

**Supplemental Table 1. Search Strategy in PubMed and Cumulative Index of Nursing and Allied Health Literature (CINHAL)**

Terms Included	Key Words Used per Term
Home Health	"Home health"[MeSH Terms] OR ("home health"[Title/Abstract] OR "home care"[Title/Abstract]) OR ("home-based care"[Title/Abstract] OR "visiting nurse"[Title/Abstract])
AND	
Rural/Urban	"rural population"[MeSH Terms] OR "rural"[Title/Abstract] OR "urban population"[MeSH Terms] OR "urban"[Title/Abstract] OR "urbanicity"[Title/Abstract] OR "rurality"[Title/Abstract]
AND	
Quality of care	(("shortage"[Title/Abstract] OR "shortages"[Title/Abstract]) OR ("service"[Title/Abstract] OR "services"[Title/Abstract]) OR ("agency"[Title/Abstract] OR "agencies"[Title/Abstract])) OR ("lack"[Title/Abstract] OR "lacking"[Title/Abstract]) AND "capacity"[Title/Abstract] OR "supply and distribution"[MeSH Terms] OR "quality of health care"[MeSH Terms] OR "quality"[Title/Abstract] OR "experience"[Title/Abstract] OR ("care experience"[Title/Abstract] OR "care experiences"[Title/Abstract]))
Filters:	Humans English Adult: 19+ years January 2010 – April 2020 Excluded: Commentaries/editorials

NOTE: MeSH = Medical subject headings.

**Supplemental Table 2. Quality Ratings of Included Articles using Newcastle-Ottawa Quality Scale (NOS) with AHRQ Thresholds**

<b>Cohort Studies</b>										
<b>Study</b>	<b>Selection</b>		<b>Comparability</b>			<b>Outcomes</b>		<b>NOS Total</b>	<b>AHRQ Rating</b>	
	<i>Representativeness of exposed cohort</i>	<i>Selection of non-exposed cohort</i>	<i>Ascertainment of exposure</i>	<i>Outcome not present at start of the study</i>		<i>Assessment of outcomes</i>	<i>Length of follow-up</i>	<i>Adequacy of follow-up</i>	Max=9	
<b>Iyer 2016</b>	*	*	*	-	**	*	*	-	7	Good
<b>Mroz 2020</b>	*	*	*	*	**	*	*	*	9	Good
<b>Rahman 2020</b>	*	*	*	-	**	*	*	-	7	Good
<b>Case-control Studies</b>										
<b>Study</b>	<b>Selection</b>			<b>Comparability</b>		<b>Outcomes</b>			<b>NOS Total</b>	<b>AHRQ Rating</b>
	<i>Case definition adequate</i>	<i>Representativeness of the cases</i>	<i>Selection of controls</i>	<i>Definition of controls</i>		<i>Ascertainment of exposure</i>	<i>Same method of ascertainment for cases and controls</i>	<i>Non-response rate</i>		
<b>Chen 2016</b>	*	*	*	*	**	*	*	-	8	Good
<b>Chen 2020</b>	*	*	*	-	**	*	*	-	7	Good
<b>Cotton 2017</b>	-	*	*	-	**	*	*	-	6	Fair
<b>Falvey 2018</b>	*	*	*	*	**	*	*	-	8	Good
<b>Falvey</b>	*	-	*	*	**	*	*	-	7	Good

<b>2020</b>											
<b>Koru 2018</b>	*	*	*	-	**	*	*	-	7	Good	
<b>Mroz 2018</b>	*	*	*	*	**	*	*	-	8	Good	
<b>Smith 2017</b>	*	*	*	-	**	*	*	-	7	Good	
<b>Shang 2021</b>	*	*	-	-	**	*	*	-	6	Fair	

**NOTE:** AHRQ stands for the Agency for Health care Research and Quality. The Newcastle-Ottawa Scale (NOS) is an 8-item checklist that examines cohort and case-control studies (nonrandomized studies) in three areas awarding stars for ‘high study quality’ characteristics: 1) selection (4 items each worth 1 star); 2) comparability (1 item worth maximum 2 stars); and 3) assessment of outcomes/ascertainment of exposure (3 items each worth 1 star). Scores range from 0-9 and with AHRQ-developed thresholds translate into an overall rating of good, fair or poor study quality. Good study quality includes three to four stars for selection, one to two stars for comparability, and two to three stars for outcome/exposure. Fair study quality includes two stars for selection, one to two stars for comparability, and two or three stars for outcome/exposure. Poor study quality includes zero to one star for selection, zero stars for comparability, or zero to one star for outcome/exposure.

