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The Impact of Healthcare Disparities in Rural Ohio

Bailey Stammen & Sara Curtis

Scholarship in Medicine Final Report (2023)

Abstract

Rural communities in the state of Ohio face barriers to care that affect the health of the population. This paper investigates the extent to which the general state of health, life expectancy, uninsured rates, and access to primary care providers can be affected by living in a rural community and how these variables have changed over time. Data from urban and rural counties in Ohio, taken from 2016 to 2022 via the 2022 County Health Rankings, will be used to explore health-related concerns. There were significant findings of decreased general health and access to primary care providers for rural communities in Ohio for 2022. Additionally, there was a significant finding for increased uninsured rates for rural populations in Ohio for 2022.

Introduction

Health outcomes directly affect the longevity and quality of life of patients. One's health outcome can highly depend on their zip code. There are differences in rural populations as compared to urban populations for income, life expectancy, access to primary care, poor health, and lack of health insurance. Lower-income populations typically experience worse health outcomes regardless of whether the people live in urban or rural areas. The income disparity also affects access to nutrition and healthcare for the rural population.¹ Although there are medical facilities that exist in both rural and urban areas of Ohio to treat their communities, facilities in rural communities have fewer provisions, primary providers, and specialists than their urban

counterparts.² Even though 14% of the United States population resides in rural regions, only about 10% of total primary care physicians practice there. Rural communities also tend to have higher population rates of uninsured people.³ Patients tend to not seek medical care when they lack insurance and typically lack insurance due to financial constraints. Rural residents are more likely to report having no preventative care compared to their urban counterparts.⁴ When maintenance health care is not done, the health of the individual is at risk for preventative diseases. Access to affordable care would help to decrease the barriers for vulnerable populations.

The medical outcomes tend to be worse in rural populations as compared to urban communities.¹ There is a higher mortality rate associated with living in a rural population as compared to living in urban settings.⁵ Some populations are more vulnerable than others within healthcare in rural communities. Rural women in Ohio face barriers to obtaining healthcare, gaining health insurance, and routine health maintenance visits.⁶ Due to differences in social determinants of health for rural communities as compared to urban areas, there is a preventative care gap for the pediatric population in Ohio.⁷ Vulnerable populations include more than women and children. People that are recovering from recent hospitalizations face increased mortality after discharge in rural uninsured populations as compared to urban uninsured populations.⁸

Healthcare disparities affect every community in America. However not much is known about the degree to which living in rural Ohio can affect one's general state of health, life expectancy, uninsured rates, income, and access to primary care providers. Are these determinants improving or worsening over time? The more information that is gathered, the better the Ohio governing bodies can implement appropriate changes to improve the health and

quality of life for their residents. This would also expose other areas of concern for the rural populations that could be investigated for the benefit of the community.

Research Questions

RQ1. How does the percentage of the rural population correlate with the percentage of the uninsured population in Ohio in 2022?

RQ2. How does life expectancy differ between rural and urban counties in Ohio in 2022?

RQ3. How does access to primary care services differ between urban and rural populations in Ohio in 2022?

RQ4. How does the percentage of the rural population correlate with the percentage of being poor or fair health in 2022 for Ohio?

RQ5. How has median household income changed in Ohio counties between 2016 and 2022?

Methods

Data Collection

The data explored within our research came from the 2022 County Health Rankings. County Health Rankings obtained this data from multiple sources including the American Community Survey, the annual social and economic supplement of the current population survey, county business patterns, demographic population estimates, federal tax returns, SNAP benefits recipients, Medicaid participation, children's health insurance program participation, and the decennial census. County Health Rankings measures health variables of nearly all counties within the United States. Our research is focused on data from urban and rural counties within Ohio from the years 2016 and 2022. The counties classified as urban have a population

greater than or equal to 50,000 and those labeled rural have a population below 50,000 people.⁹ Out of the 88 counties in Ohio, 49 counties fell under the rural classification while the remaining 39 counties were classified as urban. The percentage of the populations within each county of Ohio that were uninsured was evaluated. The average life expectancy for each county within Ohio was observed. We also chose to look at what percentage of the population was labeled as having poor or fair health within each Ohio county. The average income in Ohio in 2022 was also examined and compared to the average income in Ohio in 2016. The exclusions in our data collection were any state other than Ohio and years other than 2016 and 2022.

