



RESEARCH BRIEF #52

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Why are COVID-19 Vaccination Rates Lower in Rural than in Urban areas of the U.S.?

Shannon M. Monnat and Yue Sun

Achieving high vaccination coverage is the best way to prevent coronavirus spread, promote economic recovery, and save lives. Yet as of September 2021, less than two-thirds of U.S. adults had been fully vaccinated.

COVID-19 vaccination rates vary substantially across the United States, with some counties nearing 100% vaccination while others have rates under 5%.¹ Vaccination rates are lower, on average, in rural than in urban counties. This disparity is concerning given that COVID-19 infection and mortality rates are higher in rural areas, and rural hospitals have less capacity to deal with surges in severe cases.

This brief summarizes the results of a recent study published in [The Journal of Rural Health](#) that compared vaccination rates across the rural-urban continuum and identified the major contributors to lower rates of vaccination in rural counties.

COVID-19 Vaccination Rates are Lower in Rural Counties

As of August 11, 2021, 45.8% of adults in rural counties had been fully vaccinated compared to 59.8% in urban counties. Figure 1 shows the percentage of adults vaccinated across the USDA Economic Research Service's nine category rural-urban continuum codes (RUCC), which disaggregate metropolitan (urban) counties by population size and disaggregate nonmetropolitan (rural) counties by

KEY FINDINGS

- As of August 11, 2021, 46% of adults in rural counties had been fully vaccinated compared to 60% in urban counties.
- Higher Trump vote share in the 2020 Presidential election and lower educational attainment collectively explain lower rural vaccination rates.
- Nationally, Trump vote share is the single largest contributor to county-level variation in COVID-19 vaccination rates; each standard deviation increase in Trump vote share is associated with a 6.25 percentage point decline in the vaccination rate.
- Counties with larger shares of residents who are non-Hispanic Black also have significantly lower vaccination rates, whereas counties with higher median household income and more physicians per capita have significantly higher rates.
- Mandates may be the most effective strategy for increasing vaccination rates and saving lives.

both population size and adjacency to metro areas (see the Data and Methods section at the end of the brief for descriptions of each RUCC).

