Urban-Rural Differences in Infection-Related Hospitalizations Among U.S. Home Healthcare Patients

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Project Aims

- Describe differences in infection-related hospitalizations during home healthcare (HHC) episodes by urbanicity and source of HHC admission.
- Discuss how urbanicity may impact healthcare needs and health outcomes among U.S. HHC patients.

Background

- About 3.4 million Medicare beneficiaries receive HHC, and infections are a leading cause of hospitalization among HHC patients (based on Outcome and Assessment Information Set data).
- Access to HHC is important for those who need short-term medical help after being discharged from the hospital.

Methods

Data and Sample

- 2017 Outcome and Assessment Information Set (OASIS), Master Beneficiary Summary File (MBSF), Medicare Provider Analysis and Review file (MedPAR), and 2013 Rural-Urban Continuum Codes (RUCC).
- 908,521 60-day HHC episodes include elderly 546,870 HHC patients from nationally representative 1,417 HHC agencies.

Measurement

- Hospital transfer from HHC with infection as the primary cause.

Primary cause is classified as:

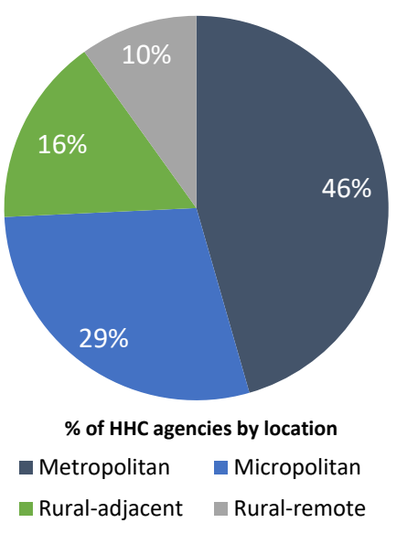
- ✓ Infection was the primary diagnosis and present on admission (POA) **or**
- ✓ Infection was indicated as the MedPAR admitting diagnosis code and POA

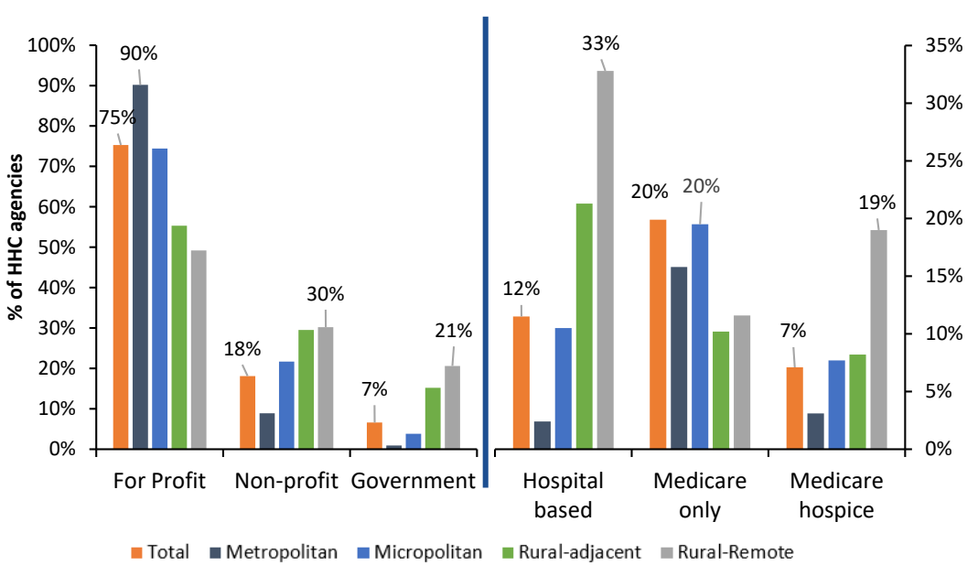
Analyses

- Agency and patient level descriptive statistics.
- Multivariable linear probability models of hospitalization (during 60-day HHC episode) due to any infection (primary cause), adjusting for patient and agency characteristics and stratified by HHC admission source.
- Percent change in infection-related hospitalizations for three urbanicity categories were compared against metropolitan using t statistics.

