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COVID-19 Vaccination: Concerning Trends in Primary Care Health Professional Shortage Areas



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INTRODUCTION

Widespread vaccination is the most promising way to control the coronavirus disease 2019 (COVID-19) pandemic. Unfortunately, U.S. vaccination rates have stagnated. The rates are particularly low among racial/ethnic minority groups¹ and rural residents.² Although much of the discussion about low vaccination centers on person-level factors, the role of healthcare system factors is not well understood. An important system factor is the availability of primary care physicians, who play an integral role in counseling patients regarding the risks and benefits of vaccination. The U.S., however, has a considerable shortage of primary care providers with >84 million (25%) Americans living in primary care health professional shortage areas (PC-HPSAs).³ These are concentrated, but not exclusively located, in rural areas (61%)⁴ and have complex demographic patterns.⁵ Previous studies have reported higher rates of COVID-19 infection and deaths in full-county PC-HPSAs.⁶ This study assesses the association between COVID-19 vaccination rates and county PC-HPSA status.

METHODS

The county-level data were from 2 sources: (1) the daily number of fully vaccinated people from the Centers for Disease Control and Prevention (CDC) and (2) the 2020–2021 Area Health Resource Files from the Health Resources and Services Administration (HRSA), which classifies all U.S. counties into 3 groups—full-county PC-HPSAs, partial-county PC-HPSAs, and non-PC-HPSAs. Previous research has confirmed the Area Health Resource Files data quality and value for workforce analysis.⁷

Daily trends in COVID-19 vaccination rates were assessed by county PC-HPSA status between December 13, 2020 (the date of COVID-19 vaccine arrival in counties) and September 19, 2021. A negative binomial regression with state fixed effects was estimated to assess the association between vaccination rates on September 19, 2021 and county sociodemographic characteristics and health resources. Analyses were conducted using Stata/SE, version 16.0, with SEs clustered at the state level.

RESULTS

Full-county PC-HPSAs trailed behind other counties in COVID-19 vaccination rates, and the gap has widened over time (Figure 1A). Full-county PC-HPSAs within the bottom quartile of vaccination rates were concentrated in the South and Midwest (Figure 1B). Full-county PC-HPSAs had the lowest vaccination rates for each studied age group (12–17, 18–64, ≥65 years) (Figure 1C–E). The gap was especially pronounced for those aged 12–17 and 18–64 years.

The regression analysis indicated that relative to non-PC-HPSAs, full-county PC-HPSAs had significantly lower vaccination rates (incidence rate ratio=0.88, 95% CI=0.80, 0.98), whereas there were no significant differences between partial-county and non-PC-HPSAs. Furthermore, vaccination rates were significantly higher in counties with greater non-White population, higher income, more hospitals and community health centers, and located in metropolitan counties (Appendix Table 1, available online).

DISCUSSION

This study identified growing disparities in COVID-19 vaccination rates in full-county PC-HPSAs. This effect was consistent across age groups.

Recognizing the potential impact of primary care provider shortages on vaccination rates, CDC and HRSA piloted the COVID-19 Health Center Vaccine Program in February 2021 and subsequently expanded it to all community health centers in April 2021.⁸ Aside from local vaccine allocations, this program provided direct

