**VDSS\_ZIP\_TREAT\_MAP.R - README**

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**File Name: VDSS\_ZIP\_TREAT\_MAP.R**

**Purpose**

This script generates a thematic map displaying the treatment status of ZIP codes in Virginia based on the treat\_g50 variable. ZIP codes are categorized into "Treated," "Non-Treated," or "Partially Treated" groups, and the map is saved in multiple formats for visualization and analysis.

**Overview**

The script processes treatment data for Virginia ZIP codes and:

1. Loads treatment data and calculates the average treat\_g50 value for each ZIP code.
2. Categorizes ZIP codes by treatment status.
3. Merges the processed data with Virginia ZIP code shapefiles.
4. Generates a thematic map with distinct color coding for treatment statuses.
5. Saves the map in PNG, PDF, and HTML formats for various use cases.

**Datasets and Tools**

**Input Files:**

1. **zip\_treat.dta:** Contains treatment data for ZIP codes, including the treat\_g50 variable.

**Output Files:**

1. **Zip\_Treat\_Map.html:** An interactive HTML map.
2. **Zip\_Treat\_Map.pdf:** A static PDF version of the map.
3. **Zip\_Treat\_Map.png:** A static PNG image of the map.

**Dependencies:**

* **R Libraries:**
  + haven: For reading .dta files.
  + sf: For handling shapefiles.
  + tmap: For creating thematic maps.
  + dplyr: For data manipulation.
  + tigris: For accessing TIGER/Line shapefiles.

**Script Functionality**

**1. Loading and Processing Data:**

* Reads the zip\_treat.dta file using haven.
* Converts the ZIP column to character format.
* Calculates the average treat\_g50 value for each ZIP code.

**2. Categorizing ZIP Codes:**

* Classifies ZIP codes into treatment status categories based on the average treat\_g50 values:
  + **Non-Treated:** avg\_treat\_g50 == 0
  + **Treated:** avg\_treat\_g50 == 1
  + **Partially Treated:** 0 < avg\_treat\_g50 < 1
  + **Unknown:** Other cases.

**3. Loading and Merging Shapefiles:**

* Loads Virginia ZIP code shapefiles (ZCTA boundaries) using tigris.
* Merges ZIP treatment data with shapefiles by ZIP code.

**4. Creating the Map:**

* Generates a thematic map using tmap, with distinct colors for each treatment category.
* Overlays county boundaries for additional context.

**5. Saving the Map:**

* Exports the map in the following formats:
  + **PNG:** High-resolution image.
  + **PDF:** Static document format.
  + **HTML:** Interactive web format.

**File Output**

**Zip\_Treat\_Map.html:**

* An interactive map displaying ZIP codes by treatment status.

**Zip\_Treat\_Map.pdf:**

* A static PDF map for presentation and printing.

**Zip\_Treat\_Map.png:**

* A static PNG map for visualization and sharing.

**Usage**

1. Place the zip\_treat.dta file in the Raw Data/VDSS\_Zip\_Treat\_Map/ directory.
2. Install the required R libraries.
3. Execute the script in an R project environment.
4. Access the output files in the Plots/VDSS\_Zip\_Treat\_Map/ directory.

**Notes**

* The script uses specific colors to represent treatment statuses:
  + **Treated:** Light blue.
  + **Non-Treated:** Light brown.
  + **Partially Treated:** Light green.
* Ensure the input data is complete and correctly formatted to avoid errors during processing.
* Interactive maps require a web browser for viewing HTML files.