**Supplemental Table 3. Urban and Rural Differences in Home Health Care Utilization and Outcomes**

Study	Urban/Rural Differences By Quality Metric
<b>Home Health Care Utilization (5 studies)</b>	
Falvey 2018	<b>A Significant Urban/Rural difference.</b> After adjusting for hospital length of stay, non-elective admission, baseline ADL function, prior post-acute care use, and patient sociodemographic characteristics, patients receiving care from a rural HHC setting had 10.7% lower PT utilization after total knee arthroplasty compared to patients receiving care from an urban HHC setting (95% CI: -13.7 to -7.9).
Falvey 2020	<b>A Significant Urban/Rural difference.</b> After controlling for patient sociodemographic characteristics, post-hospital disability, medical complexity, and symptom burden, home health patients living in a rural area had 6% fewer home health rehabilitation visits after an intensive care unit (ICU) stay compared to those in an urban area (adjusted risk ratio (aRR) = .94; 95% CI = 0.91, 0.98).
Iyer 2016	<b>Mixed Urban/Rural differences.</b> There were no significant rural-urban differences in the number of home health visits for Medicare beneficiaries with stroke. Rural beneficiaries were significantly less likely than urban beneficiaries to receive services from rehabilitation specialists (84.1% and 89.8% respectively, $P < 0.05$ ). Urban beneficiaries were significantly more likely to fall in the oldest age category compared to rural beneficiaries (36.3% and 32.9%, $P < 0.05$ ). Rural beneficiaries were more likely to be White compared to urban beneficiaries (85.5 % and 74.5% respectively, $P < 0.05$ ) and live in counties without a hospital (6.8 vs. 1.9%, $P < 0.05$ ), with fewer HH agencies, and with fewer primary care providers. In bivariate analyses, there were no rural-urban differences in the receipt of services from rehabilitation specialists based on the beneficiaries' age except those above 85 years old (rural: 82.8%; urban: 89.3%, $P < 0.05$ ). Rural disparities present in all race categories, across all regions, and across varying levels of physician and specialist personnel at the county level (all $P < 0.05$ ) with the exception of the Midwest. Although rural beneficiaries with stroke receiving any HH services had slightly higher mean number of episodes compared to urban counterparts (1.5 vs. 1.4 episodes, respectively, $p < .0001$ ), there was no difference in mean number of HH visits. These findings were similar among those who received HH services from rehabilitation specialists. There were no differences found in number of providers seen across all HH episodes except for the services from physical therapists (rural: 94.2% vs. rural: 95.8%; $p = .015$ ). In the multivariate models, after including the beneficiary characteristics to the model, rural beneficiaries with stroke had lower odds of receiving HH services from any rehabilitation specialist compared to urban beneficiaries (adjusted odds ratio (aOR): 0.54; 95% CI: 0.44, 0.65). However, after including both beneficiary and county characteristics in the model, no significant differences were detected.
Mroz 2020	<b>Mixed Urban/Rural differences.</b> Several differences increased as rurality increased. Compared to their urban counterparts, rural counties have Medicare beneficiaries that are older, male, less diverse, and with lower Hierarchical Condition Category scores (i.e., lower risk of high health care costs). Home health care utilization differed by location; in rural areas, smaller percentages of patients utilize home health care services and there are fewer home health visits per 1,000 beneficiaries. In certain Census Divisions (Pacific, Mountain, West North Central, and New England), rural beneficiaries do not utilize home

