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MPH 665: Geographic Information Systems

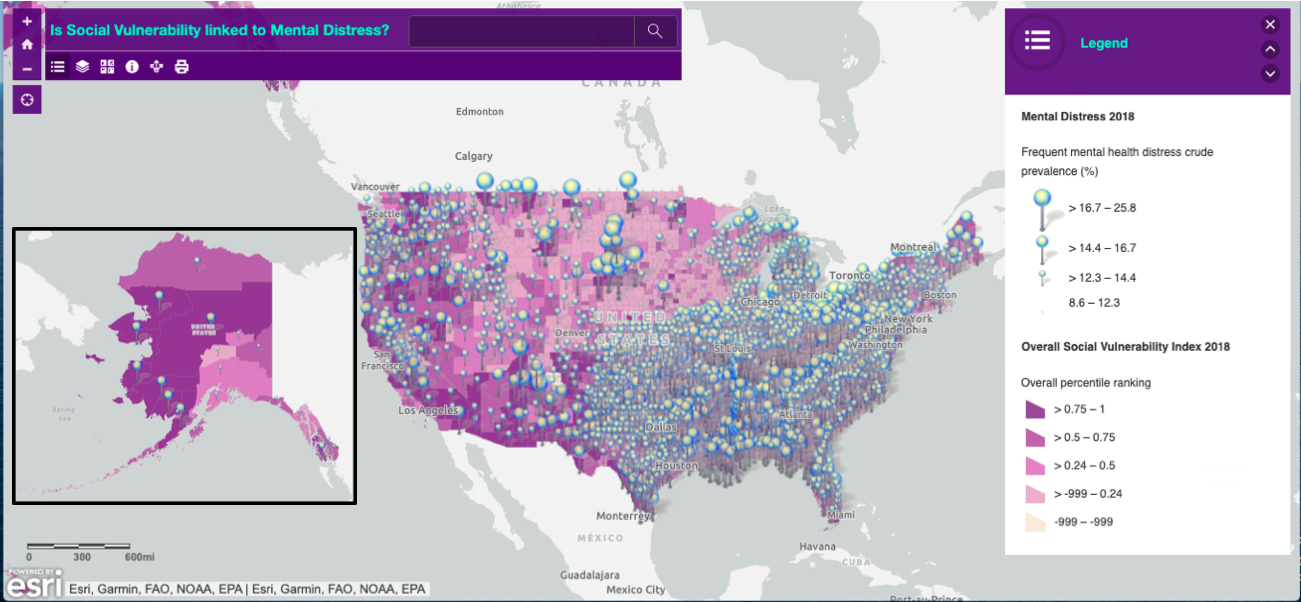
Professor Ian Dunn

August 3, 2021

**Is Social Vulnerability linked to Mental Distress?**

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**Map**

<https://arcg.is/0PbyGu0>

**Project Statement**

In areas with a higher Social Vulnerability Index (poverty, crowded housing, lack of vehicle access, language barriers, minority status, and disabilities), there is a higher amount of mental distress.

**Datasets**

The data sets used came from the Centers for Disease Control and Prevention (CDC) 2018 [PLACES Project](https://www.cdc.gov/places) and the Centers for Disease Control and Prevention (CDC) 2018 Social Vulnerability Index (SVI). Both of these data sets were found in the Living Atlas of ArcGIS online posted by data\_cdc.

The 2018 PLACES Project data provides model-based estimates of frequent mental distress prevalence among adults aged 18 years and older based on location. PLACES stands for **P**opulation **L**evel **A**nalysis and **C**ommunity **E**stimates. This data came from the [Behavioral Risk Factor Surveillance System (BRFSS)](https://www.cdc.gov/brfss/index.html), [Census 2010](https://www.census.gov/programs-surveys/decennial-census/decade.2010.html) population counts or Census annual county-level [population estimates](https://www.census.gov/programs-surveys/popest.html), and the [American Community Survey (ACS)](https://www.census.gov/programs-surveys/acs.html) estimates.

