TRANSPORTATION DISPARITIES MAPPING TOOL USER GUIDE

California Air Resources Board
UCLA Center for Neighborhood Knowledge

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ABOUT THE
TOOL

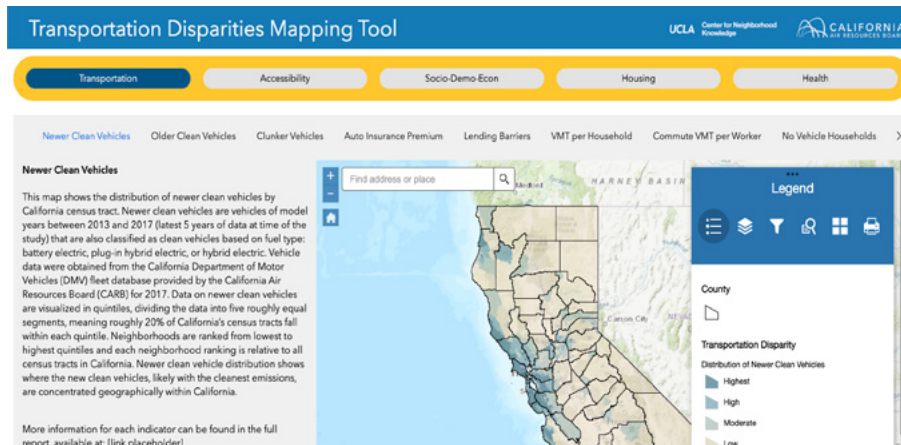## **What is the Transportation Disparity Mapping Tool?**

The Transportation Disparity Mapping Tool is a project developed to better understand transportation disparities and built environment-related determinants of health in California. It is a component of larger initiatives of the California Air Resources Board (CARB). According to Senate Bill 150, CARB is mandated to assess progress toward meeting greenhouse gas reduction goals. While striving to meet these goals, CARB also aims to ensure all segments of society benefit from CARB's climate change agenda, including disadvantaged communities (SB 535 and AB 617). In accordance with CARB goals, this mapping tool is a web-based information visualization portal that contains indicators related to the causes, characteristics, and consequences of transportation disparities. This tool provides useful indicators for CARB and other organizations to help fulfill state mandates related to climate change, greenhouse gas emissions, and environmental justice, and to evaluate progress towards a more sustainable and environmentally just future.

This tool was developed with an advisory committee and analyzed four major categories of disparities, including private vehicle ownership, public transit, active transportation, and transportation networks. The advisory committee, which aimed to provide stakeholder engagement, included representation from health experts, academics and researchers, and community organizations. The advisory committee also assisted in selecting which indicators and disparities should be prioritized and with the overall construction of the mapping tool. Additionally, a team of researchers and academics, led by Principal Investigator Paul Ong of UCLA Center for Neighborhood Knowledge (CNK), developed and visualized the indicators used in this tool. The development of this guide was funded in part by the **California Initiative for Health Equity and Action**.

This guide shows where to find documentation and methodology for each indicator. It provides guidance on how to navigate the map so that the user can work through the features and see the full scope of the information.

As a land grant institution, the authors acknowledge the Gabrielino and Tongva peoples as the traditional land caretakers of Tovaangar (Los Angeles basin, Southern Channel Islands), and recognize that their displacement has enabled the flourishing of UCLA.

MAPPING TOOL

The Transportation Disparities Mapping Tool is available [here](#).

▷ **Data Highlights**

This mapping tool includes four domains of transporation disparities and multiple built environment determinants of health. Here is a select list of the indicators included in each of the primary data domains of the mapping tool:

Transportation
- Newer Clean Vehicles
- Vehicles per Household
- % Public Transportation for Job Commute

Accessibility Measures
- Access to High-Quality Transit Locations
- Accessibility to Employment Opportunities
- Jobs-Housing Fit