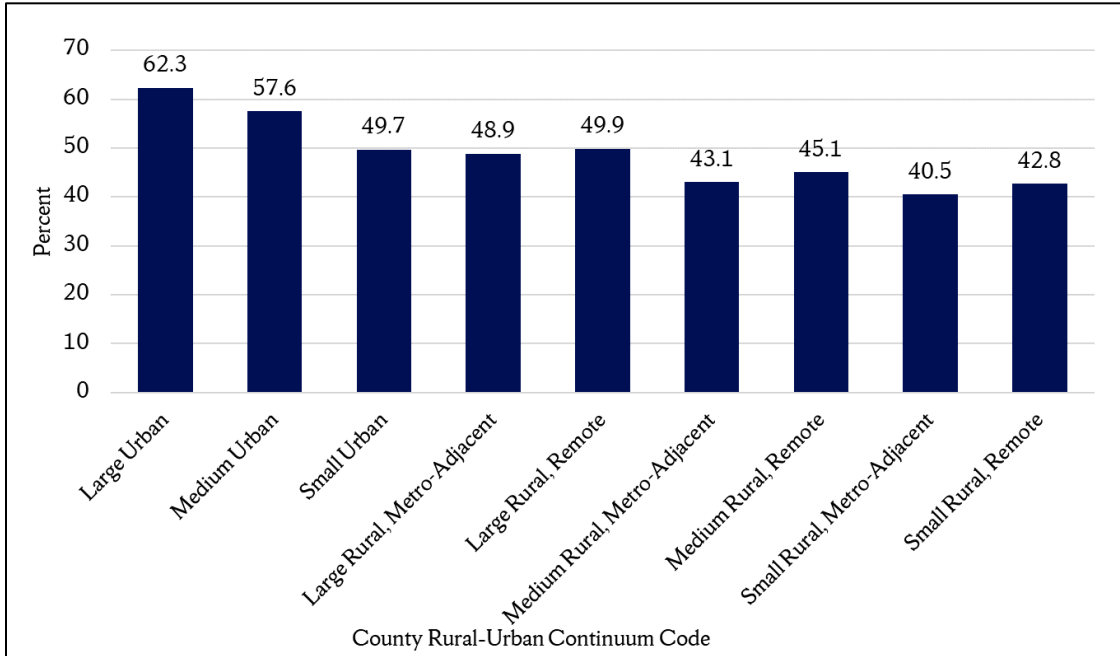


Figure 1. Percentage of Adults (ages 18+) who are Fully Vaccinated by Rural-Urban Continuum Code

Note: Vaccination rates are from the U.S. Centers for Disease Control and Prevention and are current as of August 11, 2021.

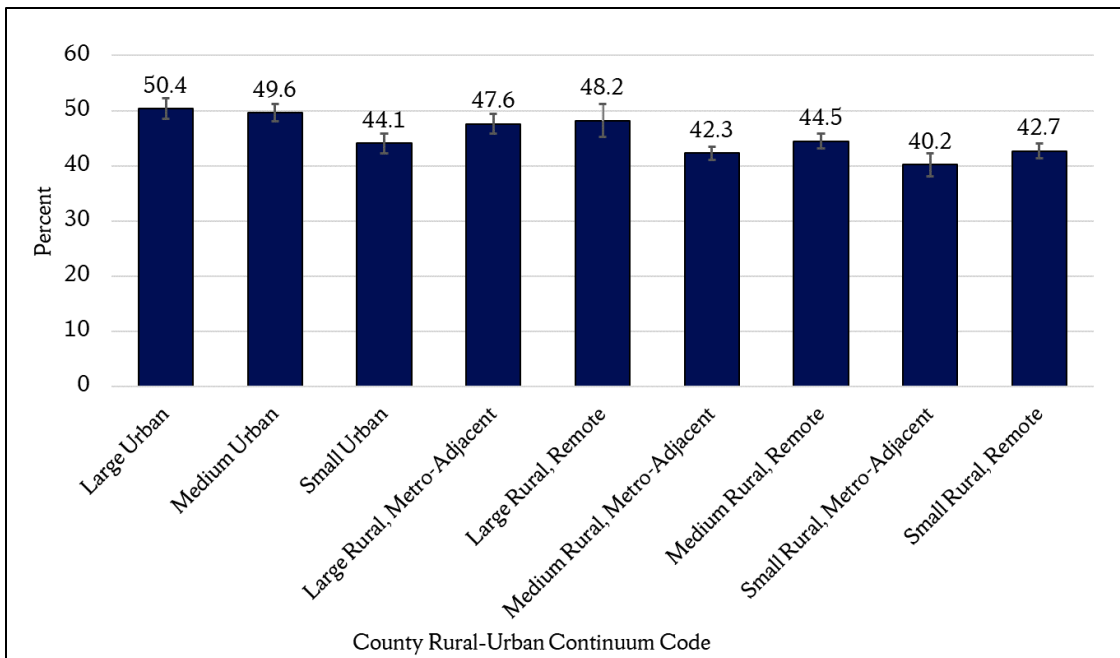


Figure 2. Average County Adult Vaccination Rates by Rural-Urban Continuum Code

Note: Vaccination rates are from the U.S. Centers for Disease Control and Prevention and are current as of August 11, 2021. Error bars represent 95% confidence intervals.

Vaccination rates decline with increasing levels of rurality. Rates are highest in large urban counties (RUCC 1) at 62.3% and lowest in metro-adjacent medium and small rural counties (RUCCs 6 and 8) at 43.1% and 40.5%, respectively. Likewise, average county-level vaccination rates (the mean vaccination rate of all counties in their respective RUCC category) are highest in large and medium urban counties (RUCC 1 and 2) and lowest in medium and small rural counties that are adjacent to metropolitan areas (RUCCs 6 and 8) (Figure 2).

