

*The comment below was posted on [journalreview.org](http://journalreview.org) on February 8, 2008. Following the closing of that site, the comment was reproduced here in September 2012. A follow up was posted on February 10, 2008. It can be found [here](#).*

*Reproducing the material in the form of a pdf document made it easier to present a table. So an addendum was added to show in table form the figures from Table 2 of the Werner article with the various measures of differences between rates discussed in the comment.*

### **Pay-for-performance implications of the failure to recognize the way changes in prevalence of an outcome affect measures of racial disparities in experiencing the outcome**

Werner et al.[1] found that after New York implemented a CABG report card, racial disparities in CABG rates increased. Such finding has been increasingly cited in discussions of the way pay-for-performance may affect healthcare disparities. A recent article described the Werner study as the only study of such effect so far.[2]

Like virtually all health and healthcare disparities research to date, however, the Werner study suffers from the failure to recognize the way measures of differences between rates tend to change solely because of changes in the prevalence of an outcome. CABG use increased substantially during the period examined by Werner et al. The white rate increased from 3.6% of AMI patients in 1988-1991 to 8.0% in 1992-1995, while the black rate increased from 0.9% to 3.0% during this period. It is the increase in the absolute difference between these rates – from 2.7 percentage points in 1988-1991 to 5.0 percentage points in 1992-1995 – that underlies the study's finding that has received such attention.

But changes in the difference between the black and white rates need to be examined with a recognition of what would typically occur solely because of the general increase in CABG use. To begin with, for reasons explained in references 3 through 16, and in several score references at [Measuring Health Disparities](#), during a period of increase in CABG one would typically observe a decrease in the relative difference between rates of receiving CABG and an increase in the relative difference between rates of failing to receive CABG. And that is what did occur. The ratio of white rate of receiving CABG to that of the black rate declined from 4.0 in 1988-1991 to 2.7 in 1992-1995; and the ratio of the black rate of failing to receive CABG to that of the white rate increased from 1.03 (99.1%/96.4%) in 1988-1991 to 1.05 (97.0%/92.0%) in 1992-1995.

In the case of the absolute difference between rates on which Werner et al. rely, for reasons explained in references 4 through 15, one would expect such difference to increase (as did occur and which was interpreted by Werner et al. to reflect a meaningful increase in disparity). On the other hand, for reasons explained in most of those references, one would expect the difference measured in odds ratios to decline, which also occurred. The ratio of the white to black odds of receiving the procedure declined from 4.1 in 1988-1991 to 2.8 in 1992-1995.

The references explain these issues, and why none of these changes ought alone to be regarded as indicating a meaningful change in disparity, at sufficient length that there is no reason for extensive discussion here. I do note, however, that references 6-7 and 9-13 discuss the Sehgal article[17] that Werner et al. cite as finding that quality improvements reduced racial disparities. Those references, particularly number 12, explain why one would expect absolute differences typically to decline in the context addressed by Sehgal at the same time that one would expect absolute differences typically to increase in the context addressed by Werner et al.

There remains the issue of whether disparities changed in some meaningful sense after implementation of the report card program (perhaps increasing as a result of the avoidance of high risk patients, as suggested by Werner et al.). As discussed in many of the references, identifying meaningful changes in disparities is fraught with difficulties, particularly in the common situation where, as here, all the measures change in the standard direction. Nevertheless, employing the approach addressed briefly in the latter part of reference 6, and discussed in the contexts of actual data in references 14 and 15 (with much attention devoted to the speculation involved in such approach), one finds that the estimated difference between black and white means of hypothesized distributions of factors associated with the outcome declined from .57 standard deviations in 1989-1992 to .47 standard deviations in 1992-1995. That is, such approach shows a decline in the disparity. But too much uncertainty is involved with the approach to place much weight on such result.

