districts but larger than individual neighborhoods. Oakland's 2007 Bicycle Plan, 2017 Pedestrian Plan, 2019 3-Year Paving Plan, and 2019 Bicycle Plan have used the planning areas as a way to distribute resources and projects.

Oakland's nine Planning Areas are: **Central / East Oakland, Downtown, Coliseum / Airport, Downtown, East Oakland Hills, Eastlake / Fruitvale, Glenview / Redwood Heights, North Oakland Hills, North Oakland / Adams Point, and West Oakland.** Below are the calculations we used to create each Planning Area Score (PAS) as well as the Share of Priority Neighborhoods value.

Planning Area Score (PAS) is the total score for a Planning Area calculated by the sum of all tract scores within that planning area, each scaled by the percentage of a tract's population in that planning area.

Planning Area Score (PAS) = Sum of (Tract Final Score x (Tract Population / Planning Area Population))

Share of Priority Neighborhoods is based on PAS and scaled by the planning area's percent of total city population.

Share of Priority Neighborhoods = (Planning Area Population x PAS) / City Population

Planning Area	Population	Planning Area Score (PAS)	Share of Priority Neighborhoods
Central / East Oakland	99,586	1.27	29%
Coliseum / Airport	3,775	1.26	1%
Downtown	19,897	1.16	5%
East Oakland Hills	32,073	0.90	7%
Eastlake / Fruitvale	99,218	1.17	27%
Glenview / Redwood Heights	31,915	0.74	6%
North Oakland Hills	23,973	0.51	3%
North Oakland / Adams Point	80,439	0.78	15%
West Oakland	25,869	1.24	7%
Citywide	416,745*	--	100%

*Does not include the population of three Census tracts with unavailable or unreliable data.

Rationale of Factors for Prioritizing Neighborhoods

People of Color (POC)

Definition	Minority populations include persons who identify as any of the following groups as defined by the Census Bureau in accordance with guidelines provided by the U.S. Office of Management and Budget: American Indian or Pacific Islander Alone (Non-Hispanic/non-Latino); Asian Alone (non-Hispanic/non-Latino); Black or African-American Alone (non-Hispanic/non-Latino); and Other (Some Other Race, Two or More Races). The Office of Management and Budget defines "Hispanic or Latino" ethnicity as a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.
Data Source	American Community Survey (ACS) Table B03002 (Hispanic or Latino Origin By Race), 2017 5 Year Estimates
Universe	Total Population
Variable Calculation	(Total Population - White Alone(Non-Hispanic/non-Latino)) / Total Population (B03002_001E - B03002_003E) / B03002_001E

Rationale:

One of the key findings from the City of Oakland Equity Indicators 2018 Report was that "race matters" and that "almost every indicator of well-being shows troubling disparities by race."[11] For example, one of the most staggering disparities in the report found that a Black Oakland youth was 112.63 times more likely to be arrested on felony charges than a white Oakland youth in 2017.[12] Oakland's history, like the United States, includes laws and policies that have had lasting negative impacts on people of color. Tracking race-based disparities in accessing opportunities and resources is essential to the goal of dismantling systemic racial oppression.

Census race and ethnicity categories, and the data based on them, are inherently limited as they do not encompass all lived experiences. For example, a Middle Eastern or North African category is not included in the Census, which limits the ability of people from the Middle East or North Africa to more accurately report their identities.

A more detailed breakdown of racial and ethnic categories by census tract is available to view on the map where you can turn layers on and off.

[11] Oakland Equity Indicators (2018), 8
[12] Oakland Equity Indicators (2018), 123

Low-Income Households

Definition	Households with annual incomes below $50,000. Closest approximation to 50% Area Median Income (AMI) for a family of 4 in Oakland ($52,150) in 2017. https://www.oaklandca.gov/resources/rent-and-income-limits-for-affordable-housing
Data Source	American Community Survey (ACS) Table B19001 (Household Income in the Past 12 Months (In 2017 Inflation-Adjusted Dollars)), 2017 5 Year Estimates
Universe	Households
Variable Calculation	(Households making less than $49,999) / Total households (B19001_002E + B19001_3E + B19001_4E + B19001_5E + B19001_6E + B19001_7E + B19001_8E + B19001_9E + B19001_10E) / B19001_001E

Rationale:

In 2017, the cost of living for a two-parent, two-child family in Alameda County was $121,922 per year.[13] Affording adequate housing, food, child care, transportation, health care, and other necessities are beyond the financial reach of many Oakland families. In addition, being low-income compounds existing hardships, such as being disabled or elderly. Furthermore, access to opportunity is deeply tied to income. The Department of Transportation's Strategic Plan pursues actions to decrease transportation costs and increase access to employment centers in an attempt to alleviate this financial burden on families.[14] Households of four who make less than 50% AMI are considered "very low income" by the Department of Housing and Urban Development (HUD) and qualify for various types of affordable housing programs such as housing vouchers.