Higher Trump Vote Share and Lower Educational Attainment Explain Lower Rural Vaccination Rates

Regression models show that lower average rural vaccination rates are explained by a combination of lower average educational attainment and higher average 2020 Presidential vote share for Donald Trump in rural counties. Vaccination rates are lower in counties with lower percentages of residents with a 4-year college degree or more and in counties with larger shares of the 2020 Presidential vote going to Donald Trump. On average, rural counties have lower educational attainment and had much larger vote shares for Trump in the 2020 election. These two factors are the primary contributors to lower COVID-19 vaccination rates in rural counties.

Nationally, Trump vote share is the single largest contributor to county-level variation in vaccination rates across the U.S. Net of all other factors, a one-standard-deviation (i.e., 16 points) increase in Trump vote share is associated with a 6.25 percentage point reduction in the vaccination rate. The relationship between Trump vote share and adult vaccination rates is illustrated in Figure 3. We see that average vaccination rates decline as the share of the Trump vote increases.

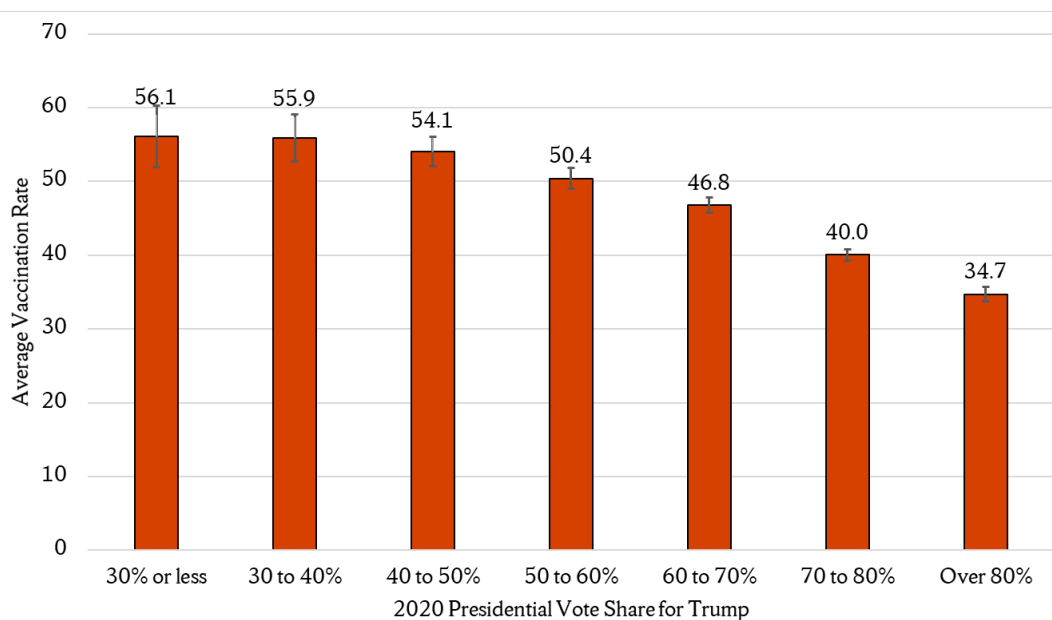


Figure 3. Average Adult Vaccination Rates by 2020 County Vote Share for Trump

Note: Vaccination rates are current as of August 11, 2021. Error bars represent 95% confidence intervals.

Vaccination rates are also significantly lower overall in counties in the highest quartile (top 25th percentile) of percent Black and significantly higher overall in counties with higher median household income and more physicians per capita.

We Must Combat Vaccine Resistance to Increase Vaccination Rates

Lower vaccination rates in rural areas are concerning given higher rural COVID-19 infection and mortality rates, recent surges in cases due to the Delta variant, and limited hospital capacity to deal with severe cases in rural communities. Several interventions are needed to increase vaccine uptake in lagging communities.

