

*[The comment below was posted on journalreview.org on February 12, 2008. Following the closing of that site, the comment was posted here in September 2012.]*

## **Perceptions of changes in healthcare disparities among the elderly dependant on choice of measure**

Escarce and McGuire[1] found that racial differences in the use of medical procedures and diagnostic tests among elderly person, measured in terms of relative differences between rates of receiving those procedures/tests, usually decreased between 1986 and 1997. They suggest a number reasons for why that occurred.

The Escarce/McGuire study, and particularly the data in its Table 2, provide a useful illustration of the ways various measures of difference tend to change as the overall prevalence of an outcome changes, as well as of the prevailing confusion over measurement of healthcare disparities. I have explained in a number of places the tendency whereby as the overall prevalence of an outcome increases, relative differences in experiencing it tend to decrease while relative differences in failing to experience it tend to increase.[2-4] In the realm of healthcare, by and large, one observes that, as in the Escarce/McGuire study, procedure rates are generally increasing for whites and blacks alike. As also can be observed in the Escarce/McGuire study (putting aside for a moment interpretations of changes in the size of disparities), whites tend usually to have higher rates both at the beginning and the end of any period studied.

So for purposes of reducing the complexity of the discussion that follows, I restrict it to the situation where the rates are generally increasing and where the white rate was greater than the black rate at both points examined. Further, to reduce the role of randomness, and using the white rate as an indicator of general prevalence, I restrict the discussion to situations where the white rate increased by at least 20%. A table supporting the discussion that follows (and which may be found [here](#)), however, provides information on all rates for procedures for which the Escarce/McGuire's Table 2 provide black and white rates for both 1986 and 1997.

There were 12 such cases, and in 9 of those the relative difference between black and white rates declined. But in each of those 9 cases (as well as the other 3 cases) the relative difference between rates of failing to receive the procedure increased. I do not mean to suggest that the relative difference between rates of failing to receive the procedure is a better way of looking at the matter. However, the National Center for Health Statistics (NCHS) has recommended that all disparities be measured in terms of relative differences in experiencing the adverse outcome [5,6] (an approach I criticize in references 3,4 and 10-12). Thus, NCHS would regard the disparities to have increased in all 12 cases.

Some researchers tend to measure changes in healthcare disparities in terms of absolute differences between rates, which differences are the same for the favorable and the adverse outcome.[7-9] But absolute differences between rates tend also to change solely because of changes in the prevalence of an outcome, though in a more complicated manner than relative differences. As I have explained and illustrated in a number of places, including reference 10-14, where (1) the relative difference between rates of experiencing the favorable outcome

(measured in terms of the rate of the advantaged group to that of the disadvantaged group) exceeds (2) the relative difference between rates of failing to experience the outcome (measured in terms of the disadvantaged group's rate of failing to experience the outcome to the advantaged group's rate of failing to experience the outcome) – termed “Zone A” in the figures in reference 10 – increases in the favorable outcome tend to increase absolute differences. On the other hand, where (2) exceeds (1) – termed “Zone B” in the figures in reference 10 – increase in the favorable outcome tend to reduce absolute differences. References 10-15 explain how failure to understand these patterns has led to the misinterpretation of various patterns of changes in absolute differences.

In all of the 12 cases mentioned above, (1) was greater than (2) both in 1986 and 1997. Hence, typically, increases in outcome rates would tend to increase absolute differences. And, in fact, in all cases the absolute difference increased. Thus, researchers who rely on absolute differences would have found disparities to increase in all 12 cases.

Differences measured in odds ratios, which some researchers would use as a measure of disparity, tend to move in the opposite of absolute differences as the prevalence of an outcome changes.[10,11] Thus, in Zone A, increases in prevalence would tend to reduce differences as measured in odds ratios. Differences measured in odds ratios in fact declined in 9 cases (including 8 of the 9 cases where the relative difference in receiving the procedure declined) and in 2 of the 3 cases where relative differences in receipt of the procedure increased). Thus, researchers who rely on odds ratios would find disparities to have declined in 9 cases and increased in 3 cases.

In sum, for the most part the patterns of changes were in accord with would typically occur in the circumstances – absent, that is, some meaningful change in disparity or some irregularity in the underlying distributions of factors associated with experiencing the outcome. Possibly, by examining departures from the standard patterns in the situations where such departure were found, or by use of the technique described in references 16 and 17, one might identify meaningful changes in disparities. Thus, for example, in the 3 cases where the relative difference in experiencing the outcome increased during a period of increasing overall rates for the procedure (Swan-Ganz catheterization, radio nuclide stress test, permanent pacemaker), such changes, being contrary to the standard pattern, could be read to reflect a meaningful worsening of the disparity. (As mentioned, these included 2 cases where the odds ratio also changed in the nonstandard manner.) One might also cautiously draw such inference on the basis of the nonstandard increase in the odds ratio in the 1 case (mammogram) where all other measures changed in standard directions.

In the remaining 8 situations, each measure changed in the standard manner. One might nevertheless attempt to determine whether the disparity changed in some meaningful way using the second approach described in references 16 and 17. That approach involves estimating the difference between means of hypothesized underlying normal distributions of factors associated with experiencing the outcome on the basis of the black and white rates at each point in time. Such approach indicates that the disparities declined in each of the 8 cases. It should be kept in mind, however, that, as discussed in references 16 and 17, there is good deal of speculation involved in that approach. It also warrants note that in the case of radio nuclides stress test, the

approach showed a decline in disparity even though the nonstandard increase in the relative difference of experiencing the outcome suggested an increase in the disparity, further calling into question the reliability of an approach based on estimations of means.

There remains the matter of the explanations for the declines in relative differences offered by Escarce/McGuire. Notably, the explanations do not include a recognition of the fact that increases in prevalence would tend usually to reduce relative differences in experiencing an outcome. Without taking the space to detail them, however, I will add that the explanations the author offer are by no means implausible (and tend to be consistent with the results of the second approach just described). But those regarding the increases in the absolute differences to reflect increasing disparities might well find equally plausible explanations for such perceived increases.

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