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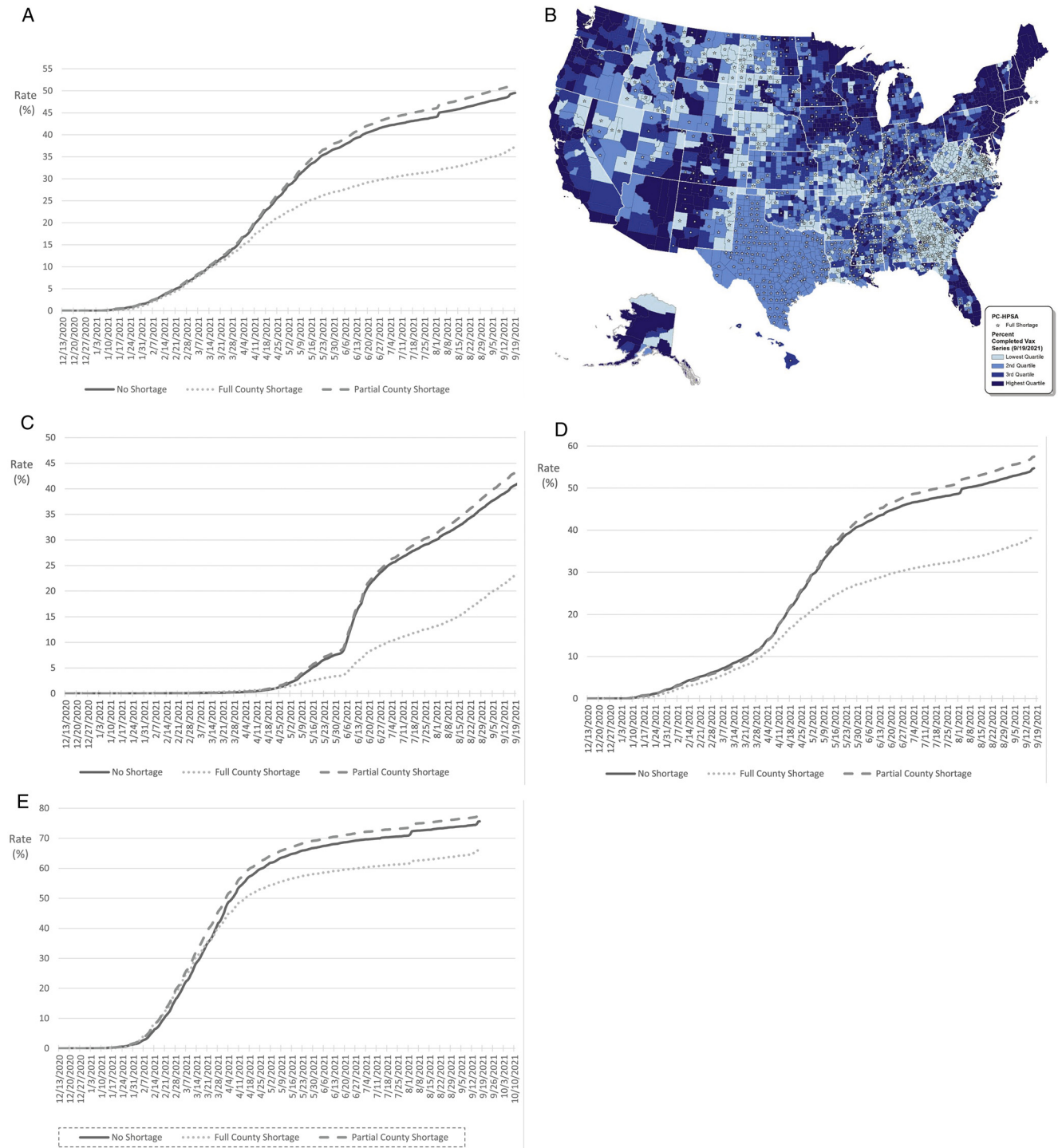


Figure 1. (A) Vaccination rate by primary care health professional shortage status, the general population. (B) Distribution of U.S. counties by COVID-19 vaccination rate and full-county PC-HPSA status. Note: Because Hawaii and Texas did not report county-level vaccination rates to CDC, counties in these 2 states were assigned their state-level vaccination rankings (second quartile for Hawaii and third quartile for Texas). (C) Vaccination rate by primary care health professional shortage status, population aged 12–17 years. (D) Vaccination rate by primary care health professional shortage status, population aged 18–64 years. (E) Vaccination rate by primary care health professional shortage status, population aged ≥65 years. CDC, Centers for Disease Control and Prevention; PC-HPSA, primary care health professional shortage area.

supply of vaccines to community health centers, most of which are located in health professional shortage areas. This study suggests that disparities in underserved areas have actually widened despite support from CDC and HRSA for vaccinations in community health centers, raising questions about the program's effectiveness. Complementary strategies are needed to increase vaccination rates, including partnering with community pharmacies,⁹ conducting a COVID-19-specific health information campaign, and expanding peer support counseling and school health programs.

The finding of comparable vaccination rates between partial-county and non-PC-HPSA counties may be attributable to similar population-to-primary care physician ratios between the 2 groups. By contrast, full-county PC-HPSAs have much lower ratios.¹⁰

This study has limitations. The data did not have county-level information about vaccination rates among racial/ethnic groups, vaccine sites, local vaccine mandates, number of primary care physicians leaving their jobs, or share of physicians using telehealth. Future studies should examine the minimum level of primary care availability that is required to ensure sufficient vaccine uptake and whether telehealth may alleviate primary care workforce reduction during the pandemic and improve vaccination rates. Researchers should consider employing spatial autocorrelation to rigorously control for clustering and dispersion of vaccination rates in longitudinal analyses.

All told, this study's findings suggest that further efforts are needed to improve COVID-19 vaccine coverage in full-county PC-HPSAs. Specifically, more efforts should target those aged 12–17 and 18–64 years in full-county PC-HPSAs.

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2021.12.024>.

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