[13] Family Budget Calculator (Economic Policy Institute, 2018)
[14] City of Oakland Department of Transportation Strategic Plan, 15

Severely Rent Burdened Households

Definition	Households are considered severely rent-burdened when they pay over 50% of their income on rent.
Data Source	American Community Survey (ACS) Table B25070 (Gross Rent as a Percentage of Household Income In the Past 12 Months), 2017 5 Year Estimates
Universe	Renter-occupied housing units
Variable Calculation	Renter-occupied housing units paying 50.0 percent or more / Total renter-occupied housing units B25070_010E / B25070_001E

Rationale:

High costs of homeownership and the racialized wealth gap in the Bay Area have caused many Oakland residents to be dependent on rental property for housing. According to the Department of Transportation Strategic Plan, rents in Oakland have increased 63% in the past five years.[15] The availability and cost of rental housing poses a significant burden to middle and low-income families and individuals. These residents must spend larger proportions of their income on rent, reducing their ability to afford other basic needs, like food and medical care. Unaffordable housing has been linked to reduced overall safety, lower levels of cognitive achievement in children, and poorer health outcomes.[16]

Regression analysis comparing the POC factor and Low-Income factor to Severely Rent Burdened factor is found on Appendix page 19.

[15] City of Oakland Department of Transportation Strategic Plan, 8

[16] Anderson et al. (American Journal of Preventive Medicine, 2003), 47-67; Harkness (Housing Policy Debate, 2005), 223-55; Pollack et al. (American Journal of Preventive Medicine, 2010), 515-21

Population with a Disability

Definition	The U.S. Census Bureau defines disability as: Hearing difficulty- deaf or having serious difficulty hearing (DEAR); Vision difficulty- blind or having serious difficulty remembering, concentrating, or making decisions (DREM); Ambulatory difficulty- having serious difficulty walking or climbing stairs (DPHY; Self-care difficulty- having difficulty bathing or dressing (DDRS); Independent living difficulty- because of a physical, mental, or emotional problem, having difficulty doing errands alone such as visiting a doctor's office or shopping (DOUT).
Data Source	American Community Survey (ACS) Table C18108 (Age by Number of Disabilities), 2017 5 Year Estimates
Universe	Civilian noninstitutionalized population
Variable Calculation	(Total population - (Under 18 with no disability + 18 to 64 years with no disability + 65 and older with no disability)) / Total population (C18108_001E - (C18108_005E + C18108_009E + C18108_0013E)) / C18108_001E

Rationale:

The Oakland Equity Indicators Report identifies disability as one of the facets of an individual's identity that should not have a detrimental effect on the distribution of resources, opportunities, and outcomes for the city's residents.[17] In addition, the Department of Transportation's Strategic Plan outlines Oakland's commitment to support transportation access for residents with disabilities and achieve full Americans with Disabilities Act (ADA) public right-of-way compliance.[18] 8.3% percent of Oakland residents under the age of 65 have a disability.[19] Individuals with disabilities require additional infrastructure in order to access employment and education. Identifying concentrations of the disabled population can help direct appropriate resources to places where it is needed most.

Regression analysis comparing the POC factor and Low-Income factor to Population with a Disability factor is found on Appendix page 20.