Results

Characteristics of HHC agencies (n = 1,417) by urbanicity of agency location





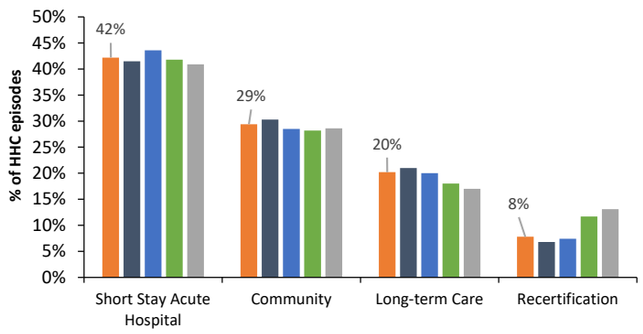
Results

HHC patient (n = 546,870) characteristics by urbanicity of residential location

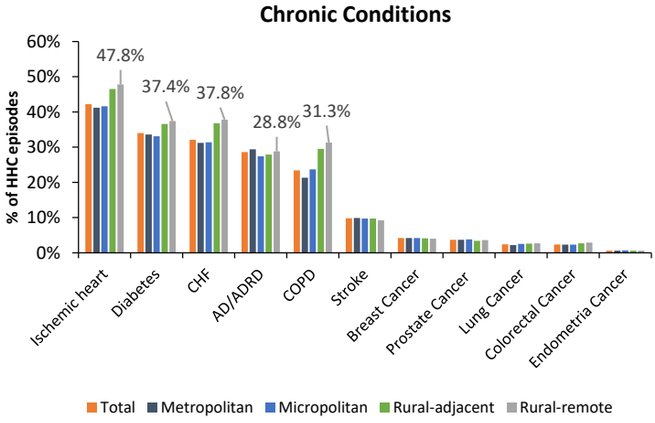
Variables	Total	Patient Residential Location			
		Metropolitan	Micropolitan	Rural-adjacent	Rural-remote
N (%)	546,870 (100%)	250,504 (46%)	160,673 (29%)	82,239 (15%)	53,454 (10%)
Weighted N	4,359,892	2,292,163	1,401,305	439,834	226,590
Home Health Care to Hospital Transfer 60-day episodes (%)					
Any hospital transfer	14.93	14.73	15.04	15.47	15.02
Hospital transfer with infection as primary cause	27.0	26.9	27.2	26.8	27.1
Patient Characteristics (%)					
Age:					
65-69	14.7	14.3	15.2	15.4	15.6
70-74	18.1	17.5	18.6	19.5	18.8
75-79	18.7	18.2	18.9	20.0	20.0
80-84	19.3	19.3	19.2	19.5	19.5
85-89	18.1	18.8	17.5	16.6	16.7
90-94	11.1	12.0	10.6	9.0	9.4
Female	61.6	61.9	61.3	61.2	61.2
Race/Ethnicity:					
White	81.3	76.1	85.7	89.7	90.5
Black	11.7	14.3	9.6	8.0	6.6
Asian	1.9	3.0	1.0	0.1	0.3
Hispanic	2.6	3.7	1.6	0.7	0.9
Native	0.3	0.2	0.4	0.8	0.9
Other	2.1	2.8	1.7	0.8	0.8
Dual Eligible	24.4	25.6	21.1	26.7	27.5
ADL dependent	81.5	82.2	83.4	77.1	71.5
Living Alone	12.0	11.5	11.8	14.1	14.5

NOTE: FIPS codes from MBSF were used to identify patient residential locations. The 2013 US Department of Agriculture Rural-Urban Continuum Codes (RUCC) were used to distinguish counties according to population size and proximity to nearby metropolitan areas. Codes range from 1 to 9, with higher values representing decreasing levels of urbanization. Patient residential locations were classified by the associated RUCC code: metropolitan (codes 1); micropolitan (codes 2 and 3); adjacent to metropolitan areas (codes 4, 6, and 8); and, not adjacent to metropolitan areas (codes 5, 7, and 9).

