Risk Adjustment in Home Health Care CAHPS

Lisa M. Lines, PhD, MPH; Wayne L. Anderson, PhD; Harper Gordek, MPH; and Anne E. Kenyon, MBA

We recently reviewed the paper by Chen et al titled "CMS HCC Risk Scores and Home Health Patient Experience Measures" in the October 2018 issue of *The American Journal of Managed Care®* and would like to comment on aspects of the methods and findings.[1] We are researchers at RTI International, which is the CMS contractor responsible for conducting national implementation activities for the Home Health Care Consumer Assessment of Healthcare Providers and Systems (HHCAHPS) Survey.

Chen et al performed risk adjustment using agency-level, not person-level, CMS Hierarchical Condition Category (HCC) risk scores. In theory, for use in national implementation, we believe that an agency-level HCC risk adjustment measure presents at least 2 construct validity issues. First, HCC scores are known to be subject to upcoding, which likely contributes to their agency-level coefficient having upward bias, consequently contributing to the magnitude of their findings. Second, the random sampling method used in HHCAHPS does not consider all of an agency's patients to be eligible for sampling. The survey inclusion criteria are that patients must have had at least 2 skilled visits in the past 2 months, be 18 years or older, have received care other than routine maternity care, not be receiving hospice care, and not be receiving care for a condition for which the state prevents the release of patient information. Moreover, the survey is not answered by all eligible patients. Because the authors used agency-level HCC risk scores that are based on the entire patient population of an agency, there were likely to be outliers at the high end that may have also contributed upward bias in their agency-level HCC score measure. Random samples such as those used in HHCAHPS are, theoretically, less affected by outliers.

We identified 2 additional methodological issues. First, the authors did not report that they tested for excessive correlation. Because Chen et al used state fixed effects and race variables together, there may have been excessive correlation because racial composition varies by state. Their inclusion of additional variables beyond those currently used in national implementation of HHCAHPS may also result in some excessive correlation for which testing results should be reported. Second, the authors controlled for agency profit/nonprofit status and the number of years that an agency had been certified by Medicare,

both of which may reflect aspects of an agency's care orientation that are rightfully reflected in the agency's publicly reported scores.

With respect to the paper's results, effect sizes for care experience measures can be categorized as small (difference of 1 point), medium (3 points), or large (≥5 points).[2,3] The findings on agency-level HCC scores reported by Chen et al indicate small to moderate effects on HHCAHPS measures with just 1 exception (effect on willingness to recommend the agency). Further, a 2017 paper by Smith et al[4] found that effects of race categories were of the same magnitude as some of the existing risk adjusters currently used that are associated with race (eg, education level, health status). The race effects reported by Chen et al were also relatively small (0.1 coefficient or smaller), suggesting that our current adjusters generally control for race effects.

RTI International staff conducted rigorous diagnosis-related risk adjustment testing as part of a mode experiment before national implementation began, using more than 100 separate diagnosis-derived condition categories underlying the CMS HCC score methodology. We found that only schizophrenia and dementia had sufficiently large, statistically significant coefficients to merit inclusion as risk adjusters. In addition, the HHCAHPS publicly reported case-mix–adjusted scores already include adjustments for self-reported general and mental health status, as well as selected sociodemographic and other adjustments. Self-reported information on health conditions has been previously shown to be reasonably reliable and accurate—sometimes more accurate than claims data.[5-8]

In addition to the issues identified above, an agency-level HCC measure is impractical for use in national implementation, given that the CAHPS surveys collect deidentified data. Even if we did have patient identifiers, individual-level HCC scores would not be available on a timely basis for use in regular public reporting.

Chen et al conclude that "findings indicated that current risk factors insufficiently adjust for the variation in beneficiaries' clinical and functional conditions that affects patient experience."[1] We thank the authors for bringing their concerns forward, but given the methodological issues presented here, the relatively small size of their results, the extensive testing we conducted prior to national

implementation using hundreds of claims-derived diagnoses, and the impracticality of using agency- and patient-level HCC scores, we think that the current risk adjustment strategy used in HHCAHPS, although not perfect, is effective. ∎

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Reply to "Risk Adjustment in Home Health Care CAHPS"

Hsueh-Fen Chen, PhD; J. Mick Tilford, PhD; Robert F. Schuldt, MA; and Fei Wan, PhD

We appreciate the opportunity to address the RTI team's main concerns of our study. Our paper demonstrated that CMS Hierarchical Condition Categories (HCC) risk scores are related to patient experience in home health.[1] These findings suggest that HCC risk scores should be considered when evaluating the performance of home health agencies. However, the RTI team raised 2 concerns regarding the validity of agency-level HCC risk scores. First, HCC risk scores are prone to upcoding by providers across the spectrum, resulting in an upward bias. Statistically, upcoding will change the HCC risk score but not the SD. Our findings are based on the SD of HCC risk scores and therefore unlikely to be affected by upcoding. Secondly, the RTI team indicated that agency-level HCC risk scores likely include outliers, whereas the random sampling used in the Home Health Care Consumer Assessment of Healthcare Providers and Services (HHCAHPS) is unlikely to be affected by outliers, due to the exclusion of patients with certain conditions.[2] The exclusion criteria are not based on the HCC risk scores. Additionally, most patients treated by agencies still remain in the sampling pool, regardless of their outlier scores. Theoretically, a randomizing process that selects patients from each agency will yield the characteristics of the sample that are similar to those of the patients cared by the agency. Thus, the outliers at the agency level of HCC risk scores and the outliers of HCC risk scores from the randomized HHCAHPS sampling should not differ significantly.