[17] Oakland Equity Indicators (2018), 8
[18] City of Oakland Department of Transportation Strategic Plan, 11
[19] (n.d.). Retrieved from https://www.census.gov/quickfacts/oaklandcitycalifornia

Low Educational Attainment

Definition	Population 25 years and over with less than a Bachelor's degree
Data Source	American Community Survey (ACS) Table B15003 (Educational Attainment for the Population 25 Years and Over), 2017 5 Year Estimates
Universe	Population 25 Years and Older
Variable Calculation	1 - (Percent Bachelor's Degree or Higher) / Total Population 1 - (B15003_022E + B15003_023E + B15003_024E + B15003_025E) / B15003_001E

Rationale:

According to the CalEnviroscreen 3.0 Report, educational attainment is, "an important element of socioeconomic status."[20] Low educational attainment is correlated to many of the other indicators outlined in this report. Having a college diploma is essential to finding entry level work or advancement opportunities within a large number of Bay Area industries. Lack of access to education can impact both the financial and health status of Oakland residents. The Bureau of Labor Force Statistics found that full-time workers without a high school diploma had median weekly earnings of $515, compared with $718 for high school graduates without a college education and $1,189 for those with a bachelor's degree.[21] Educational attainment is an important independent predictor of health[22] that can be linked to indoor and outdoor pollution and increased incidence of respiratory illness.[23]

Regression analysis comparing the POC factor and Low-Income factor to Low Educational Attainment factor is found on Appendix page 21.

[20] CalEnviroScreen 3.0, 132
[21] High school graduates who work full time had median weekly earnings of $718 in second quarter (U.S. Bureau of Labor Statistics, 2017)
[22] Cutler and Lleras-Muney (National Bureau of Economic Research, 2006)
[23] Krewski et al. (Health Effects Institute, 2000); Cakmak et al. (Archives of Environmental & Occupational Health, 2006); Shankardass et al. (Proc Natl Acad Sci USA ,2009); Neidell (Journal of Health Economics, 2004)

Seniors 65 Years and Over

Definition	Individuals 65 years of age and older
Data Source	American Community Survey (ACS) Table B01001 (Sex by Age), 2017 5 Year Estimates
Universe	Total Population
Variable Calculation	Male Population 65 and Older + Female Population 65 and Older / Total Population (B01001_020E + B01001_021E + B01001_022E + B01001_023E + B01001_024E + B01001_025E + B01001_044E + B01001_045E + B01001_046E + B01001_047E + B01001_048E + B01001_049E) / B01001_001E

Rationale:

Many older Americans stop working and are more vulnerable to health complications. Prioritizing services for seniors is essential to ensuring that seniors are able to live to the best of their ability and do not fall into poverty. The Department of Transportation Strategic Plan outlines support for making the roads safer and public transit more affordable for elderly populations.[24] Seniors may benefit from accommodations like priority seating on buses, public recreational spaces, longer time for using the crosswalk, and accessible, wide sidewalk designs for wheelchairs and walkers to enhance their overall mobility.

Regression analysis comparing the POC factor and Low-Income factor to the Seniors 65 Years and Over factor is found on Appendix page 22.

[24] City of Oakland Department of Transportation Strategic Plan, 22

Single Parent Households

Definition	Families with at least one child. To determine whether or not single-parent families exceed tract concentration thresholds, the share of single parent families is calculated as a share of all families regardless of whether or not they have any children.
Data Source	American Community Survey (ACS) Table B11004 (Family Type by Presence and Age of Related Children Under 18 years), 2017 5 Year Estimates
Universe	Families
Variable Calculation	(Male Householder with related children of the householder under 18 years + Female Householder with related children of the householder under 18 years) / (Total Families) (B11004_010E + B11004_016E) / B11004_001E

Rationale:

According to the American Community Survey, approximately 23.5% of Oakland households in 2018 were made up of single parent families with children under the age of 18. This is significantly higher than the national average of 15.8%.[25] The Plan Bay Area 2040 Equity Analysis Report found that a high number of single parent households in a neighborhood is strongly correlated with poverty and low intergenerational mobility.[26] Children of single parents may face various economic and social barriers to opportunity. An analysis done by Healthy Alameda County found that both adults and children in single-parent households experience increased risk of morbidity and mortality from all causes.[27]

Regression analysis comparing the POC factor and Low-Income factor to the Single Parent Households factor is found on Appendix page 23.

[25] Family Type by Presence and Age of Related Children Under 18 Years (Census Reporter, 2018)
[26] Plan Bay Area 2040 Equity Analysis Report (Metropolitan Transportation Commission/Association of Bay Area Governments, 2019), 4-5
[27] Single Parent Households (Healthy Alameda County, n.d.)

Citations

"About Race." The United States Census Bureau, January 23, 2018. https://www.census.gov/topics/population/race/about.html.

Anderson LM, St. Charles J, Fullilove MT, Scrimshaw SC, Fielding JE, Normand J (2003). Providing affordable family housing and reducing residential segregation by income. American Journal of Preventive Medicine 24(3):47-67.