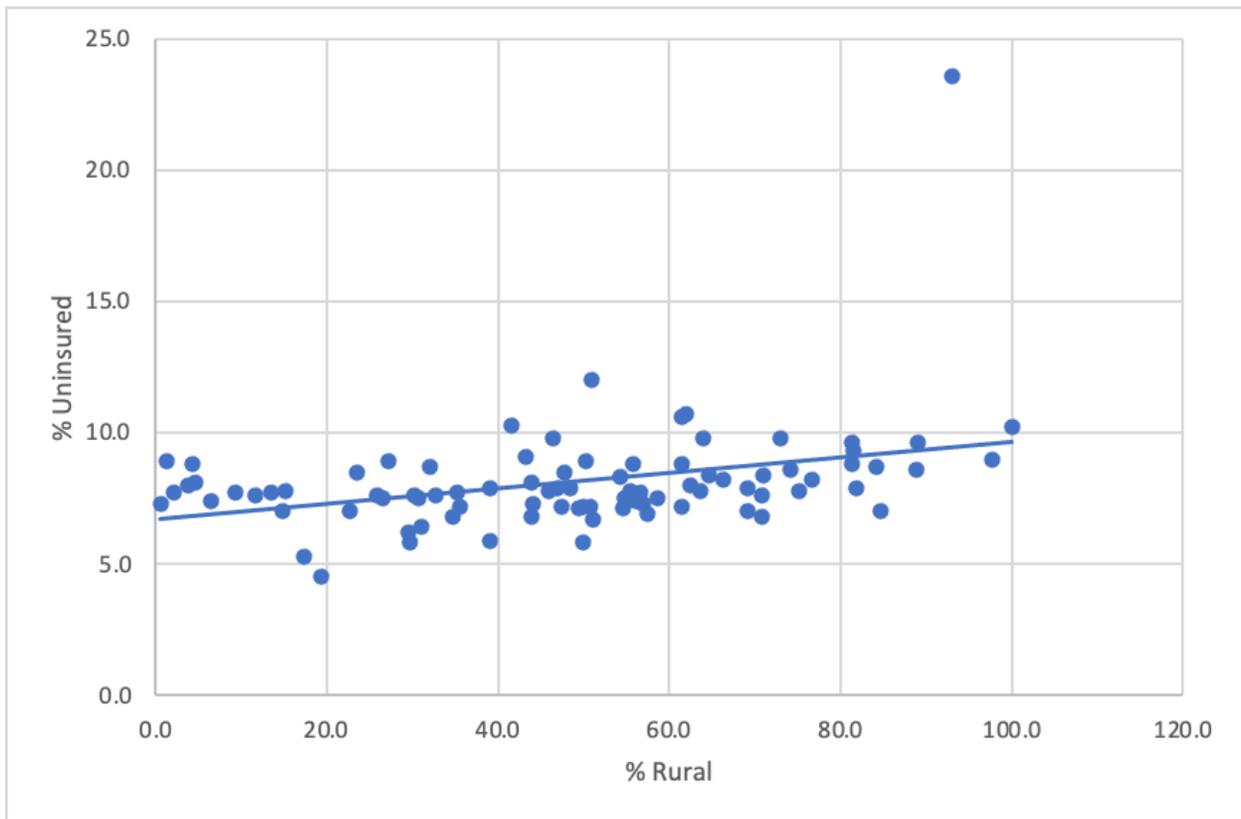
Data Analysis

To answer our questions, we used three different testing techniques using SPSS Software. These techniques were Pearson rank correlation, an unpaired t-test, and a paired t-test. The Pearson rank correlation was used since the data showed an even distribution for the data. The Pearson test measures the correlation between two variables. It was used to assess the correlation between uninsured percentages (RQ1) and the identification of health status (fair/poor) within the rural and urban counties in Ohio in 2022 (RQ4). An unpaired t-test determines the differences between two variables. The unpaired t-test was done to answer the questions for the life expectancy of the populations (RQ2) as well as access to primary care services for urban and rural populations in Ohio in 2022 (RQ3). The paired t-test determines if the mean difference between two variables is zero. The paired t-test was done to answer the question regarding the living wage for residents of rural and urban counties within Ohio in 2016 and 2022 (RQ5).

Results

Evaluating the relationship between the uninsured population in Ohio that also lives in a rural community in 2022 (RQ1), a Pearson correlation indicated a significant positive correlation ($r = .352, p < .001$) where, as the percentage of rural residents increases, the percentage of uninsured people in Ohio also increases in 2022 (Figure 1).

Figure 1: The correlation of the percent of rural residents versus the percentage of uninsured population in Ohio communities in 2022



Pearson correlation indicated a significant positive correlation ($r = .352, p < .001$).

*The 2022 rural resident population data was collected in 2010.

Figure 1 shows that there is a direct relationship between the number of rural residents and the number of uninsured people in Ohio. This determines that there are higher rates of uninsured people that live in rural communities in Ohio in 2022.

