

Introduction to GIS
2023

Fall

The Impact of Health Insurance On the Income Distribution In San Francisco

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Introduction

As we all know, health insurance is a critical component of a well-functioning healthcare system, providing individuals with financial protection against the high costs of medical care especially in the United States. However, access to health insurance is not evenly distributed across the population in the country, and there is growing evidence that this disparity may be contributing to income inequality. This GIS case study aims to present the impact of health insurance on the income distribution in San Francisco, California.

San Francisco is one of the most expensive cities in the United States, and the cost of living is higher than other cities in the United States. This puts a strain on low-income residents, who are more likely to be uninsured or underinsured towards medical care. As a result, lower income households are more likely to experience financial shortage due to medical expenses. The results of the case study may help public health policy makers to understand income inequality will play an important role in affecting residents' health insurance purchasing or enrollment decisions.

Obamacare, which is also known for the Affordable Care Act, has played a significant role for reducing citizen medical expenditure. Unfortunately, the ACA still cannot entirely solve the problem of uninsured Americans. Based on the survey implemented before, 13% of Californians were uninsured in 2016, and this number is likely due to the cost of health insurance keep increasing .

The GIS case study will use 2015 U.S Census data about health insurance and Income level in San Francisco to examine the relationship between health insurance and income distribution in the city. The data set includes income, health insurance coverage, and different types of healthcare insurance purchasing and comparing the difference between lower income and highest income level distribution towards health coverage through ArcGIS.

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Methods

The case study used 2015 US Census data from ACS 5 years to examine the relationship between health insurance coverage and income distribution in San Francisco. The specific ACS variables used in this study were:

- Income: Total household income with different level (Household income under \$25,000 and \$100,000 or more)
- Health Insurance: Health insurance coverage status (insured, uninsured, preference of public, private coverage)

The 2015 with all tracts for the San Francisco data set CSV file was imported into a GIS software program (ArcGIS). The data was cleaned and removed the rows and columns which are not needed for the case study. The data set was joined to a shapefile of census tracts in San Francisco and different Income levels with health insurance status were divided to become different layers. The information was analyzed using a variety of spatial statistics and visualization techniques.

A variety of visualization techniques were used to display the data, including:

- Choropleth map: This method is used for shading census tracts according to their value for a particular variable.
- Graduated color symbology: This is an effective way to communicate the information about income distribution in the San Francisco Bay Area.
- Layout with legend: Ungrouped and grouped statistical information of the income level distribution and medical insurance.

Based on the observation, there is a strong correlation between health insurance coverage and income. Residents of high-income census tracts are more likely to be insured than residents of low-income census tracts. According to spatial patterns toward health insurance coverage. Residents who are insured tend to be clustered in high-income areas, while uninsured residents tend to be clustered in low-income areas. Apparently, The relationship between health insurance coverage and income is not uniform across the city.