Socio-Demo-Econ
- Largest Ethnoracial Group
- Job Density
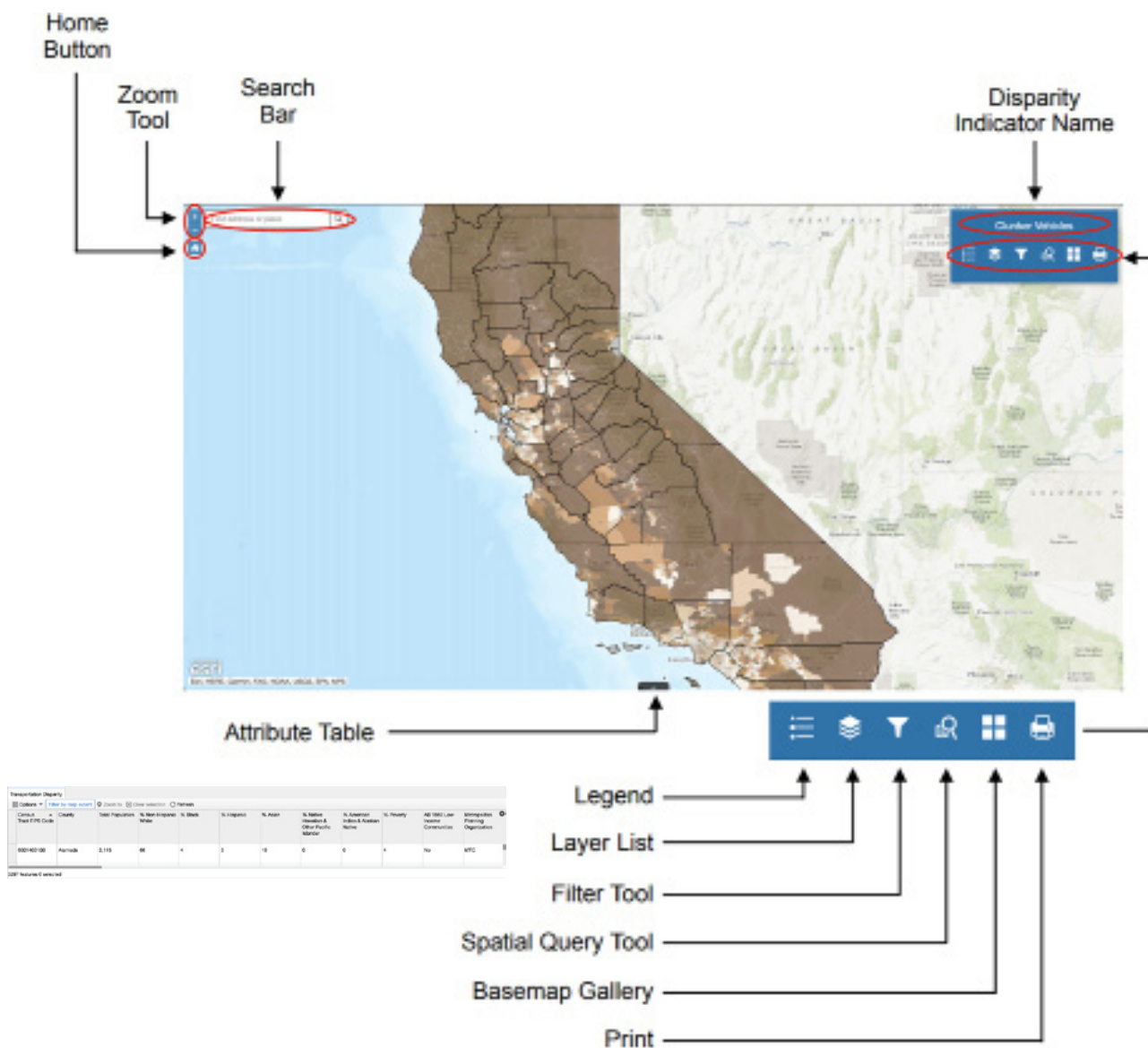- Neighborhood Change, Socioeconomic Variables

Housing
- % Multi-Family Housing Units
- % Households Paying 50% or More of Income Towards Housing Costs
- % Renter-Occupied Households

Health
- Traffic Collisions per Weighted Roadways
- Primary Care Shortage Areas
- Cardiovascular Disease

▷ Main Navigation Overview

Use the tools on the top corners to navigate the mapping tool. On the top right, there are widgets that allow you to search for an area of interest and on the top left, you will find various tools to conduct your analysis.

We recommend exploring the different tools on the platform first before diving straight into the next section of the user guide, which provides detailed information and instructions.

Who to contact?

Please contact CARB at helpline@arb.ca.gov if you have any questions or feedback regarding the mapping tool.
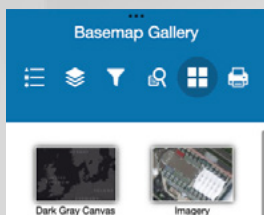
How do I use the mapping tool?

To search for a specific location, type a county, city, zip code, address, or place into the search bar and the map will automatically zoom to that location. Once you have typed your desired search location, you can either select it from the options that appear below the search bar or click on the magnifying glass icon to zoom to that location.

To zoom, use the boxes with the + and - symbols on the lefthand side of the map to zoom in and out. Clicking the "+" will zoom in to wherever your page is centered around, and clicking the "–" will zoom out. You can also place your mouse over a desired location and swipe with two fingers on your trackpad to zoom in and out. Alternatively, you can click and hold your mouse anywhere on the map while dragging to pan around the screen.

Click the ***home button*** with the home icon at any time to return to the original map extent.

To change the basemap, click on the highlighted icon composed of 4 white squares titled "Basemap Gallery," the fifth icon from the left. From there, a list of 12 optional basemaps will appear below. You can select whichever basemap you prefer and can change the basemap at any point without affecting your other selections/zoom.
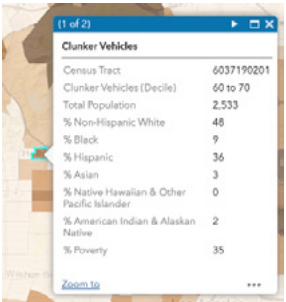
Find address or place

Basemap Gallery

Dark Gray Canvas   Imagery

Joel Muniz

▷ Pop-Up Window

Click on any tract within the map and a pop-up window will appear. Within it, you will see:
1. The title, indicating what indicator this map is displaying
2. The unique Census Tract number
3. What category the specific census tract falls under for your given indicator (listed as a decile, number, etc.)
4. The total population number
5. Demographics of the population within that census tract.

