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September 27, 2017

Kate Goodrich, M.D.

Chief Medical Officer

Centers for Medicare and Medicaid services

7500 Security Boulevard

Baltimore, MD 21244

Re: Enhancement of the Overall Hospital Quality Star Rating System, August 2017

Dear Dr. Goodrich:

The Jayne Koskinas Ted Giovanis Foundation for Health and Policy (JKTGF) is pleased to provide comment to the Centers for Medicare and Medicaid Services (CMS) on improving and enhancing the Medicare Hospital Star Rating System. The JKTGF believes strongly that the provider quality rating system needs to be transparent and clear to Medicare beneficiaries so that they can make informed choices about quality providers.

There are two components in developing aggregate quality scores: 1) the whether scores should be combined, and 2) the method used to combine individual measures into an aggregate score. While others may comment on the former, our comments here will focus solely on the latter and more specifically on the lack of applicability of the method the CMS has used for calculating aggregate scores – the latent variable model (LVM).

Our comments here are largely from our prior analysis on this subject (http://jktgfoundation.org/data/An_Analysis_of_the_Medicare_Hospital_5-S.pdf). Below, we cite excerpts from our prior analysis in quotes and CMS should see the prior comments for the explanation of the relevant citations.

“These comments are being submitted in response to the request for comments on the Medicare 5 star quality rating system. The specific issues on which comments were solicited did not include the major deficiency on the 5 star rating system, namely, the inappropriate use of latent variable models. Several of the issues raised can be attributed to the use of a latent variable model. In particular, the fact that the Clostridium Difficile (C. Diff.) quality measure either appears with a negative or a very small positive coefficient is due to the use of a latent variable model with a single latent variable. C. Diff. is clearly an

important measure of quality. The fact that it is given a negative or tiny weight in the rating is due to the implicit structure of the latent variable model, and the fact that C. Diff. measure is measuring a different aspect of the hospitals' quality than the other measures in that component. A latent variable model implicitly assumes that there is an underlying, unseen variable embodying the characteristic being studied, in this case the "quality" of the hospitals, and that the observed values of the various measures are projections, with noise, of this unseen variable. To the extent one of the observed variables is less correlated with the other observed variables it is assumed it is a less reliable indicator of the latent variable and so is assigned a lower weight. However, the less correlated variable may just be measuring a different aspect of quality, so assigning it a small weight is throwing away useful information. We believe this is what is happening with the C. Diff. measure in the 5 star rating system.

The following discussion is taken from a paper prepared including a broader critique of the 5 star rating system (a link to the full paper was provided above).

"The first step in the assignment of the star rating is the calculation of the seven category scores from the 60+ individual quality measures. This uses a statistical technique known as latent variable modeling. The theory underlying latent variable models can be found in ³ and ⁴. The construction of a latent variable model requires an initial assumption that the observed or manifest variables (the initial quality measures in this discussion) are projections of linear combinations of unmeasurable underlying or latent variables. In this particular instance, it is further assumed that they are projections of a single latent variable. Thus, in the case of the mortality measures, it is assumed that there is an underlying mortality rate for each hospital, and the mortality rates for acute myocardial infarction, coronary artery bypass graft, chronic obstructive pulmonary disease, heart failure, pneumonia, and acute ischemic stroke are all derived from that overall mortality rate (along with a random error term). This is a far-reaching assumption, and unlikely to be valid. By combining the individual mortality measures in this way the methodology is throwing away a lot of information that is contained in the individual measures. It is quite a stretch to assume that a hospital that has a low mortality rate for pneumonia is going to also have a low mortality rate for stroke and cardiac problems, and vice versa.

The results posted by CMS in their Updates and Specifications Report² prove that this is a valid concern. Looking at the scree plots provided in Appendix E of that report, Figure E.2 (Safety of Care Group) shows that the (first) latent variable (principal component) captures less than 20% of the variance in the measures, and that even adding two more latent variables (or principal components) still captures less than 50% of the variance. An examination of the scree plots proportion of the variance explained should convince any informed and objective reader that a single latent variable is not adequate to capture the information in the individual quality measures.

The individual quality measures within each of the 7 categories of measures are combined using "loading coefficients", which can be thought of as relative weights. Looking at the "Efficient Use of Medical Imaging" category, 2 of the 5 quality measures have small negative weights, and of the other 3 one makes up two thirds of the total. In other words, the measure for this category is being largely driven by a single quality measure – "abdominal CT use of contrast material".

The Safety of Care category is also driven largely by a single measure – Complication/Patient Safety for Selected Indicators – which receives a loading coefficient of 0.93. The next highest loading coefficient in this category is only 0.17, and HAI-6, Clostridium Difficile, gets a loading coefficient of 0.001, so is contributing negligibly to the category score, but it is clearly an important measure from a patient perspective. These are additional indicators of the lack of appropriateness of a latent variable model in this context. “

Thank you for the opportunity to present these comments. If you have any questions or need further clarification, please do not hesitate to contact us.

Sincerely:

/s/

Theodore Giovanis

President