Rates of life expectancy (RQ2) were not significantly different between the Ohio rural population's average age of 76.12 years and urban 76.57 years in 2022 ($t = -1.054$, $p < .295$).

Table 1: Life expectancy in 2022 for rural and urban Ohio populations

Ohio Counties	n	Mean	SD
Rural	39	76.12	2.10
Urban	49	76.57	1.93

Abbreviation: SD, Standard Deviation

Table 1 does not show any meaningful connection for the life expectancy in Ohio whether a person is living in rural or urban areas in 2022.

The ratio of residents per primary care physician (RQ3) was significantly different between the rural 3,926.54 and urban 1,859.02 for Ohio populations in 2022 ($t = 5.237$, $p < 0.001$).

Table 2: Access to primary care services in 2022 for rural and urban Ohio populations

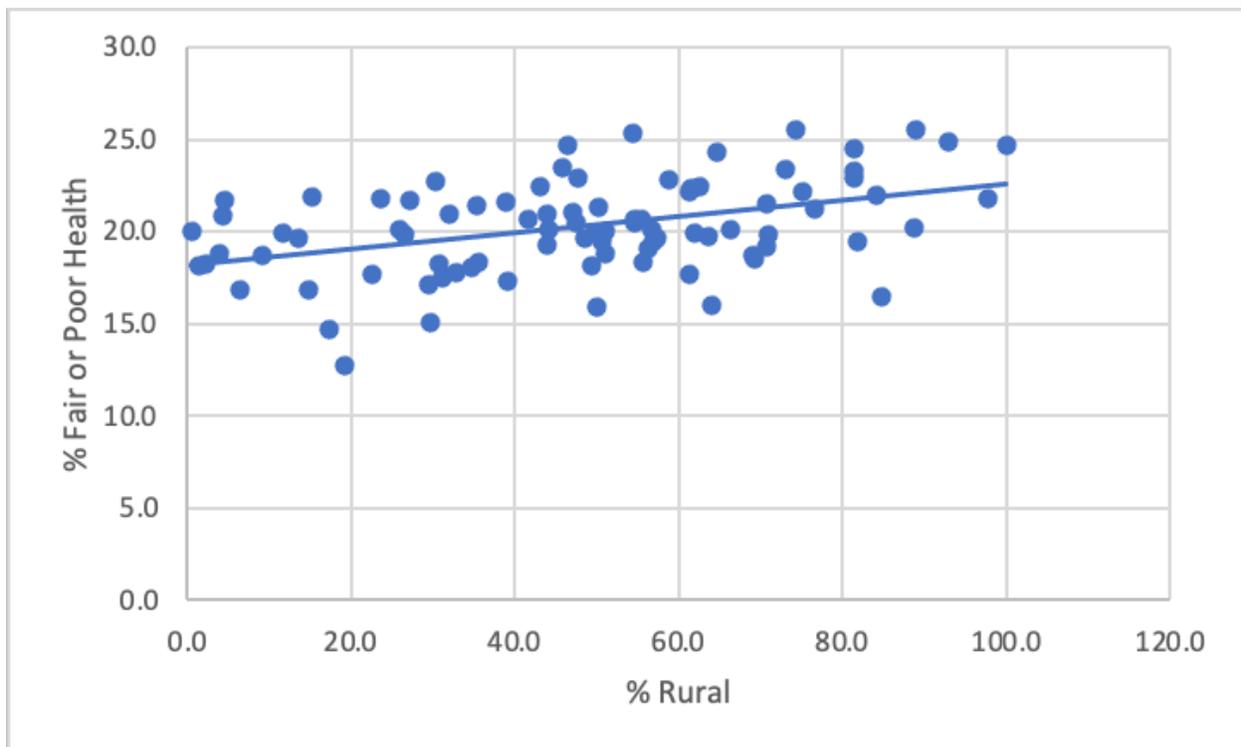
Ohio Counties	n	Mean	SD
Rural	39	3926.54	2653.86

Urban	49	1859.02	698.44
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Abbreviation: SD, Standard Deviation

Evaluating the relationship of the percentage of the population being poor or fair health in Ohio that also lives in a rural community in 2022 (RQ4), a Pearson correlation indicated a significant positive correlation ($r = .429$, $p < .001$) where, as the percentage of rural residents increases, the percentage of the population being poor or fair health in Ohio also increases in 2022 (Figure 2).

Figure 2: The correlation between being poor or fair health for people that live in rural Ohio communities in 2022



Pearson correlation indicated a significant positive correlation ($r = .429, p < .001$).

*The 2022 rural resident population data was collected in 2010.

The significant comparison for Figure 2 demonstrates the connection of rural residents in Ohio considered to be in poor or fair health in 2022.