Press "Zoom to" in the bottom left corner to zoom the map scale to the selected tract. Press the three dots in the bottom right corner for a list of options:
1. "Pan to" re-centers the selected tract to the middle of your screen
2. "Add a marker" places a marker on the tract so that it may be located easily if zoomed out to a greater extent
3. "View in Attribute Table" will cause the attribute table with information to appear at the bottom of your screen which can be exported if desired
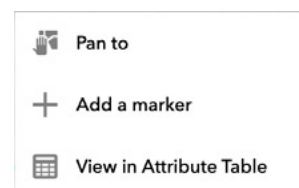
Close the pop-up window by pressing the X in the top right corner of the window box.
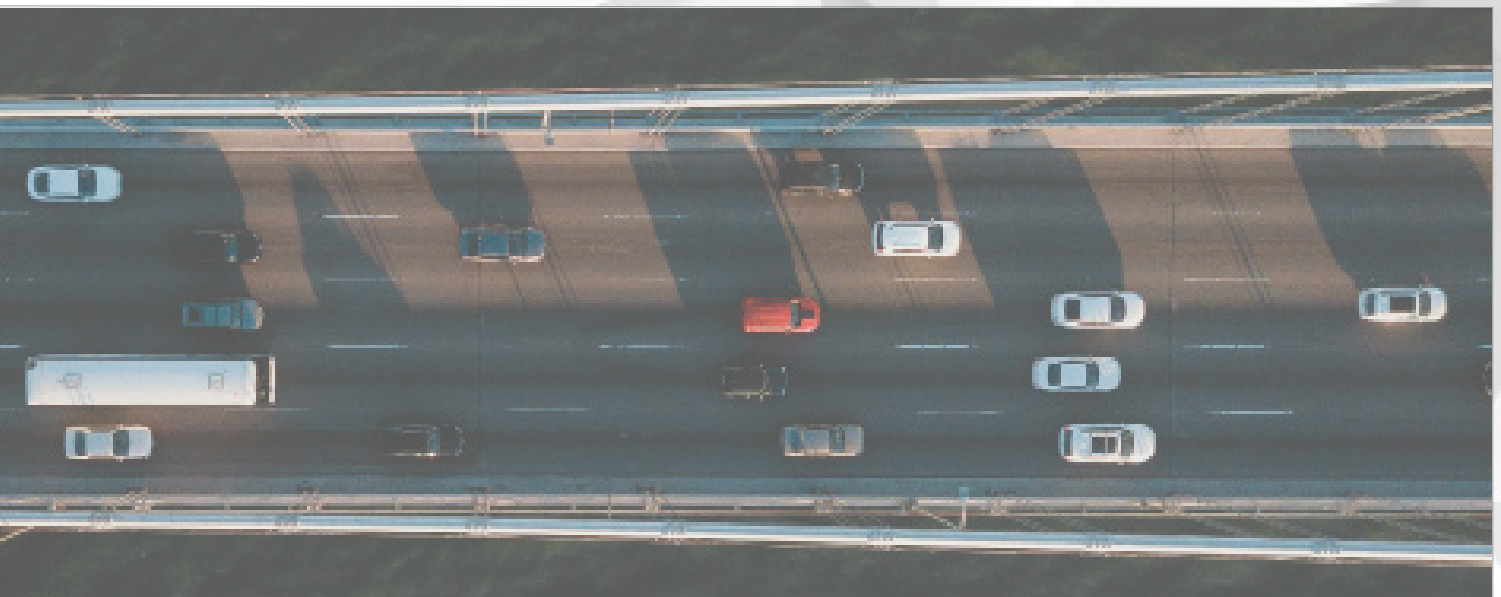
▷ Turning on Data Filtering Tools

Select the *Filter Tool* 🔽 from the main panel of widgets. You can utilize a single filter or a combination of filters to analyze patterns across California. Once filters have been selected, make sure the switch within the legend at the top of the filter list is green, indicating that the map has been turned 'on'. 🔵 The various filters operate as follows:

Geography Filters
- County is: (select a county)
- Metropolitan Planning Organization is: (select an MPO)
- SB 535 Disadvantaged Communities is: (select yes or no)
- AB 1550 Low-Income Communities is: (select yes or no)
- Area Median Income (Regionally Adjusted) is: (select a percentage range)

Socio-Demo-Econ
- Median Household Income is Between: (enter a range of values)
- % Poverty is between: (enter a range between 0 and 100)
- Largest Ethnoracial Group is: (select an option)
- Population Density (Decile) is: (select a range of deciles)
- Job Density (Decile) is: (select a range of deciles)
- Neighborhood Change, Socioeconomic Variables (Decile) is: (select a range of deciles)

Transportation
- Auto Insurance Premium (Decile) is: (select a range of deciles)
- Lending Barriers (Decile) is: (select a range of deciles)
- Newer Clean Vehicles (Decile) is: (select a range of deciles)
- Older Clean Vehicles (Decile) is: (select a range of deciles)
- Clunker Vehicles (Decile) is: (select a range of deciles)
- Average VMT per Household (Decile) is: (select a range of deciles)
- Average Commute VMT (Decile) is: (select a range of deciles)
- Vehicles per Household is between: (enter a range of values)
- % Households with No Vehicle is between: (enter a range of values)
- % Drove Alone for Job Commute is between: (enter a range between 0 and 100)
- % Carpooled for Job Commute is between: (enter a range between 0 and 100)
- % Public Transportation for Job Commute is between: (enter a range between 0 and 100)
- % Bike for Job Commute is between: (enter a range between 0 and 100)
- % Walk for Job Commute is between: (enter a range between 0 and 100)
- Average Travel Time to Work (Minutes) is between: (enter a range of values)

Accessibility Measures
- Access to High-Quality Transit Locations is: (select an option; consult guidebook) *see note below
- Availability of Weighted Bikeways per Population is: (select an option; consult guidebook) *see note below
- Availability of Parks & Public Open Space per Population (Decile) is: (select a range of deciles)
- Accessibility to Employment Opportunities (Decile) is: (select a range of deciles)
- Jobs-Housing Fit (Decile) is: (select a range of deciles)

Housing
- Housing Unit Density (Decile) is: (select a range of deciles)
- % Multi-Family Housing Units is between: (enter a range between 0 and 100)
- % Renter-Occupied Households is between: (enter a range between 0 and 100)
- % Households Paying 30 - 49% of Income Towards Housing Costs is: (enter a range between 0 and 100)
- % Households Paying 50% or More of Income Towards Housing Costs is: (enter a range between 0 and 100)
- Neighborhood Change, Housing Variables (Decile) is: (select a range of deciles)

Health
- % with Medicaid Health Insurance Only is between: (enter a range between 0 and 100)
- % No Health Insurance is between: (enter a range between 0 and 100)
- Life Expectancy at Birth is between: (enter a range of values, in years)
- Traffic Collisions per Weighted Roadways (Decile) is: (select a range of deciles)
- Primary Care Shortage Areas is: (select yes or no)
- Walkability Index (Decile) is: (select a range of deciles)
- Asthma Prevalence (Decile) is: (select a range of deciles)
- Cardiovascular Disease (Decile) is: (select a range of deciles)

Both high-quality-transit location and availability of bikeways indicators cannot be reported as decile rankings due to the nature of the data (see report for further details). For both of these indicators, the higher the filter value the more access to a high-quality-transit location or more availability of bikeway infrastructure. A value of "0" represents no access to a high-quality-transit location or no availability of bikeway infrastructure.