Cakmak S, Dales RE, Judek S (2006). Respiratory health effects of air pollution gases: modification by education and income. Archives of Environmental & Occupational Health 61(1):5-10.

Calenviroscreen 3.0, Calenviroscreen 3.0 § (2017). https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf.

"Family Type by Presence and Age of Related Children Under 18 Years." Census Reporter. Accessed April 17, 2020. https://censusreporter.org/data/table/?table=B11004&geo_ids=04000US06,16000US0653000,01000US&primary_geo_id=04000US06.

Cutler DM, Lleras-Muney A (2006). Education and Health: Evaluating Theories and Evidence. National Bureau of Economic Research Working Paper Series No. 12352.

"Department of Transportation's Strategic Plan – January 2020 Update." City of Oakland. City of Oakland, February 4, 2020. https://www.oaklandca.gov/resources/department-of-transportation-a-strategic-plan.

"Family Budget Calculator." (2018, March). Retrieved from https://www.epi.org/resources/budget/

Harkness J and Newman SJ (2005). Housing Affordability and Children's Well-Being: Evidence from the National Survey of America's Families. Housing Policy Debate 16(2):223-55.

"High School Graduates Who Work Full Time Had Median Weekly Earnings of $718 in Second Quarter." U.S. Bureau of Labor Statistics. U.S. Bureau of Labor Statistics, July 21, 2017. https://www.bls.gov/opub/ted/2017/high-school-graduates-who-work-full-time-had-median-weekly-earnings-of-718-in-second-quarter.htm.

Krewski D, Burnett RT, Goldberg MS, Hoover K, Siemiatycki J, Jerrett M, et al. (2000). Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of particulate air pollution and mortality. Cambridge, MA: Health Effects Institute.

Neidell MJ (2004). Air pollution, health, and socio-economic status: the effect of outdoor air quality on childhood asthma. Journal of Health Economics 23(6):1209-36.

Oakland Equity Indicators, Oakland Equity Indicators § (n.d.). http://2040.planbayarea.org/sites/default/files/2017-07/Equity_Report_PBA 2040 _7-2017.pdf.

Plan Bay Area 2040: Final Equity Analysis Report , Plan Bay Area 2040: Final Equity Analysis Report § (7AD). http://2040.planbayarea.org/sites/default/files/2017-07/Equity_Report_PBA 2040 _7-2017.pdf.

Pollack CE, Griffin BA, Lynch J (2010). Housing affordability and health among homeowners and renters. Am J Prev Med 39(6):515-21.

Rodriquez, Matthew, and Lauren Zeise. CalEnviroScreen 3.0: update to the California communities environmental health and screening tool § (n.d.).

Rose, Kalima. "Oakland's Displacement Crisis: As Told by the Numbers." *PolicyLink*, August 2016. https://www.policylink.org/find-resources/library/oakland-displacement-crisis.

Shankardass K, McConnell R, Jerrett M, Milam J, Richardson J, Berhane K (2009). Parental stress increases the effect of traffic related air pollution on childhood asthma incidence. Proc Natl Acad Sci U S A 106(30):12406-11.

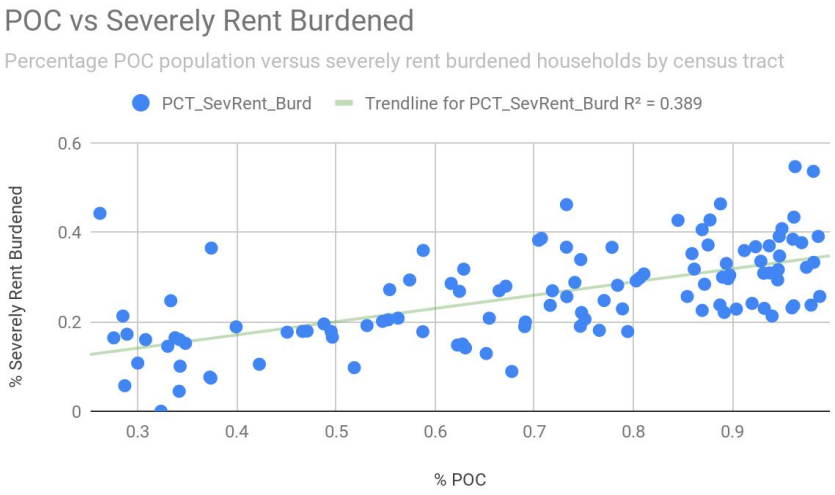
"Single Parent Households." Healthy Alameda County. Conduent Healthy Communities Institute. Accessed March 5, 2020. http://www.healthyalamedacounty.org/index.php?module=indicators&controller=index&action=view&indicatorId=411&localeId=132167&periodId=393.