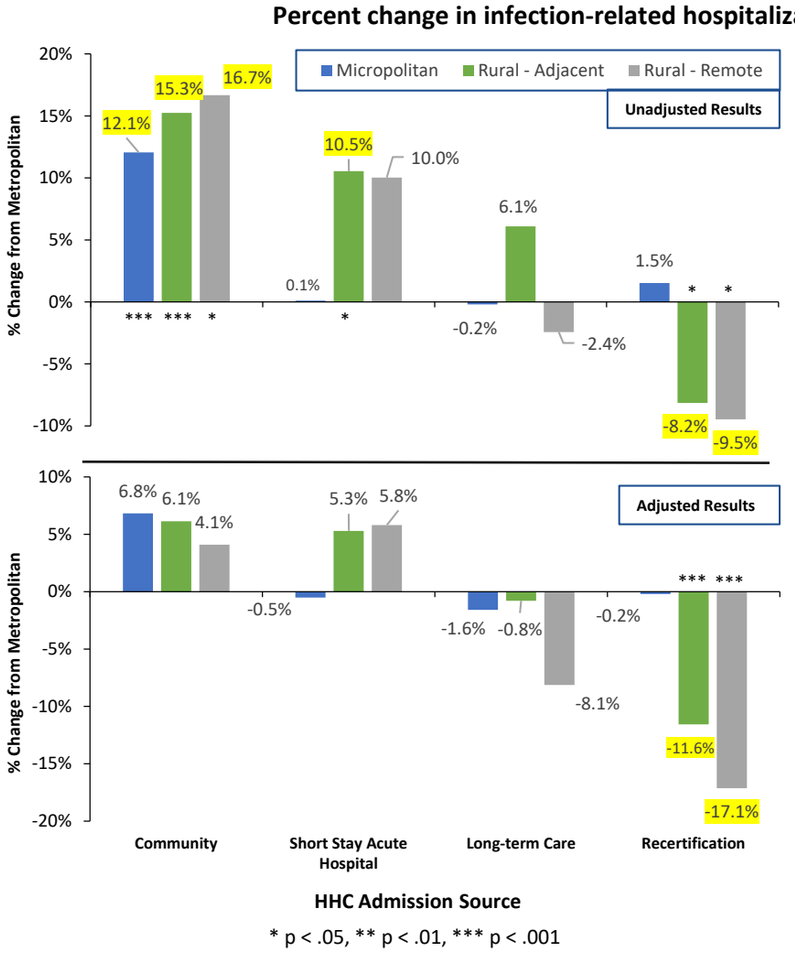
HHC admission source



Chronic Conditions



Percent change in infection-related hospitalizations compared to metropolitan



* p < .05, ** p < .01, *** p < .001

Community

- For patients admitted from the community, 12.1% of HHC episodes were more likely to result in infected-related hospitalizations among those residing in micropolitan areas compared to metropolitan; those differences increased as the patients' residential location became more rural (unadjusted: p<0.001). When adjusted for agency and patient factors, differences were much smaller and decreased as the patients' residential location became more rural (n.s.).

Recertification

- When starting with a recertification, 8.2% and 9.5% of HHC episodes were less likely to result in infected-related hospitalizations for patients residing in rural-adjacent and rural-remote areas, respectively (unadjusted: p<0.05). In adjusted models, the differences increased (p<0.001).

Short Stay Acute Hospital

- For patients admitted from a short-stay acute hospital, 10.5% of episodes were more likely to result in infection-related hospitalizations for those residing in rural-adjacent areas (unadjusted: p<0.05).

Conclusions

We found urban-rural differences in infection-related hospitalization rates among Medicare beneficiaries depending on HHC admission source which may be explained by patient characteristics. Differences in the adjusted and unadjusted hospitalization rates suggest rural residents may have additional healthcare needs compared to those in metropolitan areas.

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