More information for each indicator can be found in the full report, available at: [link placeholder]

▷ Exploring Data with Spatial Query Tools

The *spatial query tool* can be used to select and analyze certain census tracts or groups of tracts. Shapes can be drawn over the map, then tracts that intersect with the shape's area can be analyzed. There are 10 different methods of drawing points or shapes, depending on how you want to spatially filter the data. These specifications can be found under the "Tasks" section of the spatial query tool:
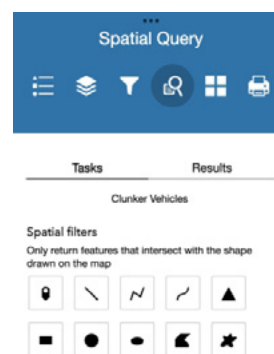
Point: The point tool allows you to place a point anywhere on the map and analyze the census tract in which the point is placed. Select the point icon, then select anywhere on the map. You will see a small gray point appear where you clicked on the map. If you want to place your point somewhere else, simply reselect the point icon and click a new location on the map where you prefer to analyze.

Line: The line tool allows you to draw a straight line anywhere on the map and then analyze tracts that intersect with that line. Select the line icon, then click and hold anywhere on the map. Continue holding as you drag your cursor for a desired length and direction over the map. Release when you are satisfied with the line. You should see a blue dotted line appear where you drew. If you want to change the location of your line, simply reselect the line icon and follow the same steps for a new location.

Polyline: The polyline tool allows you to draw multiple segments of straight, connected lines anywhere on the map and then analyze tracts that intersect with that line. Select the polyline icon, then click anywhere on the map. Move your cursor to your desired location and click again to complete a segment. Continue clicking and releasing for each segment. Once satisfied with your polyline, double-click to complete the line. If you want to change the location of your polyline, simply click the polyline tool again and follow the same steps for a new location.

Freehand Polyline: The freehand polyline tool allows you to draw a freehand line (not necessarily straight) anywhere on the map and then analyze tracts that intersect with that line. Select the freehand polyline tool, then click and hold anywhere on the map. Continue holding as you move your cursor around the map. The freehand polyline will trace where you move your cursor. Release when you are satisfied with the line. You should see a blue dotted line appear where you drew. If you want to change the location of your line, simply reselect the freehand polyline icon and follow the same steps for a new location.

Triangle: The triangle tool allows you to draw a triangle of any size anywhere on the map and then analyze tracts that intersect that triangle. Select the triangle tool, then click and hold anywhere on the map. Continue holding as you move your cursor out and in, changing the size of the triangle but remaining centered around your initial click location. Release when you are satisfied with the triangle. You should see a translucent blue triangle appear on the map. You may also simply click and release immediately for a generic sized triangle shape. If you want to change the location of your triangle, simply reselect the triangle icon and follow the same steps for a new location.
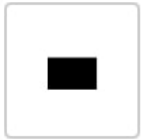
Extent: The extent tool allows you to draw a rectangle of any size anywhere on the map and then analyze tracts that intersect that triangle. Select the rectangular extent tool, then click and hold anywhere on the map. Continue holding as you move your cursor around, changing the size of the rectangle while one corner remains anchored around your initial click location. Release when you are satisfied with the extent. You should see a translucent blue rectangle appear on the map. If you want to change the location of your extent, simply reselect the extent icon and follow the same steps for a new location.

Circle: The circle tool allows you to draw a circle of any size anywhere on the map and then analyze tracts that intersect that circle. Select the circle tool, then click and hold anywhere on the map. Continue holding as you move your cursor out and in, changing the size of the circle but remaining centered around your initial click location. Release when you are satisfied with the circle. You should see a translucent blue circle appear on the map. You may also simply click and release immediately for a generic sized circle shape. If you want to change the location of your circle, simply reselect the circle icon and follow the same steps for a new location.

Ellipse: The ellipse tool allows you to draw an ellipse of any size on the map and then analyze tracts that intersect that ellipse. Select the ellipse tool, then click and hold anywhere on the map. Continue holding as you move your cursor out and in, changing the size of the ellipse but remaining centered around your initial click location. Release when you are satisfied with the ellipse. You should see a translucent blue ellipse appear on the map. You may also click and release immediately for a generic sized ellipse shape. If you want to change the your ellipse's location, reselect the ellipse icon and follow the same steps.

Polygon: The polygon tool allows you to draw a polygon of any size or shape with straight edges anywhere on the map and then analyze tracts that intersect that polygon. Select the polygon tool, then click anywhere on the map. Move your cursor to your desired location and click again to complete a segment. Move and click again to add another side. Continue adding your desired number of sides then double-click when you are satisfied. Note that the polygon must have at least 1 side (two clicks) making a line. If you cross sides over one another, a negative area may appear. You should see a blue translucent polygon specifying the areas of analysis appear on the map. If you want to change the location of your polygon, simply click the polygon tool again and follow the same steps for a new location.

