Rural Disparities in Preventable Hospitalizations: An Analysis of Midwestern Counties

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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. Prior literature has associated rurality with higher rates of preventable hospitalizations, but few studies have used matched designs to isolate this relationship. We evaluated whether urban counties in the Midwest experience fewer preventable hospitalizations than rural counties, adjusting for structural and population-level confounders.

Methods

We conducted a cross-sectional analysis of 892 Midwestern counties using 2025 CHR data, linked to the 2023 USDA Rural-Urban Continuum Codes (RUCC) and 2024 CDC PLACES data. The outcome was the number of preventable hospitalizations per 100,000 Medicare enrollees (continuous), and the exposure was urban county designation (RUCC 1-3).

Propensity scores were estimated using logistic regression and 18 covariates across demographic, socioeconomic, and health domains. Counties with extreme propensity scores (<0.005 or >0.994) were excluded to improve overlap between exposure groups. We compared several approaches: 1:1 matching without replacement, 1:1 matching with replacement, and 1:1 matching with replacement and a caliper width of 0.05. Covariate balance was assessed using standardized mean differences, Love plots, and Rubin’s rules. A secondary analysis applied inverse probability of treatment weighting (ATT).

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. 1:1 matching with replacement and caliper width of 0.05 achieved the best balance (Rubin’s Rule 1 = 14.98; Rule 2 = 1). Application of this matching approach suggested that urban counties had 137.21 fewer preventable hospitalizations per 100,000 than matched rural counties (95% CI: −292.96 to 18.53). IPTW did not improve balance and yielded a smaller and wider treatment effect (−17.58; 95% CI: -984.72 to 949.55).

Conclusions

After rigorous adjustment, urban counties in the Midwest had substantially fewer preventable hospitalizations than rural counties. This adds to a body of literature suggesting a possible urban advantage in healthcare access or outpatient infrastructure. Future work should evaluate state-level variation, disease-specific hospitalization patterns, and alternative weighting approaches such as generalized boosted modeling.