Author’s response to reviews

Title: Patient Complexity in Quality Comparisons for Glycemic Control: an Observational Study

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Implementation Science Editorial Team

Dear Sirs/Madams:

We are pleased to resubmit our manuscript 'Patient Complexity in Quality Comparisons for Glycemic Control: an Observational Study', having incorporated the excellent suggestions from the reviewers. We feel that our manuscript is now stronger, and await your decision.

We now respond to each of the reviewer’s points in detail. Changes to the manuscript have been bolded.

Reviewer 1

1. The authors conflate conceptually different domains in the model.

However, our intent with this paper is to demonstrate the effects of failing to account for complexity in quality comparisons. We have developed a conceptual model of complexity, the Vector Model of Complexity (in press at the Journal of General Internal Medicine, and appended for your review). In it, we posit that patient complexity is more than just comorbidity, and this theme is more clearly explicated in the present manuscript. We purposely used available data in administrative data sets widely available, not only in the VA but in many HMO’s, to demonstrate that some of the domains in the Vector Model of Complexity can be readily operationalized. Doing so has major effects on quality comparisons. We hope that more direct explication of the Vector Model in the introduction clarifies the conceptual domains operationalized in our model.
2. ¿Some patient characteristics make standard A1c thresholds less appropriate.¿

We completely agree with the reviewer, and note that our intent with the paper was to point out the effects of ignoring this reality in quality comparisons. We have clarified this goal in the Introduction. Indeed, as the reviewer points out, the current practice is to, for example, compare a health care system with mostly older individuals (older age is associated with lower A1c values, regardless of quality of care) with another comprised of largely working parents. The informativeness of assessing the 2 health systems' success with their respective patient populations without acknowledging these differences seems indeed dubious. Yet, this is exactly the practice currently in place in the US. The reviewer cites the example of age; our inclusion of age in the model reveals that age is one of the strongest predictors, demonstrating that age differences do indeed have a large impact on A1c levels in the VA. Although the reviewer states ¿clearly, these patient characteristics should be taken into account when comparing quality across facilities¿, the policy decision to date has been to exclude very old individuals, but nothing else. We hope that our manuscript can help inform the ongoing dialog about methods to compare quality of care.

3. ¿Marital status does not necessarily justify a more relaxed outcome target, although (it) can make it more difficult to reach that goal¿. By adjusting away differences (on) sociodemographic risk factors, one may be ¿throwing in the towel¿ on vulnerable patients rather than requiring health systems to step up to the challenge. Should we relax A1c targets simply because more of their patients are using insulin? The answer is unclear.

As described above, we have now clarified that the goal of our manuscript was to operationalize readily available variables in administrative data bases that reflect some of the axes of the Vector Model of Complexity, and to demonstrate what the effects of this experiment were on rankings of VA facilities on quality of care. Social support is an important element of the Socioeconomic Vector in the Vector Model of Complexity, and marital status was available in VA data. We have been careful to avoid proposing relaxing of targets for any specific group in this paper. We completely agree with the reviewer that this is an important but unclear topic in quality comparisons. Rather, our goal was to demonstrate the effects on assessment of A1c goal achievement of accounting for domains that make patients more or less complex.

We agree with the reviewer that a fascinating area in need of more empiric data is the tension between the need to make fair comparisons and the desire to spur health systems to provide excellent quality of care. Our intent is to contribute to the evidence base as the health care community continues to hone its efforts to improve the quality of the care provided. In our Vector Model paper, we attempt to broaden the dialog on complexity to acknowledge that multiple aspects of individuals’ lives make self-care and preventive health practices difficult. Only through a careful examination of the effects of current practice can an informed discussion take place. We have written our manuscript to provide some of that
4. Inadequate treatment of comorbid clinical illnesses using a simple, unidimensional, unweighted score across 30 conditions.

The reviewer points out that summary measures of comorbid illnesses have limitations. We used a measure that was developed in VA patients specifically, and validated against the SF-36 veterans version. We now provide an additional reference in the text.

We also examined the more familiar Charlson Index score, a weighted measure that has been well validated to predict 1-year mortality in numerous populations. A criticism of the Charlson constructed in administrative data has been lack of data demonstrating its predictive ability using outpatient ICD-9 codes as well as data from hospitalizations. We used this population to assess 1 year mortality in VA diabetes patients, and as can be seen from the figure below, ICD-9 codes from outpatient data can also be used to construct indices that predict mortality well.

We have now added text to the manuscript that we tested alternative approaches to capturing comorbidity, without any appreciable difference on the results. We agree that finding similar results using alternative approaches increases the robustness of our findings, and thank the reviewer for this suggestion.

We completely agree with the reviewer that the topic of how individual illnesses affect rankings is important. As we developed this paper, we became interested in the effect of specific conditions, and developed a separate manuscript on the topic. That manuscript is in press at the Journal of General Internal Medicine and is now cited.

Given the focus of this paper on demonstrating the effects of applying the Vector Model using existing administrative data, with several elements of complexity in addition to comorbidity, we felt that an extensive analysis on individual comorbid conditions would be distracting from our main message.

5. Include two sets of analyses: one using a more comprehensive set of risk factors and a second using a more minimal set of cofactors that could be justified as representing reasonable/appropriate considerations when defining clinically meaningful, patient-centered targets for glycemic control.

In developing this manuscript, we initially took exactly the approach described by the reviewer. A central debate revolved around whether to compare a more comprehensive model with a more parsimonious model. In the end, we developed a separate manuscript on a more comprehensive model that included a richer set of data from a large survey conducted in the VA in 1999-2000. That paper demonstrates that the variation across the 105 included VA facilities on the measured characteristics was substantial (see Maney M, et al. Impact of self-reported patient characteristics upon assessment of glycemic control in the VHA. Diabetes Care 30:245-251, 2007).
The current manuscript is the more parsimonious model, restricted to only variables available in administrative data. We felt that this was substantively different because it includes many more patients (not just those who responded to the survey) and demonstrates that characteristics that are widely available without the expense of additional data collection can be operationalized to represent several domains of patient complexity, as guided by the Vector Model.

6. What (we) mean by complexity as different from risk adjustment.

We have clarified the framework in the text, throughout the introduction, methods and discussion. Our inclusion of the age*comorbidity interaction is now better explicated.

7. Expand the description of the comorbidity index.

We have now expanded this description in the methods section.

Reviewer 2

1. Would an average A1c score provide different insights?

As the reviewer suspects, many diabetes patients in the VA are indeed tested more frequently than once annually. For better or for worse, the US quality industry has elected to use only the last available value, and not the mean of all available values over the past year. Because our main intent in this paper is to inform the ongoing dialog about quality assessment, we use methods as similar to those used in quality assessments to invite comparisons, hence the last available value.

We agree that longitudinal assessments of A1c provide different insights, and have published a manuscript on this topic (see Thompson W, Wang H, et al. Assessing quality of diabetes care by measuring longitudinal changes in hemoglobin A1c in the VHA. Health Services Research 2005 Dec;40(6):1818-35). In developing the analysis for that paper, we found no appreciable differences in the parameter estimates for models using the last available value compared with the mean value.

2. Problem with Figure 3.

We apologize for inability to view the figure correctly.