Reviewer's report

**Title:** Attainment of Clinical Performance Targets and Improvement in Clinical Outcomes and Resource Use in Hemodialysis Care: A Prospective Cohort Study

**Reviewer:** Bessie Young

**Reviewer's report:**

**General**

General Comments: the authors present a manuscript in which they evaluate whether standard clinical performance measures for hemodialysis patients such as adequate albumin and hemoglobin levels, calcium phosphate product, dialysis adequacy as measured by the KT/V >1.2, and fistula use, are associated with less mortality, fewer hospitalizations, and decreased costs. Attainment of clinical guideline targets was associated with improved survival, fewer hospitalizations, and less overall costs for one of the outcomes (albumin). Using multivariate modeling, the authors found that that with each additional attainment of a guideline target was associated with better survival, fewer hospitalizations and hospital days, however only attainment of albumin goals was associated with improvement in costs. The authors conclude that attainment of core dialysis guideline targets is associated with improved survival and they offer their manuscript as proof of concept. The paper as written suffers from some methodological concerns regarding data analysis and presentation.

**Major Comments:** The major concern regarding the manuscript is that the authors are performing multiple analyses on the same cohort; however they neither address the need for nor conduct corrections for multiple comparisons. The cohort is sufficiently small that the consideration for Bonferroni or some similar adjustment for the multiple analyses with multiple outcomes might need to be considered.

A second concern is that the authors present multiple, repetitive analyses with little concern or discussion of the clinical consequences of failure to attain guideline goals, or how patient characteristics might influence the ability to attain goals. Guidelines that are easier to control by the treating nephrologist tend to have better attainment compared to those goals that are more under the patient control (i.e. albumin levels which reflect nutritional status or level of inflammation versus attainment of hemoglobin levels that are more easily treated by adjustment of erythropoietin dose). Patients who have diabetes or other chronic co-morbid conditions are also less likely to have attainment of certain guideline goals, but appear more likely to attain others. Prioritization of goals, specifically, an analysis to ascertain which guidelines contribute the most to improved survival would be useful in prioritizing guideline goals. Also, understanding if there are interactions between certain goals would also be useful information as well.

Another concern is that very few patients have attainment of all the guideline goals, which brings up the issue that this study might be underpowered to ascertain all results. This should be listed as a limitation of the data.

Finally, in the discussion the authors state that the data meet criteria for causal influence. The authors should remember that this is a longitudinal observational study, and as such, only associations with outcomes can be ascertain, not cause and effect. The authors also conclude that physicians taking care of dialysis patients should be more willing and less skeptical of current guidelines. The authors should recall that many of the guidelines have some randomized control trial evidence to substantiate the specific guideline; however, some guidelines are by consensus or use very small outdated trials as the basis for the guideline and have not been fully evaluated in rigorous randomized controlled trials. Given that it would be unethical to randomize patients to low or high albumins or catheters versus fistulas, some guidelines may never be able to be randomized and we are left with observational data. However, the value of observational data should not be overstated.

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**Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)**

1. The need to adjust for multiple comparisons.
2. A model that has all predictors of interest and evaluates which guideline contributes most to the
outcomes of interest.
3. Better elucidation of the limitations of the data.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Minor Comment
Abstract: All abbreviations and eponyms should be defined before use (i.e. EQUAL).

Table 1: Define all definitions used in the table

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Discretionary Revisions (which the author can choose to ignore)

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:
I declare that I have no competing interests.