Given that there is widespread vaccine availability across most of the U.S., additional efforts to increase availability are unlikely to move the needle much. Instead, efforts must be targeted at reducing vaccine resistance. A recent Kaiser Family Foundation vaccine monitor showed that 21% of rural adults reported that they would definitely not get vaccinated compared to 14% of suburban and 12% of urban residents.² Vaccine resistance and hesitancy are complex and driven by multiple factors. Differences in perceptions of risk and virus severity, trust in science and the government, and attitudes about personal choice versus collective responsibility are all likely contributing to lower rural vaccination rates. Consistent with this explanation, rural residents have been less likely to adopt COVID-19 prevention behaviors, such as physical distancing, avoiding dining out, and wearing face masks.³⁻⁵ Smaller shares of rural residents report being worried about getting sick, and larger shares say that the severity is exaggerated, getting vaccinated is a personal choice, and believe in at least one myth about the vaccine.⁶ Given that former President Trump downplayed the severity of COVID-19, regularly promoted misinformation, and politicized science-based mitigation strategies (such as mask-wearing), it is no surprise that places where Trump support is high have significantly lower vaccination rates.

Community leaders will need to employ strategies to combat misinformation and reduce vaccine resistance. We encourage rural community, health care, agricultural, and faith leaders to use tools developed by the National Rural Health Association, including talking points, op-ed templates, and public service announcements to increase vaccine uptake.⁷ Rural residents are more likely to trust their primary care physicians to provide reliable information about the vaccine than they are to trust the FDA, CDC, or local public health departments.⁶ This makes primary care physicians key messengers for educating residents about and promoting vaccination in rural communities. However, given that only 10% of a recent Kaiser Family Foundation sample indicated that their current vaccination intention is “wait and see,” combatting misinformation will not be enough.² Vaccine mandates will likely be the most effective strategy for increasing coverage rates to a sufficient level to reduce coronavirus spread and save lives.

Data and Methods

We retrieved COVID-19 vaccination rates as of August 11, 2021 for adults aged 18 and older for the 2,869 counties for which data were available from the U.S. Centers for Disease Control and Prevention.¹ Rates were unavailable for 86 urban and 187 rural counties, including all counties in Texas and Hawaii, eight counties in California, and six in Virginia. We merged vaccination rates with county-level data on demographic and socioeconomic composition (percent age 65 and older, percent non-Hispanic Black, percent Hispanic, percent age 25+ with a Bachelor’s degree or more, median household income, and percentage without health insurance), health care resources (whether the county is designated as a health professional shortage area and physicians per capita), and the 2020 Presidential vote share for Donald Trump. We then used regression models to examine how each of these factors contributed to differences in vaccination rates across the USDA Economic Research Service’s (ERS) nine-category rural-urban continuum codes (RUCCs): (1) *large urban*: counties in metro areas of 1

million population or more; (2) *medium urban*: counties in metro areas of 250,000 to 1 million population; (3) *small urban*: counties in metro areas of fewer than 250,000 population; (4) *large rural, metro-adjacent*: nonmetro county with an urban population of 20,000 or more, adjacent to a metro area; (5) *large rural, remote*: nonmetro county with an urban population of 20,000 or more, not adjacent to a metro area; (6) *medium rural, metro-adjacent*: nonmetro county with an urban population of 2,500 to 19,999, adjacent to a metro area; (7) *medium rural, remote*: nonmetro county with an urban population of 2,500 to 19,999, not adjacent to a metro area; (8) *small rural, metro-adjacent*: nonmetro county with an urban population of less than 2,500, adjacent to a metro area; and (9) *small rural, remote*: nonmetro county with an urban population of less than 2,500, not adjacent to a metro area. All regression models control for unobserved non-time varying state-level differences by using state fixed effects. For full methodological details, see the [published paper](#).

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About the Author

Shannon M. Monnat (smmonnat@syr.edu) is the Lerner Chair for Public Health Promotion, Associate Professor of Sociology, and Co-Director of the Policy, Place, and Population Health Lab in the Maxwell School at Syracuse University. **Yue Sun** (ysun46@syr.edu) is a PhD student in the Department of Sociology, a Lerner Graduate Fellow in the Lerner Center for Public Health Promotion, and an Affiliate of the Policy, Place, and Population Health Lab in the Maxwell School at SU.