Freehand Polygon: The freehand polygon tool allows you to draw a polygon of any size or shape with anywhere on the map and then analyze tracts that intersect that polygon. Select the freehand polygon tool, then click and hold anywhere on the map. Move your cursor to draw a freehand polygon shape and release when completed. If you cross sides over one another, a negative area may appear. You should see a blue translucent polygon specifying the areas of analysis appear on the map. If you want to change the location of your polygon, simply click the tool again and follow the same steps for a new location.
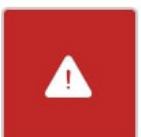
Clear: If at any point you want to clear a drawn shape, either select your desired tool and redraw, or press the red icon with the exclamation point within a triangle to clear the drawn shapes.

▷ Applying a Search Distance

1. After a shape is drawn, you can specify a search distance to increase the area of analysis. Check the box labeled "Apply a search distance" and type a number and select the units.


2. You will see your shape along with a slightly more translucent blue border around it, visualizing the specified search distance. If you do not want a search distance, either uncheck the box or type a value of zero.

3. Once satisfied, you may rename the resulting layer (optional). Then select the green button at the bottom labeled "Apply"
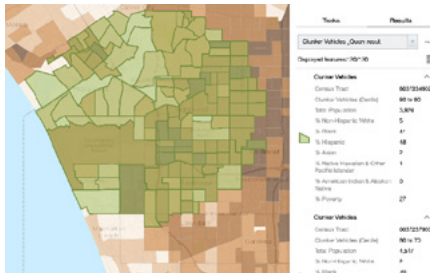
4. Upon pressing "Apply", the tool will bring you to the "Results" section of the spatial query tool and zoom to the selection of tracts that you selected with your shape. You can then click on any tract in the list to zoom to that specific tract.
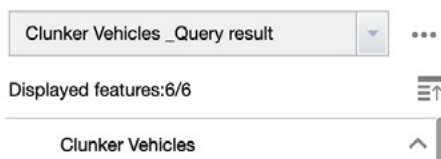
5. To show or hide the information about a tract in the results window, click on the small up arrow in the upper right corner of the tract's information section. If you want to display or hide the information for all tracts, press the symbol consisting of lines and an arrow. This will either collapse or expand all results depending on if you have your information sections open or closed currently.

Note:

You can only draw one singular spatial-filter shape at any time. Once you begin to draw a new shape, whether of the same type as the previous shape or a new type, your old shape will disappear and be replaced by the new drawing.
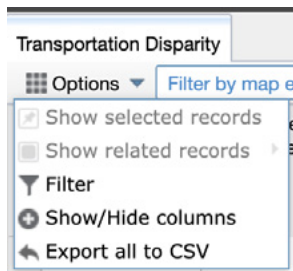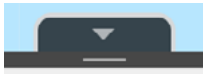
▷ How do I export data?

How do I export as a CSV file?

Click on the small black box with the arrow at the bottom of the page to bring up a table with data on indicators by census tract. You can drag the top of the table up and down to change how much of it you want to see, and at any point you can click the black arrow again to hide the table and return to the map view.

Within this table, you can choose to filter the tracts by clicking "Options" -> "Filter". You can also choose to show or hide column options by clicking "Options" -> "Show/Hide columns" then checking the columns you desire in the window that pops up.

To export the data table as a comma separated value file (.csv), click "Options" -> "Export all to CSV" then click "OK" in the window that pops up.

How do I export a map image?

To print the map, select the "Print" widget from the list of options. Within the widget, you can specify the Map title, Layout, and Format. The following file type options are available under "Format":

- AIX
- EPS
- GIF
- JPG
- PDF
- PNG32
- PNG8
- SVG
- SVGZ

(PDF, JPG, and PNG are the most common formats)
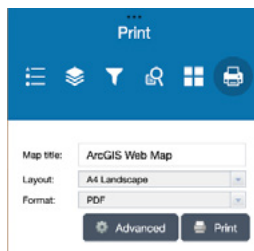
Customize your map using the options in the "Advanced" window as follows:
1. Preserve:
   - Map scale: the level of zoom will be preserved
   - Map extent: the extent of the map seen on screen will be preserved
   - Forced scale: type your own scale, or press current to use the current scale
2. Output spatial reference WKID:
   - Enter the WKID for the spatial reference. For example, "WGS_1984_Web_Mercator_Auxillary_Sphere" has a WKID of 102100
3. Layout metadata:
   - Check or uncheck "Include legend"
   - Scale bar unit: Miles, Kilometers, Meters, or Feet

Once desired options have been selected, click "*Print*". Once completed, a map image file will be displayed. Click on it to send to a printer or download in the file format specified. Press "*Clear prints*" to remove previous print layouts.
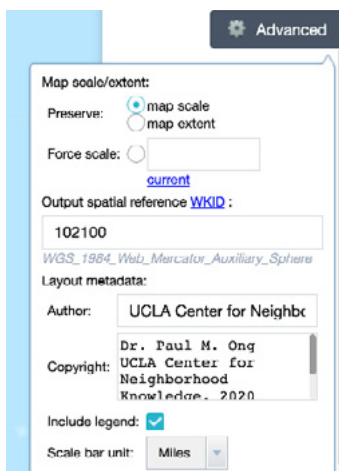
TRANSPORTATION
CASE EXAMPLES

Alex Ferguson

The following are four case examples that use data from the Transportation Disparities Database to explore the relationship between transportation and health, and the causes, characteristics, and consequences of transportation disparities. The examples highlight how different stakeholders working on related policies, plans, and programs, used the information to enhance the effectiveness of transportation-related investments, interventions, and other efforts to improve employment, educational, and health outcomes.

