Visualizing the Uninsured: A Data Science Perspective on U.S. Health Coverage

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Part 1 – Identify a Social Problem

0.1   1.1 Describe the Social Problem

The high number of uninsured Americans is a persistent issue with substantial social and economic consequences. According to the U.S. Census Bureau, over 27 million Americans lacked health insurance in 2022. This lack of coverage can lead to delayed medical care, poor health outcomes, and financial instability.

0.2   1.2 Provide Background on the Problem

Since the implementation of the Affordable Care Act (ACA) in 2010, the number of uninsured has decreased, but disparities remain. People with low income, people of color, and those living in states that did not expand Medicaid are disproportionately affected. Health insurance in the U.S. is often tied to employment, further complicating access for those in part-time, temporary, or informal jobs.

1   Part 2 – Describe and Acquire Data

1.1   2.1 Describe the Dataset

The dataset used is derived from the United States Census Bureau and includes individual-level data on health insurance coverage, demographics, and employment status.

1.2   2.2 Import and Prepare the Dataset

library(tidyverse)   library(tidyr)   library(readr)   library(ggplot2)   library(rnaturalearth)   library(maps) library(dplyr) library(purrr) library(stringr)

1.3   Data cleaning: Datasets of Uninsured Population and The Creation of The New Variable: The Uninsured Share

- describe here which states we first took out the margin of errors, then we took out the 6 small states and tell which states they are (deleware, district of columbia, hawaii, puerto rico, north dakota, rhode island, vermont and wyoming check de spelling!!), then that we took out the metadata and tell which metadata that is: age, sex, race and hispanic or latino origin, nativity and U.S. citizenship status, disability status, residence 1 year ago, educational attainment, employment status, work experience, civilian noninstitutionalized workers 16 years and over, earnings in the past 12 months and ratio of income to poverty level in the past 12 months. and that we only kept the total civilian noninstitutionalized population and household income (inflation adjusted). After that we coerced the character values in the yearly datasets no numeric and created our new variable of uninsured share. after that we combined all the yearly datasets

1.4   datacleaning Annual GDP Table and The Creation of The New Variable: Annual Real GDP Growth per year and state

2   Part 3 – Visualize and Analyze the Data

2.1   3.1 Create Initial Visualizations

Spatial Variation Visualization, U.S. Share of The Uninsured Population in 2023

- describe here that we mapped here the spatial variation of the uninsured population of the states of which we have the ACS one year estimates of and that we first created a subset of 2023 of the big dataset all_states_100 and that we plotted Alaska seperately otherwise the whole map would be too small to visualize.

Temporal Variation Visualization, Texas's Share of Uninsured Population and Texas's GDP growth rate over time

- describe that Texas stood out in our spatial variation analysis and that we wanted to dig deeper into Texas's share of uninsured population over time from 2010 until 2023, except for 2020 and that we wanted to see if economic growth played a role in this.

Sub-Group Variation Visualization, The Uninsured Rates of the Middle-Income Group in 2017 in the U.S.

- describe that already the KFF (2024) found that the uninsured people in the US are more likely to be low income and that we were wondering what the state of the middle-income group is as they earn too much for Medicaid but not enough for private insurance. 2017 is the year after Trump became president in 2016.

Event Analysis Visualization, The Impact of The Implementation of Work Requirements for Medicaid in Arkansas, 2018

- describe here what happened in Arkansas in 2018 and why the wanted to implement the work requirements and what these requirements were. and that Arkansas is the treatment group and the other 43 states are the control group and the ware analysing if the implementation had significant impact on the uninsured rates compared to the change in the control group which is the weighted average of the uninsured rates.

2.2 3.2 Identify Trends and Patterns

3 Part 4 – Communicate Findings

3.1 4.1 Summarize Key Insights

Our analysis highlights systemic inequalities in access to health insurance. Despite overall improvements since the ACA, millions remain uninsured.

3.2 4.2 Propose Solutions or Policy Recommendations

Potential solutions include:

- Expanding Medicaid in all states
- Decoupling health insurance from employment
- Increasing subsidies for marketplace plans

4 Appendix

4.1 A.1 References

- U.S. Census Bureau. (2022). Health Insurance Coverage in the United States.
- Kaiser Family Foundation. (2023). Key Facts about the Uninsured Population.

4.2 A.2 Session Info