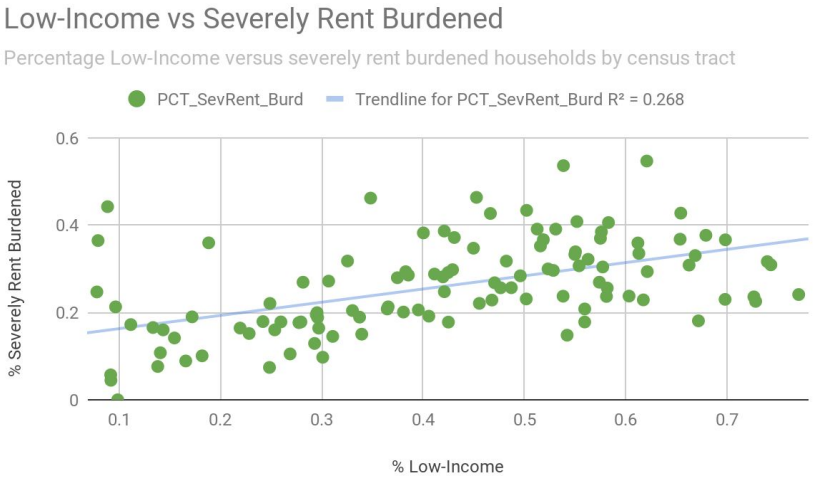
Zuk, M., & Chapple, K. (2015). Urban Displacement Project.

Appendix

This appendix includes our statistical analysis demonstrating the relationship between the two main factors (People of Color (POC) and Low-Income Households) and the five other factors (Severely Rent Burdened Households, Population with a Disability, Low Educational Attainment, Seniors 65 Years and Over, and Single Parent Households). POC and Low-Income are the factors we emphasize for determining priority by giving them increased weight; the remaining factors are included to capture dimensions of inequity that are compounded by or are not captured by the former two factors.