ATSDR’s Geospatial Research, Analysis & Services Program (GRASP) created a tool for emergency response planning and public health officials. The 2018 Social Vulnerability Index (SVI) data indicates the relative vulnerability of U.S. counties and tract based on 15 social factors grouped into four major themes. These four themes include Socioeconomic, Housing Composition and Disability, Minority Status and Language, and Housing and Transportation. The countries are ranked against one another based on percentiles that range from 0 to 1. The higher value indicates greater vulnerability. Overall percentile ranking is calculated by totaling the sums for each theme and ordering the counties. The feature layer in the online map visualizes the 2018 overall SVI for U.S. counties and tracts.

**Methods**

For this project I chose to use the online web mapping application for essay access to more detailed information by county throughout the U.S. The data was found in ArcGis Living Atlas. To see the underlying issue of social vulnerabilities I used the choropleth classification scheme with mental distress as graduated symbols to visualize the amount of the distress in the area. The SVI on the map is five different color saturations of purple to see the differences in the states percentile ranking of the SVI. Mental distress is visualized in the blue-silver pins on the counties to be able to see the color underneath and show the size of the pin in relation to the amount of mental distress.

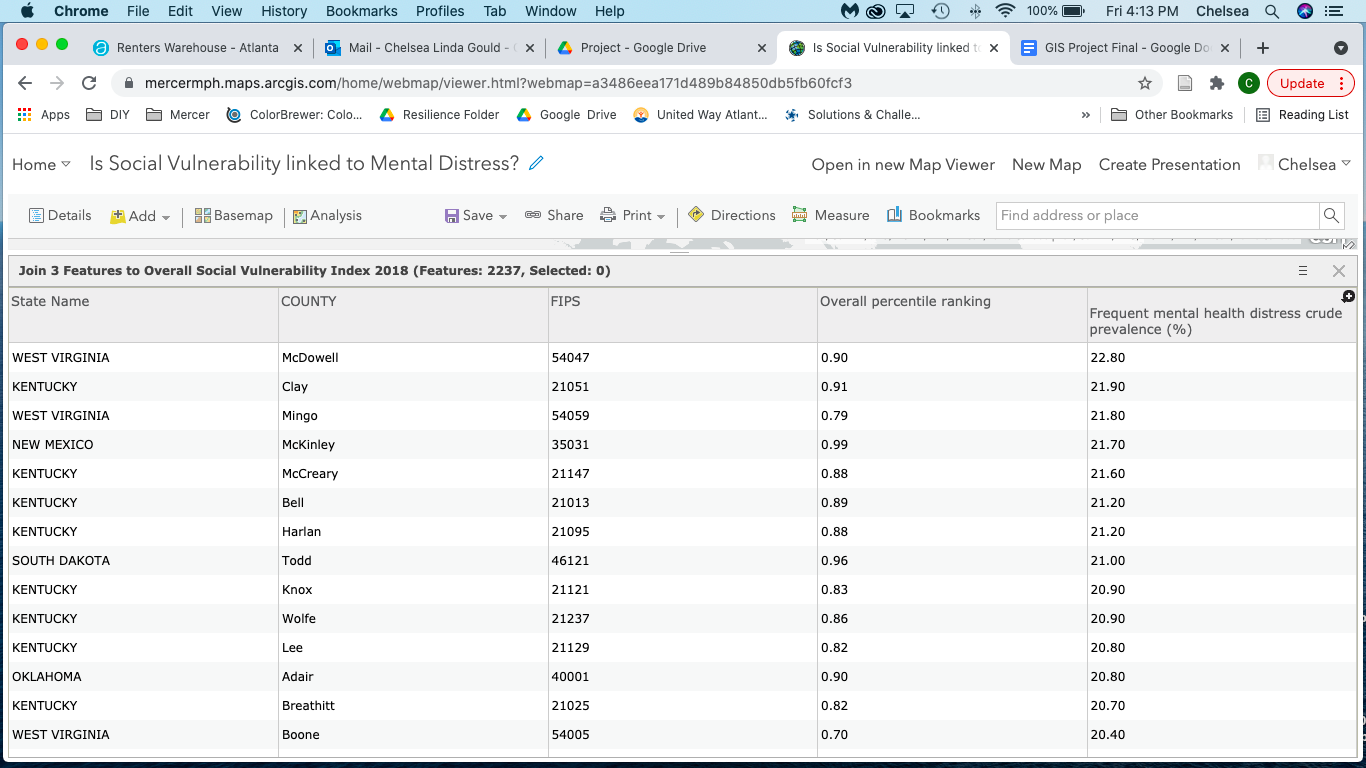
I then analyzed the data through join features matching the FIPS code fields. In the attribute table every field was hidden except: FIPS, State Name, County Name, overall percentile ranking, and frequent mental health distress crude prevalence (%). Overall percentile ranking and frequent mental health distress crude prevalence (%) was sorted by descending and ascending to look at the differences. See below for figures 1, 2, 3, and 4 for these tables.