The RTI team also identified 2 methodological issues: (1) the reporting of excessive correlation as it relates to the authors' combined use of state fixed effects and race variables and (2) our use of controls for agency profit/nonprofit status and term of certification by Medicare and how these factors are reflected in the agency's public reporting. The correlation of most of our independent variables was less than 0.20, with the exception of ownership and tenure years with CMS. Therefore, the correlation in our study is not a concern (**Table 1**). States vary in racial composition, but the correlation between racial/ethnic composition and state fixed effects is not our primary focus. States certify and regulate home health agencies and through these policies affect the practice of home health agencies.[3,4] Additionally, agencies with different ownership and CMS tenure years respond to public reporting differently.[5] Thus, controlling for those confounders (ie, state fixed effects, ownership of agency, and number of tenure years) is necessary. We reanalyzed the data by excluding ownership, number of years certified by CMS, and state fixed effects and then estimated the association between HCC risk scores and patient experience (**Table 2**). The coefficients in the model without those variables remain significant and are larger than those in our original paper.[1]

TABLE 1. Correlations Among Study Variables

	Overall Rating	Recommendation	Professional Way	Communication	Discussion	HCC Risk Score	Not-for-Profit Agency	Public Agency	Black	Hispanic	Other Race	Tenure Years
Overall rating	1.00											
Recommendation	0.72	1.00										
Professional way	0.71	0.68	1.00									
Communication	0.67	0.67	0.74	1.00								
Discussion	0.46	0.44	0.47	0.51	1.00							
HCC risk score	−0.13	−0.17	−0.13	−0.16	0.09	1.00						
Not-for-profit agency	0.08	0.12	0.06	0.12	0.04	−0.16	1.00					
Public agency	0.12	0.13	0.10	0.10	0.09	−0.15	−0.13	1.00				
Black	−0.13	−0.17	−0.05	−0.16	0.03	0.23	−0.19	−0.09	1.00			
Hispanic	0.05	0.02	0.05	0.00	0.03	0.19	−0.16	−0.09	−0.16	1.00		
Other race	−0.12	−0.12	−0.19	−0.13	−0.01	0.02	−0.04	−0.04	−0.08	0.02	1.00	
Tenure years	0.14	0.19	0.10	0.17	0.08	−0.15	0.42	0.33	−0.18	−0.25	−0.09	1.00

HCC indicates Hierarchical Condition Categories.

TABLE 2. HCC Risk Score and Patient Experience Without the Variables of Ownership, Number of Years Certified by CMS, and State Fixed Effects (robust standard errors in parentheses)

Variables	Overall Rating (N = 7637)	Recommendation (N = 7637)	Professional Way (N = 7637)	Communication (N = 7637)	Discussion (N = 7637)
Average HCC score	−2.69** (0.36)	−3.87** (0.41)	−2.02** (0.22)	−2.08** (0.26)	−2.07** (0.27)
African American	−0.04** (0.01)	−0.08** (0.01)	−0.01 (0.00)	−0.04** (0.00)	0.02** (0.00)
Hispanic	0.02** (0.01)	0.01* (0.01)	0.02** (0.00)	0.00 (0.00)	0.02** (0.00)
Other race/ ethnicity	−0.14** (0.02)	−0.17** (0.02)	−0.13** (0.02)	−0.11** (0.02)	−0.00 (0.01)

HCC indicates Hierarchical Condition Categories.

*P <.05; **P <.001.

Author Affiliations: Department of Health Policy and Management, College of Public Health, University of Arkansas for Medical Sciences (HFC, JMT, RFS), Little Rock, AR; Division of Public Health Sciences, Department of Surgery, Washington University School of Medicine (FW), St. Louis, MO.

Address Correspondence to: Hsueh-Fen Chen, PhD, University of Arkansas for Medical Sciences, 4301 W Markham St, Mail Slot 820-12, Little Rock, AR 72205. Email: hchen@uams.edu.

For the reporting issue about the effect size, the RTI team recommended 3 levels using a small size (difference of 1 point), a medium size (3 points), and a large size (≥5 points). Our presentation is based on the association between the change of 1 SD in HCC scores and the change in the percent patient experience. We believe that we should provide the association instead of arbitrarily deciding a small, medium, or large effect size for the readers.

Finally, although the RTI team is unable to adjust HCC scores for patient experience due to limitations of the data and time constraints, our findings, at least, provide evidence for stakeholders that HCC risk scores can influence patient experience at the agency level. ■

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