Realizing the Benefits of Home Care Data: Identifying Home Care Clinical Practices Most Associated with Hospital Readmissions and Non-Admitted ER Visit Rates

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Problem Statement: Cost concerns have sparked growing interest in utilization outcomes, particularly the Hospital Readmission Rates and Non-admitted ER Visit Rates. Arguably, as the health-care processes of home health agencies (HHAs) improve, their monitored utilization outcomes should improve as well. Because limited resources require many HHAs to apply focused and prioritized process improvement initiatives, this study identified the home care practices most associated with higher utilization rates. **Methods**: This research followed a secondary data analytics approach. Sixteen process variables about adherence to recommended clinical practices and two utilization outcome measures, all represented as rates, were obtained from the 2014 Medicare Home Health Compare (MHHC) Database. The data set included approximately 10,000 observations, each corresponding to a single HHA. To control for socioeconomic status and ruralness, two surrogate measures, Median Household Income and Rural-Urban Commuting Area (called RUCA), were attached to each observation based on the HHA's zipcode. RUCA was coded as an ordinal variable that increased with ruralness. Regression trees were developed using a computationally intensive process facilitated by the rpart package in the statistical environment, R. Two types of regression trees were developed by taking (a) Hospital Readmission Rate and (b) Non-Admitted ER Visit Rate as the response variables. For both types of models, the predictors consisted of the process variables, median income, and RUCA. **Results**: Interestingly, RUCA explained the utilization variance most in all models. Both utilization outcomes were worse for HHAs serving in rural areas. This finding shows that including RUCA as a control was appropriate. Median Income became relevant only when RUCA was not included. For hospital readmissions, the following three clinical practices, listed in the decreasing order of explaining variance, were most important: (1) How often the home health team checked patients' risk of falling, (2) How often the home health team began their patients' care in a timely manner, and (3) With diabetes, how often the home health team got doctor's orders, gave foot care, and taught patients about foot care. For non-admitted ER visits, a similarly ordered list of top-three clinical practices was (using shorter names, this time) (1) checking for fall risks, (2) treating patients for pain, and (3) starting care in a timely manner. **Significance**: A smaller number of clinical home care practices was most associated with two important utilization outcomes. Checking for fall risks and timeliness, also important practices for patient safety, were associated with both hospital readmissions and ER visits. These results should be immediately useful to HHAs in their focused and prioritized process improvement efforts. Investments made for Home Health Compare seem to be useful for supporting reproducible research. RUCA and Median Income were obtained from University of Washington and University of Michigan, respectively. While advanced computational tools are readily available today, collection and integration of quality data from multiple sources at the desired level of granularity seem to be the major challenges in the near future.