**Discussion**

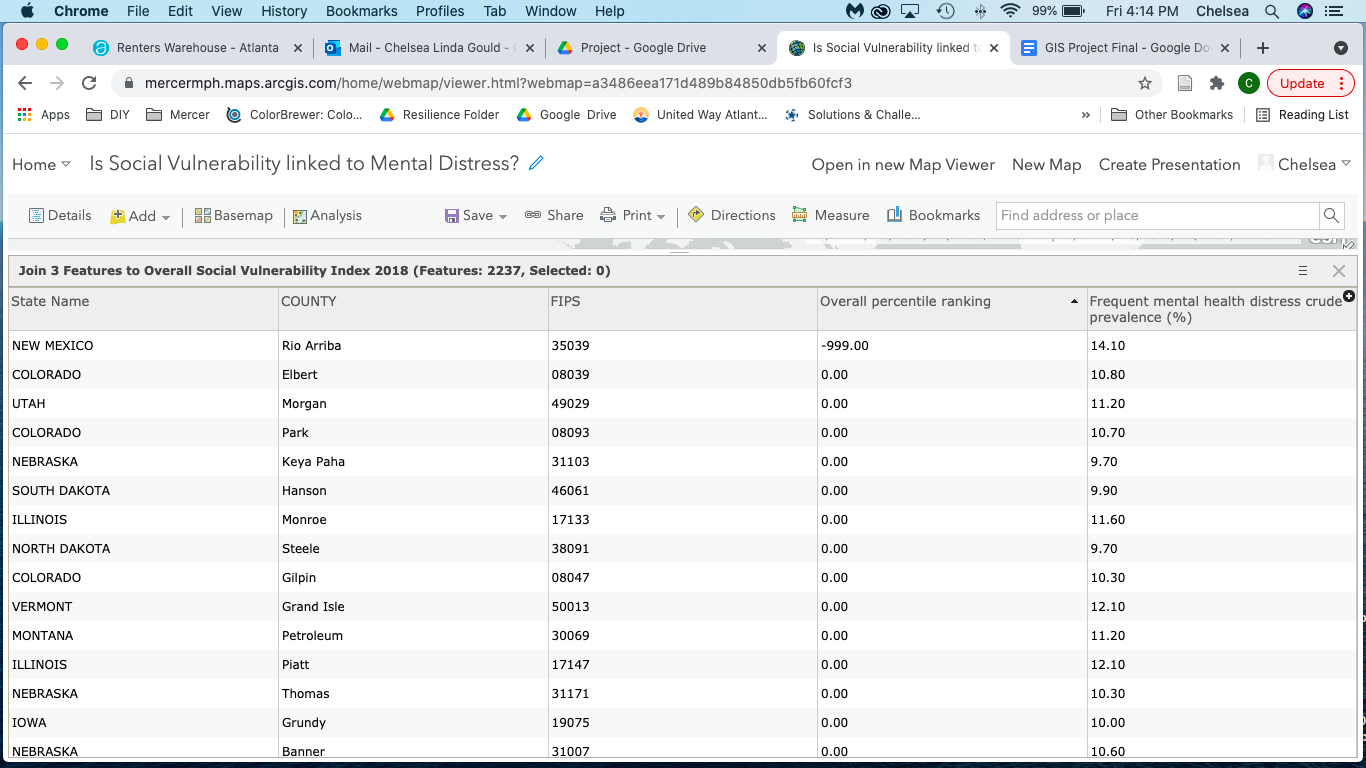
Not only do people suffer from difficulties of (SVI) factors but these come with mental stress which can deteriorate their health at a faster rate. This map was created as a tool for public health officials to see the areas of social vulnerability that need to be supported to bring down mental distress. The initial project hypothesis can be seen in the application with the correlation of darker purple, more social vulnerability, being under the larger pins, the higher percentile of mental distress.