Case Examples

1. Bikeway Planning in the South Bay
2. Understanding Transit Barriers to Health Care Access in Oakland
3. Determinants of Active Transportation in California
4. Heterogenity Among Disadvantaged Neighborhoods

▷ Bikeway Planning in the South Bay

- Indicators of use: Availability of Weighted Bikeways per Population; Traffic Collisions per Weighted Roadways
- Purpose: Informing bikeway planning

This case example describes a plan for full implementation of a master bikeway plan in Los Angeles County's South Bay. The South Bay is a coastal area in southwest Los Angeles County that includes the relatively affluent cities of Hermosa Beach, Manhattan Beach, and Redondo Beach. The community group South Bay Bicycle Coalition (SBBC) is advocating for these bikeways to promote more active transportation and improved safety in these cities. SBBC is a 501(c)(3) nonprofit founded in 2009 by a group of bike-loving advocates. The areas where the proposed bikeway would exist is relatively high income and predominantly non-Hispanic White.

Specifically in Redondo Beach, SBBC hopes to implement its 38.8 miles Bicycle Master Plan that would connect existing bikeway infrastructure to their proposed bike paths, lanes, and routes. The Bicycle Master Plan in Redondo Beach is aimed at connecting schools, businesses, services, and recreation venues as a way to promote wellness, increase access to low-cost transportation, and reduce traffic and greenhouse gas emissions.

The analysis involved:

1. **REVIEW OF CARB INDICATOR MAPS:** SBBC analyzed "availability of bikeway" and "vehicle accident" indicator maps to get a better understanding of the area's need and ability to support new bikeways.

2. **GATHERING MORE DATA:** SBBC supplemented the indicator maps with additional data on "bicycle accidents". SBBC used UCLA-CARB metadata to find the source of the accident data, which allowed them to better understand where the greatest bicycle safety concerns were located.

3. **ANALYSIS OF SUPPLEMENTAL DATA:** SBBC further analyzed 2019 and 2020 cycle counts to complement the "availability of bikeway" indicator maps. While the availability maps provided a picture of the supply of bikeway infrastructure, the raw 2019 and 2020 cycling counts provides a picture of the demand (usage) of bikeways.

4. **COLLABORATION WITH REGIONAL OFFICES:** Working alongside the regional office of the Los Angeles County public health department, the analysis of cycling counts showed that there was an increase in cycling in Redondo beach during the COVID-19 pandemic.

5. **PRESENTATION OF DATA ANALYSIS TO CITY:** Using UCLA CARB and supplemental data, the SBBC presented this information to the Redondo Beach City Council and city staff to increase awareness and encourage bikeway development.

6. **RESULTS:** Starting with UCLA CARB data, the SBBC used their supplementary data to construct two maps of the north and south portions of North Redondo Beach (see Map 1.1 and Map 1.2, respectively) that showed existing and proposed bikeways. The organization documented existing bikeways and illustrated where new paths, lanes, and routes should be developed. The South Bay Bicycle Master Plans was developed into a presentation to be pitched at the upcoming Commission and City council meetings.

Map 1.1: North Redondo Beach
Existing and Proposed Bikeways

Map 1.2: South Redondo Beach
Existing and Proposed Bikeways

▷ Understanding Transit Barriers to Health Care Access in Oakland

- Indicators of use: Availability of Weighted Bikeways per Population; Traffic Collisions per Weighted Roadways; % No Health Insurance; Primary Care Shortage Areas
- Purpose: Enhancing health service provision

This case example develops a service area profile using demographic data from the Transportation Disparities Database to measure geographic access to medical care by public transit and understand transit barriers. The purpose of the analysis was to help Asian Health Services gain a better understanding of the population and health-care providers within a reasonable bus trip from their clinic to enhance their health service provision. Asian Health Services in Oakland aims to serve the underserved, especially Asian immigrants and refugees, and provides health care services in 15 languages as well as advocacy services.

The analysis involved five steps:

1. **DEFINING A SERVICE AREA OF INTEREST:** To define the service area and boundary, we used the location of Asian Health Services' medical clinic in Oakland as our starting point to define a "catchment area," a proxy for a reasonable service area within a bus ride.

2. **OVERLAY OF CENSUS GEOGRAPHIES:** Next, we determined what constitutes a reasonable bus trip. The U.S. Department of Health and Human Services deems that 30 minute is a reasonable travel time to access health care. To determine the geographic areas within the allowable travel time, we use the Google Maps API platform to identify all census block groups reachable during a 30-minute bus trip from the clinic. The block groups are subunits of census tracts, which make it easy to join our "catchment area" with other census-based products and the Transportation Disparities Database. Map 2.1 provides an overview of the boundaries of our catchment area of interest.

3. **LOCATING & MERGING VARIABLES FROM TRANSPORTATION DISPARITIES DATABASE:** We identified four variables from the Transportation Disparities Database that are relevant to helping us understand the providers and characteristics of the population within a 30 minute bus ride from Asian Health Services:
   - population race/ethnic breakdown
   - % of the population in poverty
   - % of households without a car
   - % residents without health insurance

4. **LINKING WITH EXTERNAL DATA:** In SAS, we linked the Transportation Disparities Database variables of interest to our catchment area using the census tract ID and other external data of interest, including the number of primary care physicians providers that accept Medi-Cal, a public health care program for those with limited income.

5. **RESULTS:** We produced three types of statistics as part of our profile. The first summarizes the geographical characteristics of the catchment area. The area is about 31 square miles and the distance accessible within a 30-minute bus ride is less than 4 miles. The second statistics are selected demographic characteristics of the area, which shows the service area is disproportionately people of color, low income and transit dependent relative to California. Finally, the third set measures the number of Medi-Cal enrollees and Medi-Cal providers, and health insurance coverage. The data indicate there is about 1 medical provider per 70 people in the catchment area. About 11% of the population does not have health insurance coverage within the service area (see Map 2.1 and Table 2.1).