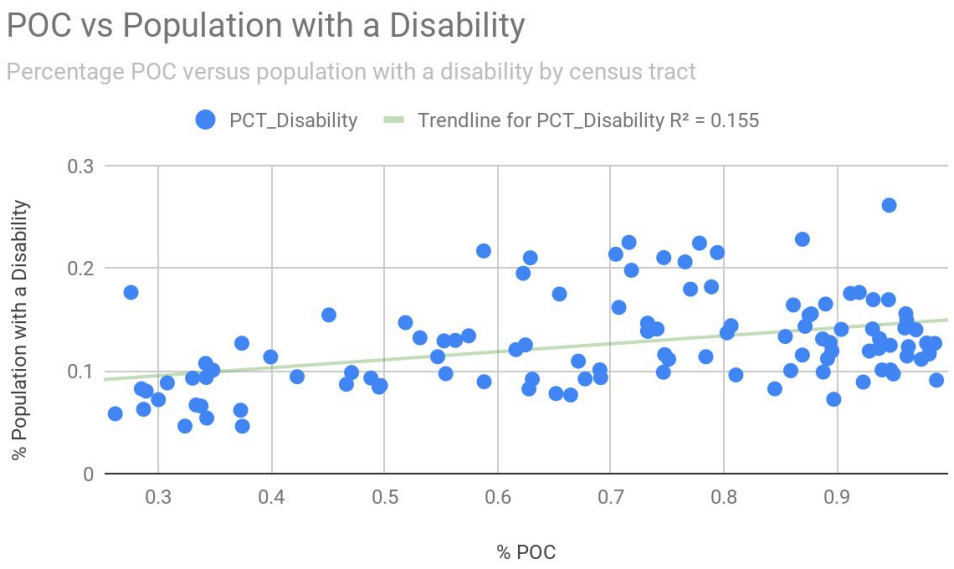
Severely Rent Burdened Households

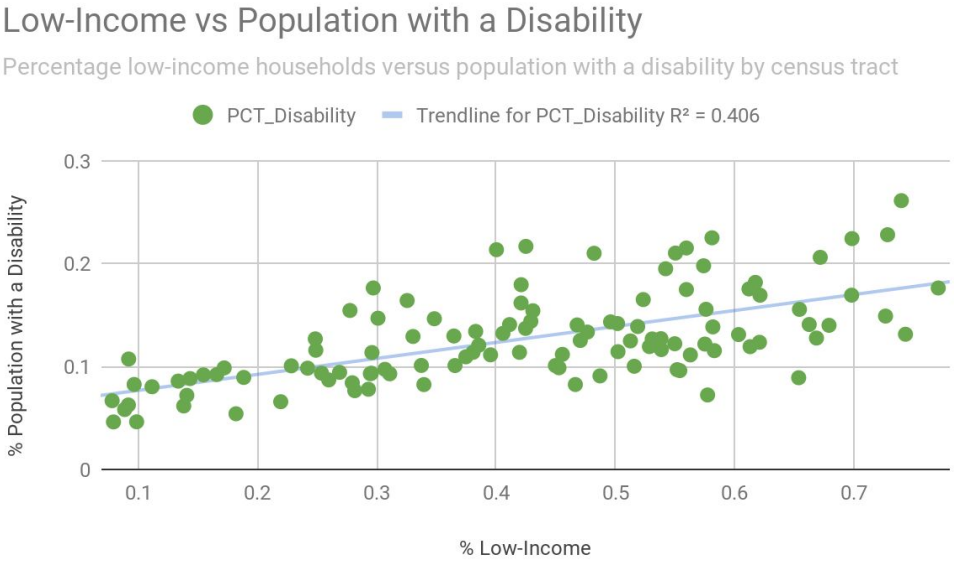




The Severely Rent Burdened factor is weakly positively correlated with both the Low-Income and POC factors. This implies that although tracts with higher Severely Rent Burdened populations are associated with greater low-income and POC populations, the association is too weak to entail overlapping populations. Therefore, the Severely Rent Burdened factor is also capturing information about a different population.