Results

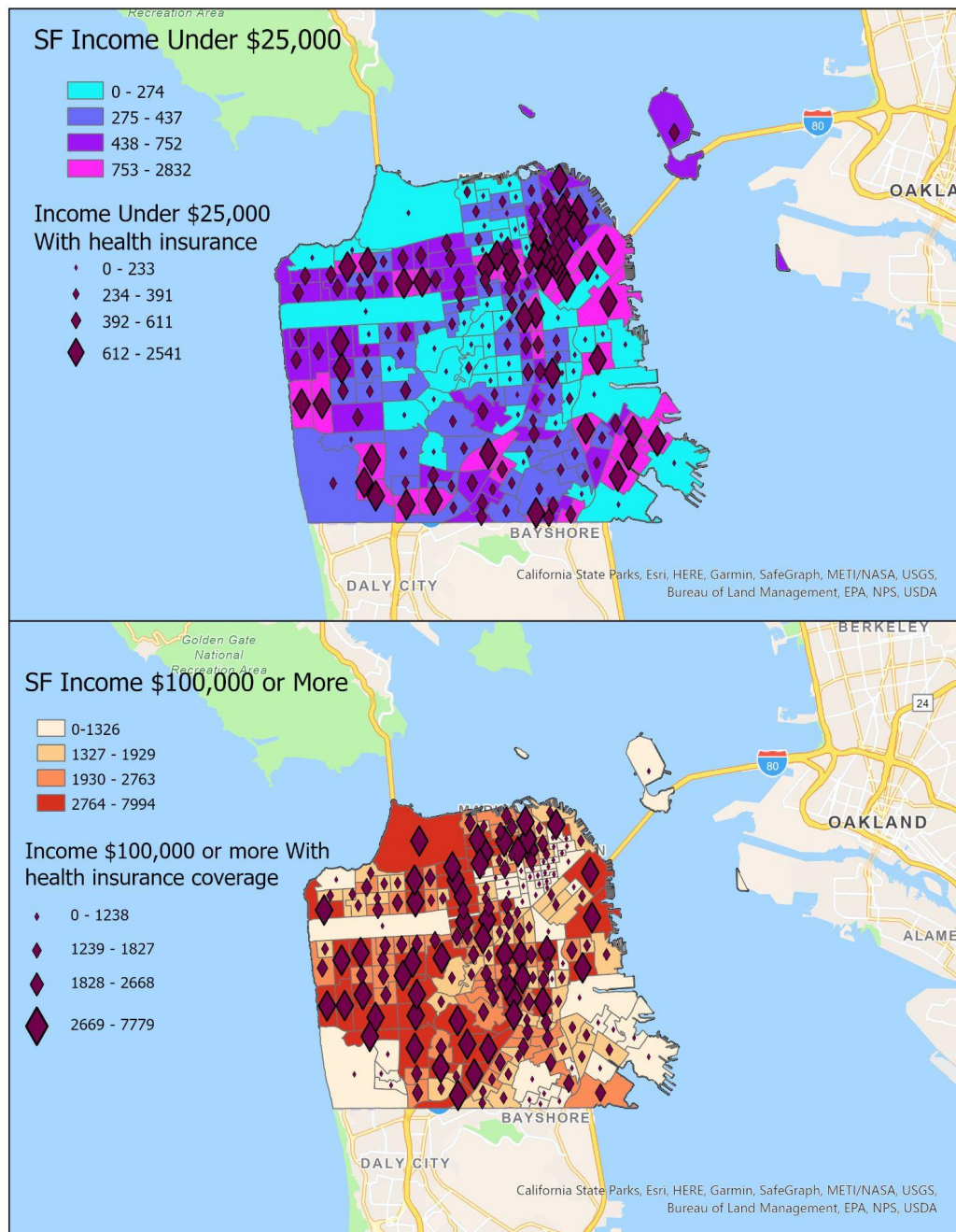


Figure 1: The relationship between different income levels and health insurance coverage

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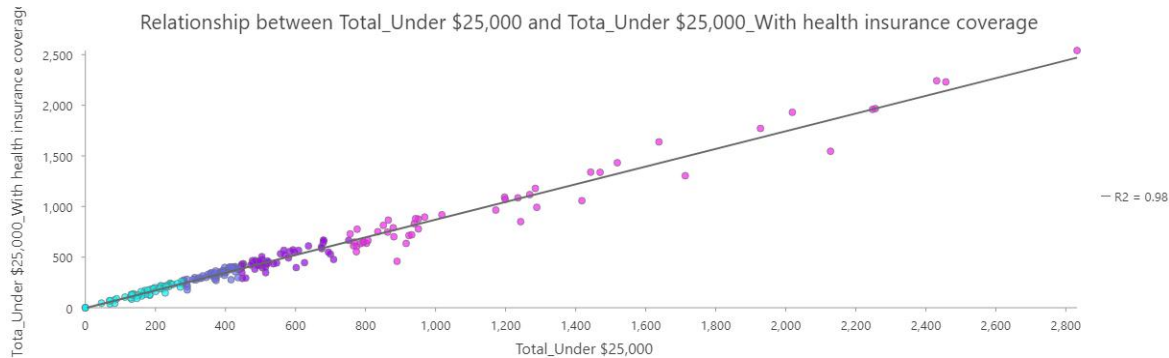


Figure 2: The Scatter plot for showing the relationship between Income under \$25,000 and health Insurance



Figure 3: The Scatter Plot for showing the relationship between Income \$100,000 or more and health Insurance

The two maps I created show the distribution of income with health insurance coverage in San Francisco, California, by census tract. The first map shows the distribution of residents whose income is lower than \$25,000 and their health coverage conditions. The second map shows the distribution of high income residents with \$100,000 or more and their health insurance enrollment situation.

The reason why I chose to map income distribution is because it is an important measure of economic inequality related to Income. This is a growing problem in this Country and San Francisco is one of the most expensive cities in the country. It is a major metropolitan area with a diverse population. So that is the reason San Francisco will be an ideal location to study the impact of health insurance on income distribution. In addition, I chose to map health insurance status because it can help present the relationship between income inequality and health insurance coverage.

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The two maps show that there is a strong correlation between health insurance coverage and income in San Francisco. Census tracts with higher level incomes are more likely to have a high proportion of residents with health insurance, while census tracts with low incomes are more likely to have a less proportion of residents who enroll in health insurance.

Based on the map, the darkest areas on both maps are concentrated in the areas, such as the Financial District, Pacific Heights, the Mission Bay and the Sunset neighborhood. These areas are known for their higher incomes so it will make sense there are high proportions of residents with health insurance. The lightest areas on both maps are also concentrated in areas like the Tenderloin, Bayview-Hunters Point, and the Downtown neighborhoods. These areas are known for their low incomes and high proportions of residents who unlikely have health insurance and the residents who living there are more likely not willing to enroll in any medical care program.

The main takeaways from these two maps are that there is a strong correlation between health insurance coverage and income in San Francisco, and that insured people are more likely to live in high-income areas. The information will be conveyed to the reader that health insurance may be a factor that contributes to income inequality for residents in San Francisco. People with health insurance are more likely to live in high-income areas, and they have capability to keep maintaining health insurance enrollment status while people without health insurance are more likely to live in low-income areas and they may be unable to afford any health insurance program. This suggests that expanding access and reducing the cost to enroll in health insurance for lower income households is really important.

Conclusion

The key takeaways based on what I observed, there is a strong correlation between health insurance coverage and income in San Francisco. People with health insurance are more likely to live in high-income areas, more likely to be willing to spend more on health insurance. However, for low-income areas, people may have difficulty purchasing health insurance and they are less likely to be insured. The income gap between people with health insurance and people without health insurance is significant.

For my further steps, if possible, I want to collect the cost of health insurance in different neighborhoods of San Francisco and it will be more accurate to explore the relationship between income inequality and health insurance coverage based on how much different types of insurance does cost.



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References

1. Glied, S. A., & Rosenbaum, S. (2014). Health insurance and income inequality. In The Oxford handbook of health economics (pp. 575-604). Oxford University Press.
2. Kuttner, R. D. (2012). The health care system in the United States: What's right, what's wrong, and how to fix it. Jossey-Bass.

Links to Web Maps

<https://arcg.is/1POTiz>

<https://arcg.is/1LDir82>