Map 2.1: Asian Health Services Catchment Area
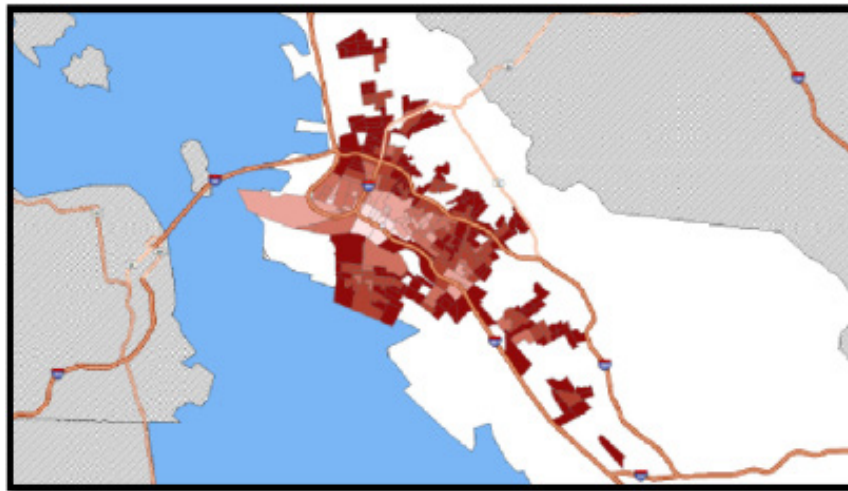
Table 2.1: Transit-Accessible Service Area Profile

Area Accessible Within a 30-minute Bus Ride from Oakland Clinic		
Area (mi²)		30.6
Median Distance (mi)		3.3
Mean Distance (mi)		3.7
Demographic Characteristics of Area		
	Catchment Area	California
Total Population	340,339	38,982,847
Non-Hispanic White	29.5%	37.9%
Non-Hispanic Black	18.7%	5.5%
Non-Hispanic Asian	21.2%	13.9%
Hispanic	24.2%	38.8%
Below Federal Poverty Level	19.8%	15.1%
Households w/o vehicle	18.8%	7.4%
Medical Care Characteristics of Area		
Percent Population with Medicaid Only	19.8%	18.9%
Percent Population Not Insured	10.8%	10.5%
Total Medi-Cal Providers	955	52,539
Medi-Cal Providers to Medicaid-only Population	1:70	1:138

▷ Determinants of Active Transportation in California

- Indicators of use: Availability of Parks & Public Open Space per Population; Access to High-Quality Transit Locations
- Purpose: Academic research on walking

This case example uses data from the California Health Interview Survey at the zip code tabulation area (ZCTA) and accessibility measures from the Transportation Disparities Database to examine the determinants of walking in California's neighborhoods. The analysis uses ecological regression models to inform both disciplinary knowledge and professional practice related equitable community development policies and practices.

The statistical analysis involved three steps:

1. **LOCATING & MERGING VARIABLES FROM TRANSPORTATION DISPARITIES DATABASE:**
We identified four variables from the Transportation Disparities Database that are relevant to helping us understand determinants of walking in California's neighborhoods: park and open space availability, EPA Walkability, high-quality transit locations, and % households without a vehicle.

2. **LINKING WITH EXTERNAL DATA:** In SAS, we linked the variables of interest from the Transportation Disparities Database to information from the California Health Interview Survey and the American Community Survey at the ZCTA level. The Transportation Disparities indicators, which are at the census tract level, were allocated to the ZCTA geographies using area weights.

3. **RESULTS:** Using multivariate ecological regression, we modeled the propensity of walking on the linear combination of variables related to demographic, health, socioeconomic status, environmental, and the accessibility measures from the Transportation Disparities Database. The measures were subsequently reviewed to assess the relative importance in the prediction of walking propensity. The regression results are presented in Table 3.1 for three models. The first model examines only the relationship between ethnoracial composition and walking. The second model includes controls for other relevant measures, and the final parsimonious model includes only variables that are statistically significant as well as racial and ethnic composition.

The regression models indicate that neighbohoods with higher percentages of Latinos correlate with a lower propensity of walking, but the direction of the relationship for Latinos changes when controlling for other factors as does the magnitude of the coefficients, as shown in model 2 and the parsimonious model 3. There is an unexpected positive correlation between propensity of walking and heart disease. The negative correlation between walking and lifetime asthma prevalence is not significant and an inverse relationship between walking and child dependency, air pollution, and poor access to parks is observed. Measures of socioeconomic status and access to neighborhood resources perform as expected. For instance, higher household income and educational attainment is associated with an increase in walking. While not shown, there is also a threshold effect for parkland access.

Neighborhoods with the worst parkland access ("park deserts") play a detrimental effect on walking. However, there is no relationship between park-rich areas and walking. There is also a positive relationship between walking in neighborhoods with a higher proportion of workers that commute to work by walking, with no vehicle, and with access to public transit. One interesting relationship is the positive association with bike/pedestrian collisions, which could indicate people are walking in higher-risk environments. Traffic collisions are higher along major arterials, and this is often where commercial, retail, and other neighborhood resources may be located and where people would walk in these neighborhoods (see Table 3.1).