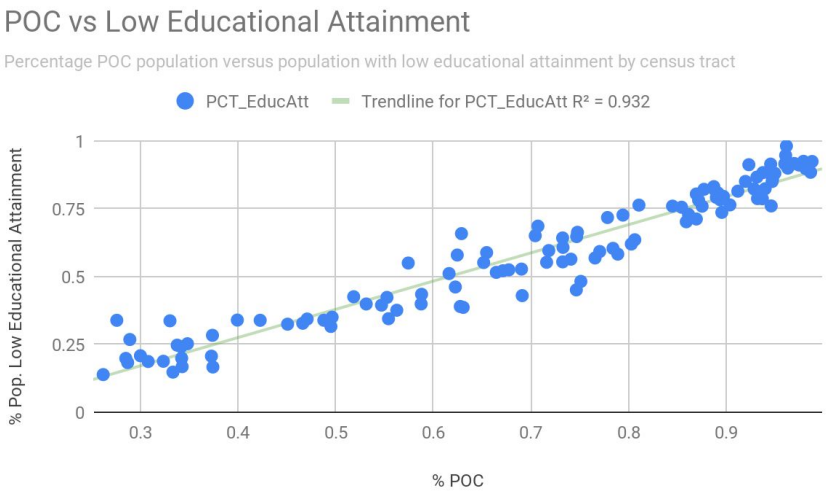
Population with a Disability

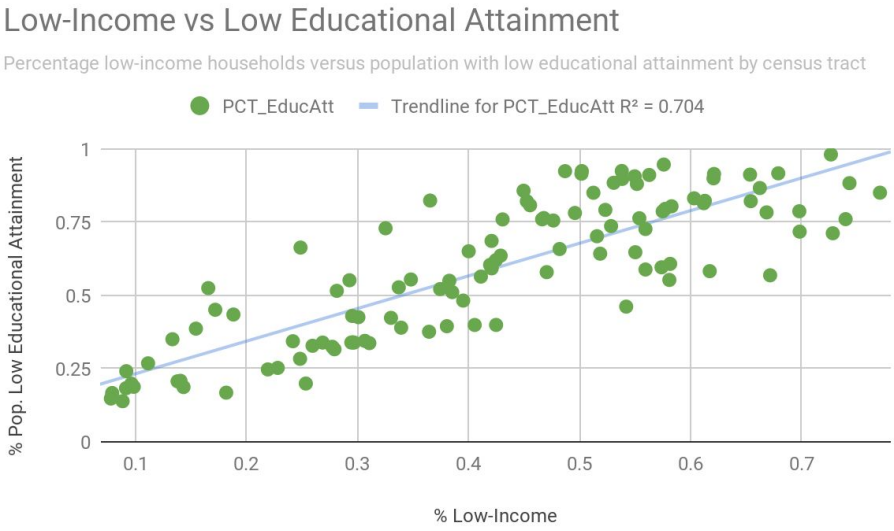




The Population with a Disability factor has a very weak positive correlation with the POC factor and a moderate positive correlation with the Low-Income factor. This implies that the Population with a Disability factor is capturing information about a different set of people affected by historic and current disparities than the POC factor.

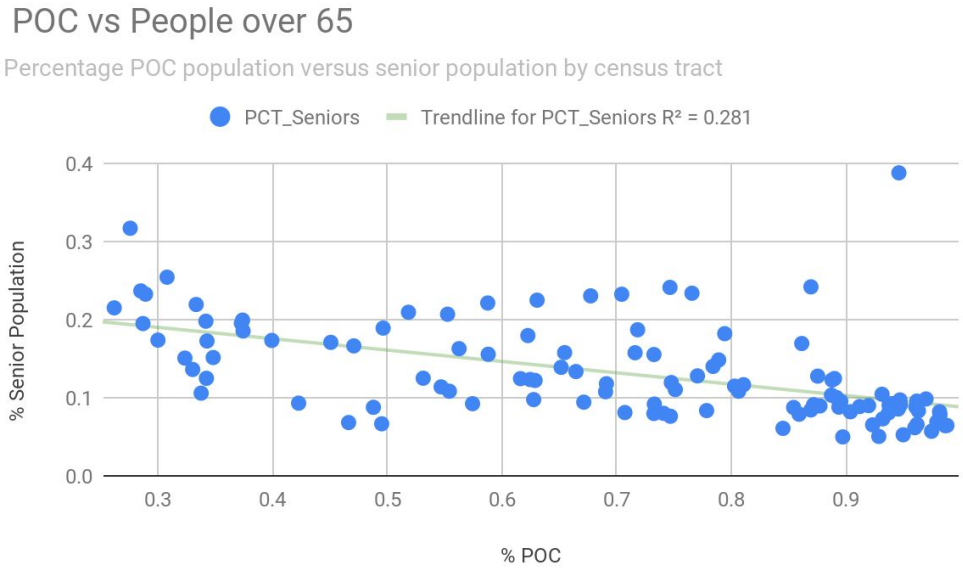
Low Educational Attainment (less than Bachelor's degree)

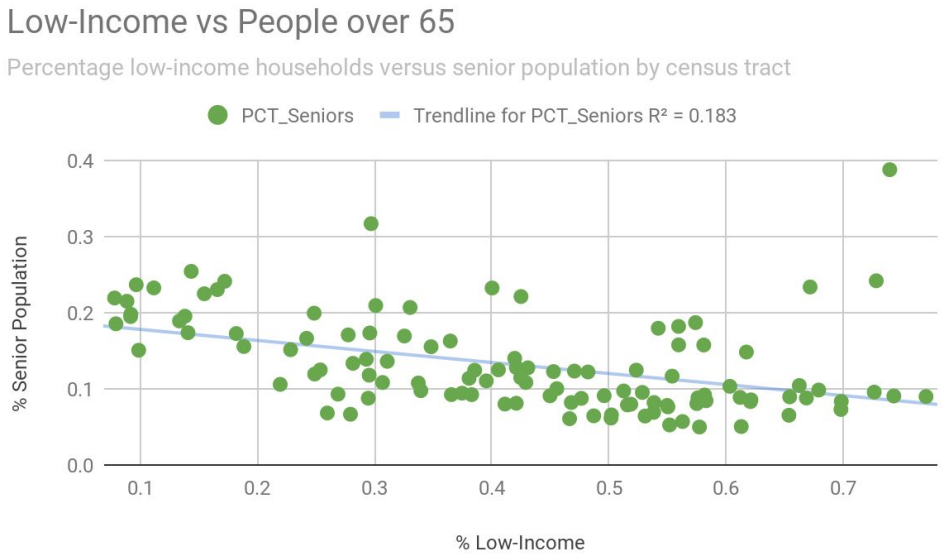




The POC factor and the Low Education Attainment factor are highly positively correlated — census tracts with high percentages of POC residents also have high percentages of population with less than a bachelor's degree. Even though both factors capture overlapping populations, including both in the overall calculation is important because it gives increased weight to those who experience the compounded effects of being a POC and having a lower level of education.

