

Quantifying the Impact of Socio-Economic Status on Quality Measures

17 May 2017

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Summary:

There is substantial evidence that low socio-economic status (SES) results in a higher risk of hospital readmission. Low SES is also associated with poorer score on other quality measures. The Centers for Medicare and Medicaid and Services (CMS) has consistently refused to make such an adjustment, providing a flawed rationale against it, but Congress has now required that peer grouping of hospitals by proportion of low-SES patients be used in the calculation of penalties for readmissions. We argue in this paper that such a peer grouping, while it may be an improvement over the current situation, is not an optimal way to adjust for SES and suggest a more refined approach based on within hospital differences in quality performance between low SES and other patients.

Background:

Congress recently mandated that CMS must take account of socio-economic status in calculating readmission penalties by creating peer groups of hospitals based on the proportion of patients with low SES that they serve, and then creating standards within these peer groups. This requirement was driven by a wealth of evidence in the literature of the need for an SES adjustment, and a steadfast refusal by CMS to consider it based on a misguided rationale.

While the use of these peer groups may be an improvement over the current situation of no adjustment, it is far from the ideal way to deal with this issue. The method described in this paper makes an SES adjustment based on the within hospital difference between the scores of low-SES and other patients. This has the advantage that it does not hold high-SES hospitals harmless for differences in the quality measures for non-SES patients, which the peer-grouping method would do.

Discussion:

The quality measures used by Medicare and the various quality measures endorsed by the National Quality Forum (NQF) do not include adjustments for differences in the socio-economic status (SES) of patients. However, it has been clearly demonstrated in the health policy literature that SES has a large impact on certain quality measures, and that hospitals or other providers with a large proportion of patients with low SES perform less well on the measures as currently constructed. The argument made by NQF and the Centers for Medicare and Medicaid Services (CMS) is that they do not want to set different standards for different classes of patients. What this argument fails to recognize is that the same procedures and standards of care can result in dramatically different outcomes dependent on the SES of the patient. Readmission rates of hospitals are highly dependent on the SES mix of their patients, and homeless patients, as one example, are much more likely to be readmitted than wealthier patients. The current policies provide incentives for hospitals and other providers to avoid patients that are likely to cause their quality scores to be lower, just the opposite of what should be done. Another argument that has been made is that safety net hospitals may be providing poorer quality care than non-safety net hospitals and that they should not be held harmless for the poorer quality care. Without making any assumptions about the truth of this latter argument, the algorithm described in this note provides a method for quantifying patient level effect of low SES separately from any hospital level effects, whether due to their being safety net hospitals, or for other reasons. To make the discussion more concrete and easier to follow the algorithm will be described for readmission rates of hospitals, but the same procedure could be applied for any class of provider, and for any binary quality measure. Measures that are continuous or categorical with more than two values would require modified algorithms, but these could be easily developed using the same concepts described here. The adjusted algorithm for a continuous measure is included below.

The algorithm for a binary quality measure, e.g., readmission

The idea of this algorithm is to separate patient level effects from hospital level effects. The most natural way to accomplish this would be to include an SES variable and possibly a categorical hospital variable in the regression model used to predict the probability of readmission. However, CMS did not include any SES variable and so the method proposed starts with the CMS model and then calculates a separate adjustment for SES.

- 1) For each hospital i , calculate the ratio of the actual readmission rate to the expected readmission rate¹, separately for low SES patients (L_i) and for other patients (N_i). These are the readmission rate indices.

¹ The expected readmission rate is the readmission rate the hospital would have experienced if it had its mix of patients, and the national experience of readmissions for that mix.

- 2) Calculate the ratio $R_i = L_i/N_i$ which is the ratio of the readmission rate index for low SES patients divided by the readmission rate index for non low-SES patients within hospital i .
- 3) Calculate the median of the R_i over all the hospitals. This is the factor by which the expected readmission rate for a particular low SES patient should be adjusted to account for their SES status.

R_i can be thought of as the proportion of additional risk of readmission that is associated with having low SES within a hospital. The median is used here to avoid having an undue impact of low volume hospitals with extreme values of the indices. An alternative would be to use a weighted mean, weighting, for example, by the lesser of the number of low-SES patients and the number of non low-SES patients.

The algorithm for a continuous quality measure

For a continuous quality measure the algorithm would be modified as follows:

- 4) For each hospital i , calculate the ratio of the actual mean value of the measure to the expected mean value, separately for low SES patients (L_i) and for other patients (N_i). These are the quality measure indices.
- 5) Calculate the ratio $R_i = L_i/N_i$ which is the ratio of the quality measure index for low SES patients divided by the quality measure index for non low-SES patients within hospital i .
- 6) Calculate the median of the R_i over all the hospitals. This is the factor by which the expected quality measure for a particular low SES patient should be adjusted to account for their SES status.

Summary

This note provides an algorithm that allows the patient level impact of low-SES to be separated from hospital or other more aggregate level effects after a model has been developed to standardize and risk adjust a quality measure. Applying this algorithm would allow one to determine whether there was a difference due to SES at the patient level, and then, based on the presence and magnitude of the effect, decide whether the difference was sufficient to justify adjusting for it. This algorithm can be applied for quality measures for hospitals, other providers, or health plans, and to a wide variety of measures. However, in situations where it is determined that SES has a substantial effect it would be preferable to design the risk adjustment regression model including an SES variable, and accounting for hospital (or other aggregate) level effects by the use of a hierarchical model.