Study	Urban/Rural Differences By Quality Metric
	<p>health care as much as those in urban areas. However, in the rural areas of West South Central, East South Central, East North Central, South Atlantic, and Middle Atlantic Census Divisions, those differences are not seen as consistently. In the most remote rural counties of the West South Central and South Atlantic Census Divisions, home health care utilization is the highest compared to metropolitan counties. The relationship between rurality and home health care utilization was significant but was driven by lower utilization in counties classified as non-core, rather than by rural counties overall. In the adjusted model, relationships between rurality and home health care utilization, number of home health episodes and visits per 1,000 beneficiaries were no longer significant.</p>
Rahman 2020	<p><b>Mixed Urban/Rural differences.</b> Compared to their urban counterparts, rural Medicare beneficiaries diagnosed with Alzheimer’s Disease and Alzheimer’s Disease and Related Dementia (AD/ADRD) are younger, male, White, Medicaid-eligible, and have fewer preexisting chronic conditions and higher neighborhood social deprivation scores (all <math>p &lt; 0.001</math>). In the year before their AD/ADRD diagnosis, rural beneficiaries spent more time in home health care, as well as hospitals and nursing homes, compared to those in urban counties (<math>p &lt; 0.001</math>). Regarding the days survived after diagnosis, metropolitan county residents survived about 1.5 months longer than micropolitan and rural residents (<math>p &lt; 0.001</math> and <math>&lt; 0.01</math>, respectively), after adjusting for individual characteristics. In the adjusted analysis, there were not significant differences in home health care utilization patterns between urban and rural beneficiaries. The adjusted share of survived days spent in the community with home health care was 0.2 percentage points lower (95% CI, <math>-0.5</math> to <math>0.2</math>) for micropolitan vs metropolitan county residents and 0.2 percentage points lower (95% CI, <math>-0.5</math> to <math>0.2</math>) for rural vs. metropolitan county residents.</p>
<p><b>Quality of Homehealth Agency Services (2 studies)</b></p>	
Cotton 2017	<p><b>Mixed Urban/Rural differences.</b> After controlling for sociodemographic, clinical, and organizational factors, patients receiving care from rural HHAs were more likely to receive any class of controlled medications (OR: 1.12; 95% CI: 1.07 to 1.17) and opioids (OR: 1.14; 95% CI: 1.09 to 1.19) compared to patients receiving care from urban HHAs. There were no significant urban/rural differences for the benzodiazepine and hypnotic.</p>
Shang 2021	<p><b>Mixed Urban/Rural differences.</b> HHAs in rural areas are significantly more likely to provide staff vaccinations on-site (70.6% vs. 42.3%, <math>p &lt; 0.001</math>) or for free (76.4% vs. 46.9%, <math>p &lt; 0.001</math>). Those HHAs also report spending more time on vaccination of patients (21.2% vs. 13.7%, <math>p = 0.028</math>). Among HHAs that admit patients with IV/central lines (96.3% rural vs. 85.9% urban, <math>p &lt; 0.001</math>), more rural agencies had written IPC policies for care of patients with IV/central lines compared to urban HHAs (100.0% vs. 98.6%, <math>p &lt; 0.001</math>). IPC policies related to ventilators also differed significantly by urban and rural location (79.2% vs. 59.1%, respectively, <math>p &lt; 0.001</math>). Urban HHAs are more likely to use antibiotic prescribing guidelines compared to those in rural areas (22.8% vs. 15.5%, <math>p = 0.045</math>); however, rural HHAs are more likely to use clinical cultural to determine patient infections (75.6% vs. 63.8%, <math>p = 0.009</math>). Rural agencies are significantly more likely to routinely provide safety syringes/needles (96.7% vs. 79.4%, <math>p &lt; 0.001</math>), blood spill kits (65.4% vs. 53.3%, <math>p = 0.007</math>), and N95 respirators (50.7% vs. 37.7%, <math>p = 0.004</math>) to their clinical staff, compared to urban agencies.</p>
<p><b>Emergency Room Visits and Hospitalization</b></p>	

