



INSTITUTE FOR DEFENSE ANALYSES

User-Friendly Decision Tools

Clifford M. Bridges

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About This Publication

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April 14, 2023

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Be a Trusted Advisor

What does a **trusted advisor** do?

- Builds a long-term relationship with **sponsors** through regular communication.
- Helps **sponsors** ask the right questions – does not just give the right answers.
- Develops **sponsors'** ability to independently reach defensible conclusions.

Be a Teacher




What does a **teacher** do?

- Builds a long-term relationship with **students** through regular communication.
- Helps **students** ask the right questions – does not just give the right answers.
- Develops **students'** ability to independently reach defensible conclusions.

Help Your Students Earn an A

Grade	Expected Ability
C	Can answer complex questions with significant guidance
B	Can check answers to complex questions
A	Can answer complex questions independently

Help Your Sponsor Navigate Decisions

Able	Desired Ability
	Can answer complex questions with significant guidance
	Can check to ensure your answers make sense
	Can discuss their ideas for solving complex questions with you

Sponsors Are Students (Are Sponsors!)

If your sponsor had to make a complex policy decision without your presence, how well will your tool have prepared them?

Learning Outcomes

Arup Social Data

Navigation

- Data Explorer
- Equity Explorer
- Eviction Analysis

About

The Equity Explorer is a set of Arup-designed analyses to identify vulnerable and historically under-served geographies at the census tract level. The tool provides a transparent, Arup-approved framework for approaching equity and allows users to compare indicators and explore the data for census tracts across the US. Users can also customize a transportation vulnerability index for their specific planning purposes to best understand which areas have the biggest gaps in accessibility and demand. Keep in mind that much of the data comes from the 2019 US Census which has limitations with response rates.

Please note that this tool is a work in progress. Contact us [here](#) or consider contributing to our [GitHub](#) repository with any suggestions or questions.

Equity Explorer

Select a Geography

Identify which census tracts you are interested in exploring.

Select a state

District of Columbia

Select a county

District of Columbia

Show raw data

Identify Equity Geographies in the Region

"Equity Geographies" are census tracts that have a significant concentration of underserved populations, such as households with low incomes and people of color. Each of these census tracts meet at least one of the two criteria below. This methodology is based on the equity priority community [methodology](#) developed by the San Francisco Bay Area Metropolitan Transportation Commission (MTC).

Criteria A	Criteria B
Census tracts have a concentration of BOTH people of color AND low-income households	Census tracts have a concentration of three or more of the remaining six equity indicators AND a concentration of low-income households

List of equity indicators

Users are likely not a novice to the field, but may be a novice to your tool. A few lines of code with effectively zero space lost can provide very helpful context.

Active Learning

Equity Explorer

Select a Geography

Identify which census tracts you are interested in exploring.

Select a state

District of Columbia

Select a county

District of Columbia

Show raw data

Raw Data

	civilian_noninstitutionali...	male	male_under_5	male_under_5_w_a_disa...	male_unde
0	2416	1160	66	0	
1	5903	3126	228	0	
2	6195	2536	158	0	
3	4946	2474	203	0	
4	3470	1606	80	0	
5	4235	1932	124	0	
6	58	38	0	0	
7	4231	2208	383	0	
8	4063	1634	0	0	
9	2527	1165	92	0	

Download raw data

Identify Equity Geographies in the Region

"Equity Geographies" are census tracts that have a significant concentration of underserved

Facilitate Active Learning

Whenever possible, enable users to complete the same analyses on their own if they want. If their results are inconsistent with yours, something important is happening; either they have a misunderstanding or you do!

Transparent Assignment Design

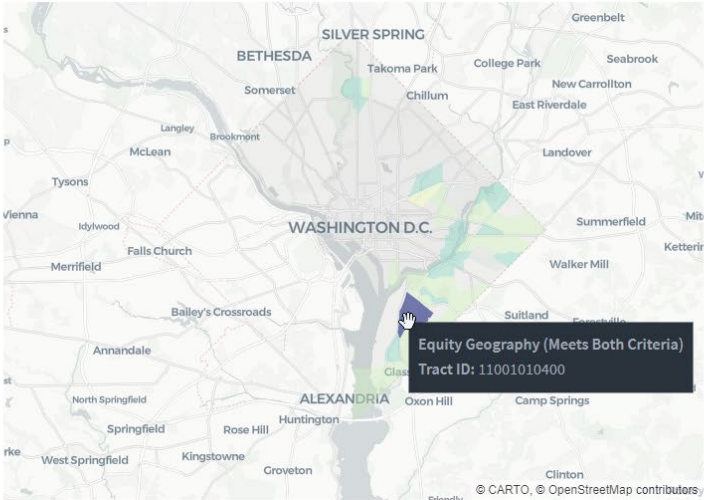
>

View Equity Geographies on Map

The map below shows all the equity geographies based on the criteria above. Scroll over the equity geographies to view which of the criteria is met.

