Rural Disparities in Preventable Hospitalizations: An Analysis of Midwestern Counties

Trisha Lal, MD; Richard S. Hoehn, MD

Background

Rurality is widely recognized as a barrier to healthcare access, ultimately contributing to worse outcomes and higher all-cause mortality, a phenomenon known as the “rural mortality penalty.” Preventable hospitalizations, defined as hospital admissions avoidable through timely and effective outpatient care, are a proxy for healthcare quality and access. While disparities in preventable hospitalizations are well-documented, this study evaluates whether rural counties in the Midwest experience disproportionately higher rates using the County Health Rankings (CHR) framework. We hypothesized that rural counties would have higher odds of preventable hospitalizations than urban counterparts.

Methods

We conducted a cross-sectional analysis using county-level data from the 2025 CHR linked to the 2023 USDA Rural-Urban Continuum Codes (RUCC) and 2024 CDC PLACES data. Rurality (RUCC 4-9) was the exposure, and high preventable hospitalization rates, defined as the top quartile among all Midwestern counties, was the outcome. We first conducted descriptive statistics to compare rural and urban counties across 18 covariates spanning demographic, socioeconomic, and health-related variables.

Counties with extreme propensity scores (<0.005 or >0.994) were excluded to improve overlap between exposure groups. Propensity scores were estimated using logistic regression, followed by 1:1 matching with replacement and a caliper width 0.2. In a secondary analysis, inverse probability of treatment weighting (IPTW) was applied to estimate the average treatment effect in the treated (ATT). The method of choice was determined based on an assessment of covariate balance using standardized mean differences, Love plots, and Rubin’s Rules. A forest plot was generated to compare treatment effects across analytic approaches.

Results

Descriptive comparisons revealed substantial baseline differences between rural and urban counties, with several structural and health-related disadvantages concentrated in rural areas. Notably, preventable hospitalization rates appeared similar between exposure groups before adjustment. Matching with replacement and caliper achieved strong covariate balance (Rubin’s Rule 1 = 6.21; Rule 2 = 1.16). In this primary analysis, rural counties had 51% lower odds of being in the top quartile of preventable hospitalizations compared to urban counties (OR: 0.49; 95% CI: 0.32–0.76). In contrast, the IPTW analysis did not achieve adequate balance or a meaningful association (OR: 1.13; 95% CI: 0.64–1.96). Sensitivity analysis using Rosenbaum’s bounds indicated results were robust to unmeasured confounding up to $\Gamma = 1.20$.

Conclusions

Contrary to our hypothesis and prior literature, rural counties in the Midwest had significantly lower odds of high preventable hospitalization rates after adjusting for confounders. This suggests a possible urban disadvantage, potentially driven by disease burden or overutilized health systems in urban settings. Future work should consider stratification by state and analysis of disease-specific hospitalization patterns.