Study	Urban/Rural Differences By Quality Metric
Chen 2020	<p><b>Mixed Urban/Rural differences.</b> The results from the analysis of variance (ANOVA) show that there were significant differences in hospitalizations and emergency department (ED) visits among urban and rural home health agencies (HHA)s (all <math>p &lt; 0.05</math>) (Results on patient-experience star ratings, pain management improvement, and harm prevention are listed below). In the regression models, all 3 types of rural HHAs had significantly higher ED visits than urban HHAs (<math>\beta</math>: 1.01; 95% CI: 0.72 to 1.29 for high utilization areas, <math>\beta</math>: 1.96; 95% CI: 0.51 to 3.42 for low population areas, and <math>\beta</math>: 1.53; 95% CI: 1.28 to 1.78 for all other areas).</p>
Koru 2018	<p><b>Mixed Urban/Rural differences.</b> The average hospital admission rate for urban agencies was significantly lower than rural agencies (15.16% vs. 16.68%, respectively). With respect to hospitalization rates, among smaller urban HHAs, the average rate hospitalization rate was 14.23%, while larger urban HHAs had an average rate of 15.46%. Among larger urban HHAs, there were 1) 2.85% lower admission rates compared to similar HHAs that do not always check for fall risks, and (2) 2.05% lower admission rates compared to similar HHAs that always check for fall risks but do not consistently begin care in a timely manner.</p> <p>Rural HHAs have an average emergency room (ER) visit rate of 13.88%, which is 2.58% higher than urban HHAs. In rural areas, timely start of care is associated with ER visits. For those rural HHAs that did not often start care in a timely manner, they had ER visit rates of almost 15%. Among the urban agencies, checking for fall risks consistently, treating patients for pain and starting care in a timely manner appear to make a difference with respect to ER visits. Urban HHAs adhering to all 3 practices had an average ER visit rate of 10.08%.</p>
Chen 2016	<p><b>Mixed Urban/Rural differences.</b> Home health (HH) beneficiaries in remote rural areas had 27% lower 30-day preventable readmission compared to those in urban areas (odds ratio (OR): 0.73; 95% confidence interval (CI): 0.57 to 0.94). HH beneficiaries in adjacent rural areas were 33% less likely to have high illness severity at 30-day preventable readmission condition compared to those in urban areas (OR: 0.67; 95% CI: 0.46 to 0.98). There was no significant difference in the extreme/major level of risk of mortality for a preventable readmission across various degrees of rurality.</p>
Mroz 2018	<p><b>Significant Urban/Rural differences.</b> Agencies located in rural (versus urban) counties were more likely to have patients that were admitted to hospitals or other institutional settings during a home health episode (OR 1.24; 95% CI: 1.18-1.30) or within 30 days of discharge (OR 1.15; 95% CI: 1.10-1.22). Also, rural HHAs were less likely to discharge patients to the community (OR 0.83; 95% CI: 0.77-0.90).</p>
<b>Quality of Patient Care Experiences (2 studies)</b>	
Chen 2020	<p><b>Mixed Urban/Rural differences.</b> The results from the analysis of variance (ANOVA) show that there were significant differences patient-experience star ratings, pain management improvement, and harm prevention among urban and rural home health agencies (HHA)s (all <math>p &lt; 0.05</math>) (See results for hospitalizations, emergency department (ED) visits above). In the regression models, HHAs in all rural areas had significantly lower patient-experience star ratings (<math>\beta</math>: -0.83; 95% CI: -1.50 to -0.16), lower activities of daily living (ADL) improvement (<math>\beta</math>: -1.29; 95% CI: -2.08 to -0.49), and worse harm prevention composite scores (<math>\beta</math>: -0.57; 95% CI: -0.02 to -0.11) compared to urban HHAs. HHAs in areas with high utilizations had significantly lower pain management</p>

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	improvement compared to urban HHAs ( $\beta$ : -0.70; 95% CI: -1.39 to -0.02). There were no significant urban/rural differences for treating wounds.
Smith 2017	<p><b>Significant Urban/Rural differences.</b> Most HHAs were located in urban areas (78.0%) with 22% in rural areas. Only a small percentage of urban HHAs (6.3%) were considered top performers in both domains (patient experience of care and care process); 13.4% and 19.4% were top performers in patient experience of care and care process, respectively, whereas 60.9% of urban HHAs were not considered top performers in either domain. Using logistic regression, the results remained the same; urban HHAs were statistically less likely to be top performers in both domains (OR: 0.67; 95% CI: 0.59 to 0.75). HHA urbanicity was predictive of slightly lower quality for both domains (patient experience of care and care process) and patient experience performance alone.</p>