Comparing the average median household income in Ohio counties in 2016 versus 2022 (RQ5), we found the income significantly increased from \$ 48,443.27 in 2016 to \$ 59,539.86 in 2022 ($t = 25.1, p < 0.001$) Table 3.

Table 3: The median household income in Ohio

Year	n	Mean	SD
2016	88	48443.27	9503.04
2022	88	59539.86 ^a	11897.28

Abbreviation: SD, Standard Deviation

Statistically significantly different from 2016 and 2022 ($p < .001$).

Table 3 shows the median income in Ohio has increased in all Ohio counties by a significant percentage.

Discussion

Rural populations face various difficulties as compared to their urban counterparts in Ohio. Our results showed significance for the degree to which living in a rural community affects the general state of health, uninsured rates, and access to primary care providers in Ohio for 2022.

The average median household income increase was significant from 2016 to 2022 in all Ohio counties. However, this correlation did not give us much insight into how income is affected in rural versus urban areas. Understanding that income inequality negatively affects health, it would be helpful to know more information about the trend of household income for Ohio to better assess and recommend policy changes. It would have been of greater use if we had compared how the median income had changed from 2016 to 2022 in both rural and urban counties if we had access to that data. That way, we could see if there was a possible income difference in rural versus urban classified populations. The life expectancy rate was surprisingly not significant between rural and urban populations in Ohio in 2022. This was surprising because it has been reported that rural counties within the United States experienced declines in life expectancy whereas urban counties experienced increases in life expectancy during the years of 2010 through 2019.¹⁰

The general state of health for the rural communities in Ohio is diminished. There is a direct correlation between the percentage of rural communities and the percentage of self-reported poor health in Ohio as seen in Figure 2. The health consequences for rural populations as compared to urban communities tend to be poor.¹ To maintain proper health there must be an adequate intake of nutrients. With a decreased income, it is less likely to be able to afford healthy foods that are full of these nutrients such as fresh fruits and vegetables.¹ Residents of rural communities also generally have limited medical resources as well as trouble accessing adequate medical care within these resources, which contributes to poor health.¹

Accessing medical care for the rural communities in Ohio is diminished. Having health insurance gives people an advantage when seeking health care. A direct correlation exists between the percentage of uninsured people to the percentage of rural communities in Ohio as

seen in Figure 1. Rural communities have higher population rates of people that do not have insurance, and the lack of insurance will impede access to healthcare.³ The burden on primary care providers to care for a higher number of residents as compared to urban populations in Ohio is seen in Table 2. The lack of insurance in rural communities as compared to urban communities leads to patients not being current on preventative care.⁴ Therefore the lack of insurance in rural communities causes decreased maintenance of health care and consequently poor health.

Conclusion

Although we found many interesting and significant correlations within our data set, there were limitations to our study. One research design limitation was the small list of variables we were allowed to choose from. Picking from this constricted list allowed us to only compare the relationships between the given variables. This was done for the sake of performing the data analysis. However, not having full freedom to pick whatever variable we wanted possibly prevented us from seeing a bigger picture or an even more vital correlation. Additional variables that we would have liked to select and explore if they were available were commute times to doctor's appointments and appointment waiting times for rural versus urban living residents. Another research design limitation was that we only looked at 2 different years (2016 and 2022). It would have been preferable to look at a range of years, but again the data set we collected from was limited. Only looking at these 2 years could give skewed results and correlations. A research process limitation was the use of aggregated data. Using aggregated data could have led us to make multi-level inferences based only on a single level of analysis. One way to make sure our inferences and correlations are not misleading because of this aggregated data is to maybe understand how the data is aggregated in the first place.

We did find direct and significant correlations between the percentage of rural in each Ohio county, the access to health care within those same counties, and the percentage of the population that is labeled as poor or fair health. All of these factors most likely play into one another. For instance, the higher provider-to-patient ratio that was found within rural Ohio counties as compared to their urban counterparts is most likely causing patients in rural areas to have longer wait times and they are not able to see their primary care provider as often as urban dwelling residents. If rural residents are not going to the doctor as often as urban residents, they are likely to have poorer health since they are not being seen and examined by a physician as regularly. Therefore, it is difficult to pinpoint one factor that is responsible for rural populations having historically worse health outcomes than their urban counterparts and is more than likely a multifactorial issue. Further investigation into the causes for decreased health insurance, access to primary care services, and poor health for the rural Ohio communities would only be of benefit to Ohio. As we are aware, the quality and length of life for Ohio residents are dependent on their health. Further analysis of these factors and how they transpire to affect the health of rural Ohio residents can better inform policymakers going forward.

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