Table 3.1: Walking Ordinary Least Squares Regression

Independent Variables	Model 1: Ethnorace n = 1,469		Model 2: Full n = 1,403		Model 3: Parsimonious n = 1,413	
Demographic						
% Asian	0.106	***	−0.024	+	−0.019	*
% Black	0.075	***	−0.005		−0.001	
% Latino	−0.029	***	0.062	***	0.065	***
% Other	0.020		0.099	***	0.093	***
Child dependency ratio			−0.024	*	−0.029	**
Elderly dependency ratio			0.007			
Foreign born			0.001			
Other Health Indicators						
% Lifetime asthma			−0.046			
% Heart disease prevalence			0.174	**	0.199	***
Socioeconomic Position						
Median household income (log)			0.017	***	0.016	***
% College degree			0.117	***	0.124	***
Chemical Environment						
Ozone ppm			−0.981	***	−0.945	***
PM2.5 µg/m3			−0.002	***	−0.002	***
Average heat days			0.000			
Built Environment						
Park desert			−0.009	***	−0.008	***
Bike + ped/road network density			1.850	***	1.904	***
EPA walkability (1–20)			0.000			
Accessibility to Neighborhood Resources						
% Workers commute by walking			0.060	**	0.060	**
% Households with no vehicle			0.183	***	0.190	***
% Pop with high-quality transit access			0.051	***	0.054	***
Constant	0.316	***	0.106	*	0.114	**
Adjusted R-Squared	0.100		0.632		0.640	

Probabilities: +$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

▷ Heterogeneity Among Disadvantaged Neighborhoods

- Indicators of use: UCLA Center for Neighborhood Knowledge's Regional Area Median Income (AMI); Availability of Weighted Bikeways per Population; Traffic Collisions per Weighted Roadways
- Purpose: Promoting active transportation in disadvantaged neighborhoods by identifying neighborhoods most in need of bikeway funding (hypothetical scenario)

Although disadvantaged neighborhoods are similar in many ways, they can differ from one another in the causes, characteristics, and consequences of transportation disparities. It is therefore critical to be able to differentiate disadvantaged neighborhoods by their specific transportation needs, challenges, and opportunities. The transportation disparity dataset can be used to reveal this heterogeneity among disadvantaged neighborhoods. We provide an example of this using a hypothetical scenario.

The hypothetical statewide policy goal is to increase active transportation in the poorest neighborhoods by funding bikeways. Because of limited funds, the public agency must identify and prioritize places that are invited to submit a proposal.

There are three initial steps:

1. **The first step** is identifying the eligible neighborhoods by defining poorest tracts as having median household income that is no more than 60% of the regional median household income. Out of 7,966 tracts with AMI data, 1,071 or 13.4% fulfill this criterion (see Figure 4.1).

Figure 4.1
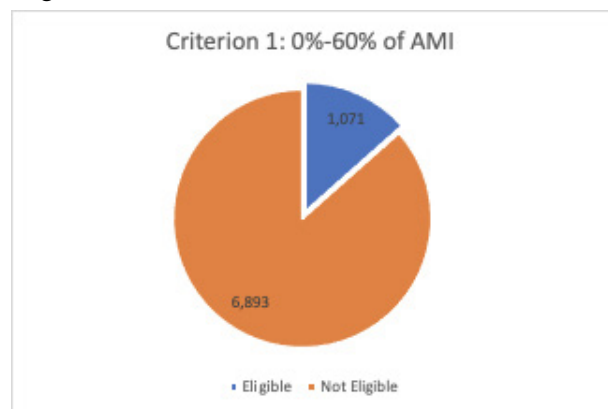
2. **The second step** is identifying the poorest tracts (those with no more than 60% of regional AMI) with the lowest bikeway-to-population ratio, which is defined as those falling into the lowest quintile for the bikeway-to-population index. It is important not to wrongly assume a priori that all low-income neighborhoods are the same in bikeway infrastructure. The data show considerable heterogeneity or diversity among poor neighborhoods, with at least some tracts falling into each of the bikeway-to-population categories. Nonetheless, the lowest-income tracts are disproportionately more likely to fall into the quintile with the least bikeway resources. Among the 1,049 lowest-income tracts with data on bikeways, 289 or 27.0% fall into the lowest bikeway quintiles, and these neighborhoods fulfill the second criterion (see Figure 4.2).

Figure 4.2
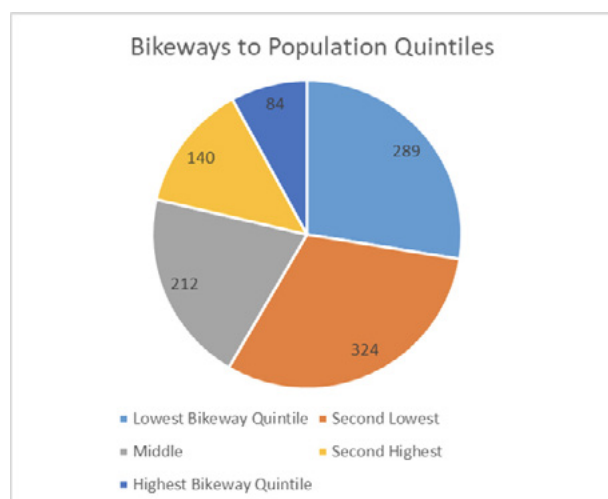
3. **The final step** is to prioritize choices among the 289 tracts by promoting safety. Here, we use traffic collisions per weighted roadways by quintile to categorize risk in the neighborhoods. Again, the data shows heterogeneity among the places, although all are among the poorest in income and bikeways. There are 29 tracts in the lowest quintile (safest), 14 in the second lowest, and 30 in the middle segment. Which neighborhoods are invited to compete depends on other considerations such as the amount of available funding and the agency's capacity to review applications.

What else can the Mapping Tool be used for?

▷ Policy

Simulations of different criteria and standards to examine which neighborhoods would be covered by a policy. For example, users can use two or more filters and thresholds to simultaneously identify areas that would be covered by a policy.

▷ Program

Identifying neighborhoods or other areas that fulfill **programmatic criteria**. For instance, using the spatial filters to highlight census tracts with few clean vehicles.

▷ Professional Practice

Develop profiles of the transportation resources and transportation needs of a neighborhood that may be used for **community planning efforts**. This can be done by identifying two or more census tracts that constitute a planning site.

▷ Individual Stakeholders

Look up information about their specific neighborhood. For example, a user can use the address search bar to locate their neighborhood and learn more about the resources or issues impacting their neighborhood.

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