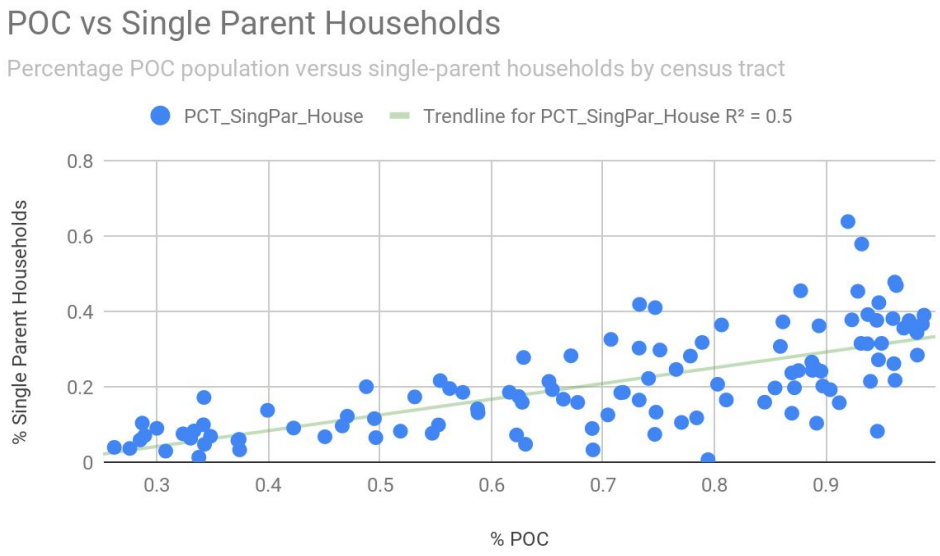
Seniors 65 Years and Over

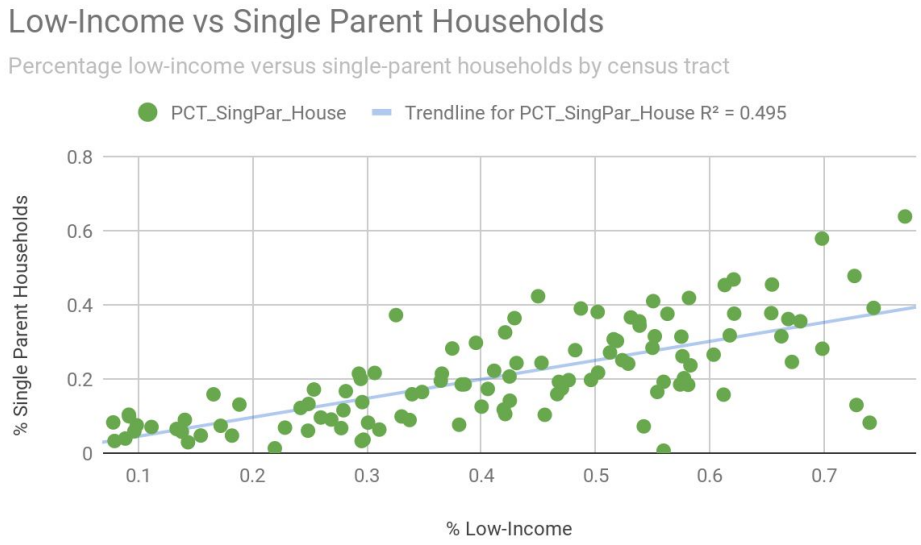




The Seniors 65 Years and Over factor is weakly negatively correlated with both Low-Income and POC, meaning that census tracts with greater senior populations tend to have comparatively slightly smaller Low-Income and POC populations. This factor captures information about a different population and increases the priority scores of census tracts that would have been considered low-priority tracts by the POC and Low-Income factors.

Single Parent Households





The Single Parent Households factor is moderately positively correlated with POC and Low-Income. This implies that Low-Income and POC may each have some overlapping populations with Single Parent Households. However, as they are not fully correlated, Single Parent Household is still capturing information about a different population and dimension of disparity.

Acknowledgements

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