

Leveraging Public Data to Investigate Home Care Quality in Urban and Rural America



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As publicly available health-related data increase, it becomes possible to leverage such data to derive information which can support various decisions for improving the quality of home care delivered in the United States (US). In this respect, an important concern is to ensure that patients who live in the rural areas of the US will have equal access to quality home care just as those in urban areas. While a number of challenges for rural home care such as staffing and transportation can be easily recognized, the urban-versus-rural variations in home care quality have not been sufficiently investigated so far.¹ Understanding such variations is important for leveraging health IT purposefully, effectively, and efficiently for specific quality improvement targets in urban and rural HHAs. By leveraging heterogeneous data from disparate public repositories, this study investigated the variations in clinical process, clinical outcome, and utilization outcome measures that belong to urban and rural HHAs.

Methods: For quality measures, HHA-level data were obtained from the Medicare Home Health Compare Database (MHHC)² for 2014 which included (i) thirteen process measures, each showing the rate of adherence with a clinical practice, (ii) seven outcome measures, each showing the rate of improvement for a clinical outcome, and (iii) two utilization outcome measures, the rate of hospital admissions and the rate of emergency room visits not resulting in an admission. For each HHA, based on its zipcode, a Rural Urban Area Commuting Code (RUCA) was obtained from the University of Washington (UW).³ Using the Categorization Scheme C⁴ suggested by UW, each HHA was categorized as either urban or rural. To further enrich our results, we also obtained socio-economic status (SES) and agency characteristics data for each HHA. As a proxy for SES, we obtained median incomes corresponding to HHA zipcodes from the Population Studies Center at the University of Michigan.⁵ As HHA characteristics, age data was obtained from MHCC in years; patient and visit counts for 2014 were used as proxy measures for HHA size, which were obtained from the Healthcare Cost Report Information System (HCRIS) Database.⁶ The data set excluded the private-duty HHAs or those reimbursed by local governments under Medicaid. Consequently, there were two samples for each measure or characteristic, one for urban and other for rural HHAs. When the compared samples had normal distributions, we used t-test for comparison; otherwise, we used the Wilcoxon-rank sum test.⁷ In addition to statistical significance, we also calculated Cohen's d for t-test and Cohen's r for Wilcoxon test⁸ to understand the effect sizes, which in this case represent the magnitudes of the difference between the means of two samples. As typically done, we converted d values to r to use a single measure for the magnitude of differences across different tests.^{9,10} Smaller r values do matter since the quality measures represent rates of care episodes.

Results: For brevity, we mention only the test results significant at $p=.01$ along with the r values in parentheses. When clinical process measures were compared, rural HHAs were better at starting care in a timely manner (.04), checking for flu shots (.03), determining whether pneumococcal vaccine was received (.10), and checking for the risk of developing pressure sores (.03). Urban HHAs were better at teaching patients about drugs (.07), checking for fall risks (.04), providing foot care for diabetic patients (.04), treating pain (.05), and taking doctor-ordered action to prevent pressure sores (.01). In terms of clinical outcomes, patients of rural HHAs had more improvement in getting in and out of bed (.06) and taking drugs correctly by mouth (.03). Regarding the utilization outcomes, urban HHAs had better hospital admission (.16) and non-admitted ER visit rates (.27).

Discussion: While there is plenty of room for improvement for both urban and rural HHAs, our results dispel the myth that rural home care is worse in terms of clinical processes and outcomes. When we perform comparisons on HHA characteristics, it seems that rural HHAs are older (.36) and they work hard; they have more patients (.09), and they make more visits (.08). Still, rural HHAs are better in four clinical process measures and perhaps not any worse in four process measures for which the test results did not show any statistical difference; they are better in two clinical outcome measures and perhaps not any worse in three others. However, regarding utilization outcomes, urban HHAs seem to be clear winners. Why is it so? It is possible that the clinical processes at which urban HHAs perform better improve the utilization outcomes more. It is also possible that clinical process and outcome measures do not provide a complete story: We note that median income is higher where urban HHAs serve (.39) pointing to higher SES levels. It is a plausible conjecture that communities with lower SES have worse health to start with, lower health literacy levels, and educational shortcomings. There may be also geographic isolation and limited access to community resources.^{11,12} There is already some evidence that rural residents generally have more annual hospital admissions than their urban counterparts.¹³

Conclusion: Urban and rural HHAs have different strengths and weaknesses in quality of care. Therefore, health IT decisions

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about the selection, purchase, and customization of various solutions, can be tailored to address different priorities in urban and rural HHAs. For example, urban HHAs could focus on timely start of care while rural HHAs focus on teaching patients about drugs via health IT adoption. Finally, it seems that the infrastructure investments made to publicize health-related data are paying off by leading to reproducible results such as those reported in this study.

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