Limit the number of equity geographies by increasing the concentration requirements

Low High



© CARTO, © OpenStreetMap contributors

More on how concentrations are defined

Equity geographies are compared against concentration thresholds as defined below.

$$\text{concentration threshold} = \text{average} + (\text{standard deviation} \times \text{coefficient})$$

Coefficients default to be 0.5. Coefficients can be increased to 1 or 1.5 to narrow the search.

⌵



There are instructions on how to use the map. The description of what this map shows is given twice, once in general terms and again in full detail.

Cognitive Load

The screenshot shows a web application interface for 'Eviction Analysis'. At the top left is a right-pointing chevron '>' and at the top right is a hamburger menu icon. The main heading is 'Eviction Analysis'. Below it is a text box with the following content:

About

This is an analysis based on work we did with [New Story](#) to help them make decisions about how to distribute direct aid to families to help keep people in their homes. The end result of this analysis is something we call 'Relative Risk.' This value is a synthesis of the sociodemographic characteristics of a county that can be used to compare counties against each other. It is *not* a measure of objective risk.

This analysis uses *total population* in its current iteration, not percentage values. This is to capture that counties with more people represent more potential risk than smaller counties. Values from a variety of data sources are normalized and then combined to represent the Relative Risk Index.

In addition to the Relative Risk calculation, we've also built calculations to estimate the cost to avoid evictions by providing direct aid for a subset of the community.

As with any analysis that relies on public data, we should acknowledge that the underlying data is not perfect. Public data has the potential to continue and exacerbate the under-representation of certain groups. This data should not be equated with the ground truth of the conditions in a community. You can read more about how we think about public data [here](#).

You can read more about the data and calculations happening here on our [GitHub](#).

Below the text box are two dropdown menus:

What type of analysis are you doing?
Multiple Counties

Select a state
District of Columbia

At the bottom left of the screenshot, it says 'Please specify one or more counties'. At the bottom right of the screenshot, there is a red square icon with a white crown. A large green arrow points from the right towards the methodology text in the text box, with the text 'Methodology is discoverable' inside it.

Information is presented in a place and at a time where it can be comprehended: at the top of the page and when the user wants.

Be a Trusted Advisor and Teacher

Integrating what we know about teaching into tools can help us advise sponsors beyond the interaction with the tool.

What are “Decision Tools”?

Tools can be:

- Static PowerPoint briefs,
- Interactive dashboards,
- Dynamic apps,
- And more

Who are “Users”?

Users can be

- Long-term sponsors who needs to understand the analysis, not just the result;
- A sponsor’s team of analysts to whom analysis tools will be transferred;
- Anyone who will be using the tool while you are not present. (Tools can grow legs!)

Key Pedagogical Terms

Active Learning – “learning through activities and/or discussion ... as opposed to passively listening”

Learning Outcomes – “statements that articulate the knowledge and skills you want students to acquire”

Transparent Assignment Design – “clearly describe the task and how it should be accomplished”

Cognitive Load – “demands and limitations on working memory”

Terms derived from the Washington University in St. Louis Center for Teaching and Learning - <https://ctl.wustl.edu/resources/glossary-of-pedagogical-terms/>

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14. ABSTRACT Personal experience and anecdotal evidence suggest that presenting analyses to sponsors, especially technical sponsors, is improved by helping the sponsor understand how results were derived. Providing summaries of analytic results is necessary but can be insufficient when the end goal is to help sponsors make firm decisions. When time permits, engaging sponsors with walk-throughs of how results may change given different inputs is particularly salient in helping sponsors make decisions in the context of the bigger picture. Data visualizations and interactive software are common examples of what we call “decision tools” that can walk sponsors through varying inputs and views of the analysis. Given long-term engagement and regular communication with a sponsor, developing user-friendly decision tools is a helpful practice to support sponsors. This talk presents a methodology for building decision tools that combines leading practices in agile development and STEM education. We will use a Python-based app development tool called Streamlit to show implementations of this methodology.					
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