Issues with looking at this from the online web mapping application are that it is hard to see a correlation if you look at the entirety of the U.S. The map shows percentile for social vulnerability but prevalence for mental distress which could skew the data. Future work should look into the prevalence of both aspects and pull from more recent data sets. Focusing on a smaller area, such as one state, may also be helpful for understanding this correlation in an area more thoroughly. This can be seen more heavily when looking at the State of Alaska on the web application.

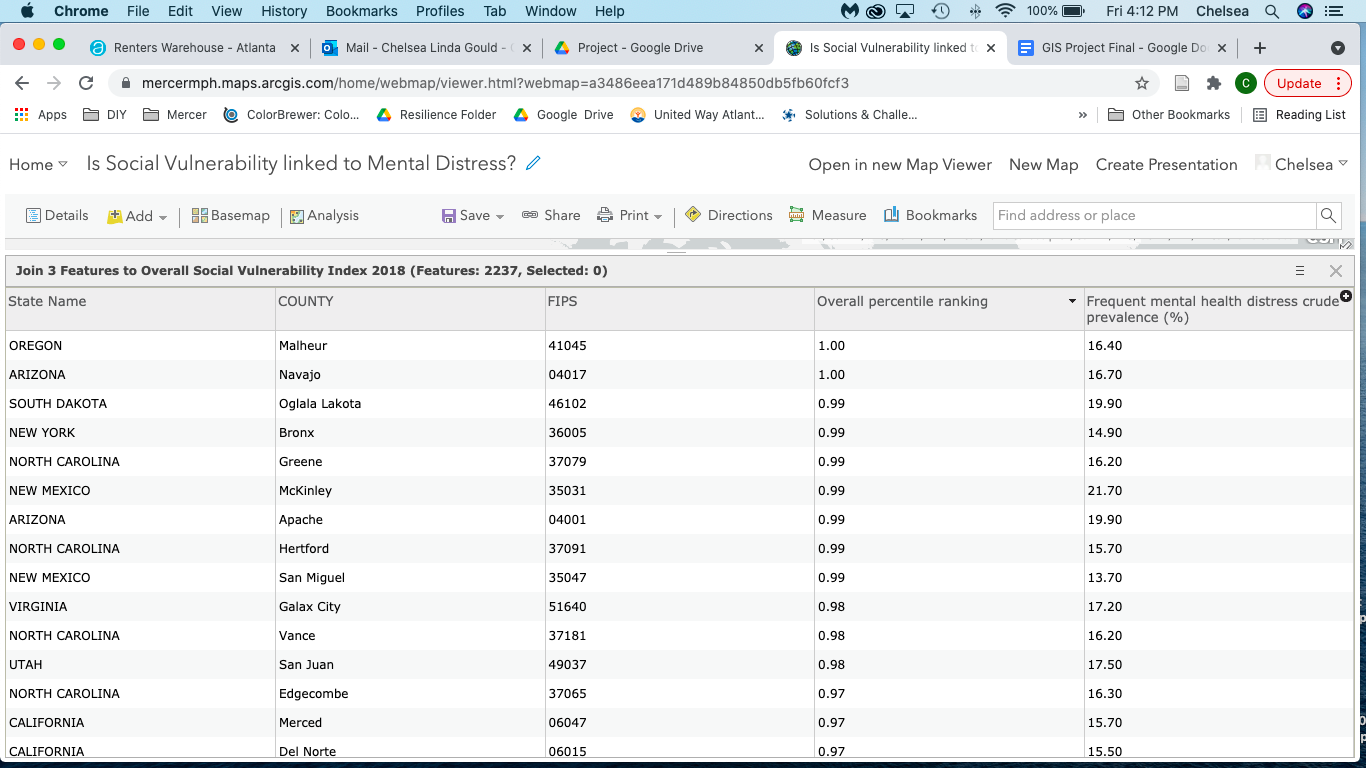
**Figure 1.** Overall Percentile Ranking by Descending



**Figure 2.** Overall Percentile Ranking by Ascending



**Figure 3.** Frequent Mental Health Distress Crude Prevalence (%) by Descending



**Figure 4.** Frequent Mental Health Distress Crude Prevalence (%) by Ascending

