

*[The comment below was posted on journalreview.org on December 19, 2009. Following the closing of that site, the comment was posted here in September 2012.]*

### **Disparities quality index is flawed in several respects**

Siegel et al.[1] have created a healthcare disparities measurement index that is intended to take into account (a) the size of the race/ethnic disparity on an indicator of quality care at an individual hospital, (b) the hospital's overall performance on the indicator, and (c) the size of the subject population receiving inferior (or superior) treatment. The basic disparities component of what the authors term a "disparities quality index" (DQI) is the relative difference between favorable outcome rates, with the overall population's rate used as the reference point. Thus, the index is problematic as a measure of the size of disparities in the way that relative differences between rates are generally problematic – because they tend to be systematically affected by the overall prevalence of an outcome. Specifically, the more common an outcome, the smaller tends to be the relative difference in experiencing it and the larger tends to be the relative difference in avoiding it, as discussed in references 2 to 4 and 100 or so other places made available on the Measuring Health Disparities page (MHD)[5] of [jpscanlan.com](http://jpscanlan.com).

The authors seem to regard their index as being a function of absolute differences between rates, with the overall rate used as a means of taking into account overall performance. Even if the component were properly deemed an absolute difference, however, it would be problematic as a disparities measure because absolute differences also tend to be systematically affected by the overall prevalence of an outcome, as discussed in references 2 and 3, as well as the Scanlan's Rule page of [jpscanlan.com](http://jpscanlan.com),[6] and varied references on MHD. See especially references 7-9, which explain why the patterns of declining absolute differences observed in Siegel et al.'s references 3 [10] and 4 [11] (which Siegel et al. cite as evidence that improvements in healthcare tend to reduce healthcare disparities) are what one should expect solely for statistical reasons, as well as why some observers would regard the disparities to have increased. Thus, however one characterizes the disparities component of the DQI, the component is a fundamentally flawed measure that undermines any complex index of which it is a part.

Let us assume, however, that relative (or absolute) differences between rates in fact constituted effective means of appraising the size of a healthcare disparity or that one replaced such measure with one seemingly not affected by the overall prevalence of an outcome (like the estimated effect size discussed on the Solutions sub-page of MHD and its references).[12]. There still would be issues about the utility of the DQI. To begin with, there always exists a question as to the utility of measures of disparity that attempt to take into account anything but the disparity itself; for such measures confound the sizes of disparities with other factors that, however important, can be more effectively examined on their own. Notably, in the case of the second period examined in Hospital A, Siegel et al. dismiss the fact that it was a substantial decline in quality that caused the dramatic decline in the DQI on the basis that hospitals would be mindful of the performance issue regardless of the DQI. While the observation is likely correct, the situation nevertheless illustrates the problematic nature of an index that seeks to summarize more than one thing.

A further issue involves the fact that the basic disparities component of the index is a function of differences between the rate of a particular subpopulation and rate of the overall population. It is far more common to calculate disparities based on rates of advantaged and disadvantaged groups. Such approach avoids confounding the disparity with the proportion a particular group makes up of the overall population. By multiplying the disparity by the log of the subpopulation size, the DQI is intended in some manner to give greater weight to larger subpopulations. Most indexes that seek to take into account the subject group's size do so on the basis of the proportion the subject group makes up of the total population, not the subject group's absolute size. Yet, use of the total population rate as the reference point for calculating the disparity creates pattern whereby the larger the proportion the subject group comprises of the total population (and hence the more the subject group's rate influences the overall rate), the smaller will be the disparity (however measured).

Again, there is a question whether one wants to confound the disparity measure with any other factor. But as noted in the preceding paragraph, some consider a disparity more important when the disadvantaged group comprises a larger proportion of the affected population. The authors themselves suggest that such is their thinking when they state that the high DQI in the fourth quarter of 2005 in Hospital A is influenced by "the larger number of Hispanic patients actually eligible for treatment as compared with non-Hispanic patients (46 vs. 32)." But it is the absolute number of Hispanic rather than the comparative number that influences the DQI. As noted in the preceding paragraph, the only way the largeness of the comparative number of Hispanics influences the DQI is by reducing the disparities component of the index. Giving weight to the number of persons in the subject group rather than the proportion the group comprises of the total, other things being equal, simply causes larger hospitals to have higher DQIs and, within hospitals, simply causes there to be higher DQIs for the outcomes for which more patients are eligible.

In discussing the fact that disparities in Healthy People 2010 are measured in terms of adverse outcomes, and the shortcomings of the DQI for measuring adverse outcomes, the authors suggest that healthcare disparities involves favorable outcomes and health disparities involve adverse outcomes. In fact both types of disparities involve dichotomies where one can examine relative disparities in either the favorable outcome (e.g., receipt of appropriate health care or the avoidance of morbidity and mortality) or the adverse outcome (e.g., failure to receive healthcare or experiencing morbidity and mortality). Indeed, the recommendation of the National Center for Health Statistics (NCHS) that all disparities be measured in terms of adverse outcome,[13] a misguided response to reference 4 (see references 2 and 3 and Section E.7 of MHD), was specifically focused on healthcare, with NCHS's recommending that disparities in things like mammography and immunization be measured in terms of relative differences in adverse outcomes. Thus, NCHS would commonly reach opposite conclusions with regard to health care from those yielded by the disparities component of the DQI. That is, as rates of appropriate healthcare increase – and relative differences in rate of receipt appropriate care tend to decrease while relative differences failure to receive appropriate care tend to increase – the DQI would tend to find declining disparities while NCHS would tend to find increasing disparities.

It is true that these patterns are not reflected in the pattern from Hospital A. But the changes in disparities observed in that hospital occurred because of a substantial reduction in appropriate healthcare rates, not the usual case and not what the earlier part of the article suggests is the main concern.

In any event, were it a valid measure, the DQI could address disparities in morbidity and mortality simply by examining the favorable outcome. As already explained, however, the DQI is flawed in a number of respects, including, crucially, the flaw that generally undermines efforts to measure health or healthcare disparities, that is, the failure to distinguish meaningful changes from the changes that are functions of the underlying risk distributions.

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