Other data are presented in the Werner study and a good part of its analysis involves the comparison of patterns of change in New York with those in other states. But I think the discussion above is sufficient to illustrate the problems with appraising changes in disparities by means of changes in absolute differences (or relative differences, etc.) without regard to the ways certain measures of differences between rates tend usually to change as overall prevalence changes. I will note, however, that the approach just referenced would show that in the other states the decline in estimated difference between means would have been from .40 to approximately .28 standard deviations. While perhaps suggesting a slightly larger meaningful decline in those states than in New York (which would seem consistent with the reasoning of the authors), I doubt that such difference would approach significance

Assuming the validity of my reasoning in the various references, virtually all health disparities research that has relied on dichotomous measures, or measures that are functions of dichotomies, is suspect for failing to consider the way such measures change solely because of changes in prevalence. But, while that would mean that substantial resources may have been wasted on such research, it is unclear that its errors have otherwise caused concrete harms. That is, whatever such research tends to show, policy makers have continued to implement what appear to them to be sensible measures for improving the health of the community. I doubt, for example, that anyone would consider eliminating something like the Back to Sleep Program because it led to increased socioeconomic (relative) differences in SIDS rates (as discussed in reference 16). Pay-for-performance, and particularly where performance will be in some part

measured by perceived effects on healthcare disparities (as, say, is discussed in reference 18), adds an additional wrinkle to the matter. But whether or not paying for performance as evaluated by perceived effects on disparities without regard to the way various measures of disparity change solely as a result of changes in the prevalence of an outcome has the potential to cause concrete harms, it has the potential to undermine what might otherwise be a useful means of promoting healthcare.

**ADDENDUM** (added September 1, 2012)

The table below show the rates in Werner table 2 and the various measures of differences between rates. RRY and RRN are the rate ratios for receipt or not receipt of CABG. The EES is the measure of difference discussed on the [Solutions](#) sub-page of [Measuring Health Disparities](#) page of [jpscanlan.com](#):

**Table 1: Measures of difference between rates shown in Werner Table 2 (ref 8608a2)**

Area	Period	W	B	RRY	RRN	AD	OR	EES
NY	1	3.60%	0.90%	4.00	1.03	2.70%	4.11	0.58
NY	2	8.00%	3.00%	2.67	1.05	5.00%	2.81	0.48
Other	1	5.90%	2.50%	2.36	1.04	3.40%	2.45	0.40
Other	2	8.80%	5.20%	1.69	1.04	3.60%	1.76	0.28

References:

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4. Scanlan JP. Can we actually measure health disparities? *Chance* 2006;19(2):47-51: [http://www.jpscanlan.com/images/Can\\_We\\_Actually\\_Measure\\_Health\\_Disparities.pdf](http://www.jpscanlan.com/images/Can_We_Actually_Measure_Health_Disparities.pdf)
5. Scanlan JP. Measuring health disparities. *J Public Health Manag Pract* 2006;12(3):293-296, responding to Keppel KG, Percy JN. Measuring relative disparities in terms of adverse events. *J Public Health Manag Pract* 2005;11(6):479–483: [http://www.nursingcenter.com/library/JournalArticle.asp?Article\\_ID=641470](http://www.nursingcenter.com/library/JournalArticle.asp?Article_ID=641470)
6. Scanlan JP. Can We Actually Measure Health Disparities, presented at the 7th International Conference on Health Policy Statistics, Philadelphia, PA, Jan 17-18, 2008 (invited session): PowerPoint Presentation: [http://www.jpscanlan.com/images/2008\\_ICHPS.ppt](http://www.jpscanlan.com/images/2008_ICHPS.ppt);

Oral Presentation: [http://www.jpscanlan.com/images/2008\\_ICHPS\\_Oral.pdf](http://www.jpscanlan.com/images/2008_ICHPS_Oral.pdf)

7. Scanlan JP. Measurement Problems in the National Healthcare Disparities Report, presented at American Public Health Association 135th Annual Meeting & Exposition, Washington, DC, Nov. 3-7, 2007: PowerPoint Presentation:

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[http://www.jpscanlan.com/images/ORAL\\_ANNOTATED.pdf](http://www.jpscanlan.com/images/ORAL_ANNOTATED.pdf)

8. Scanlan JP. Methodological Issues in Comparing the Size of Differences between Rates of Experiencing or Avoiding an Outcome in Different Settings, presented at the British Society for Populations Studies Conference 2007, St. Andrews, Scotland, Sept. 11-13, 2007: PowerPoint Presentation:

[http://www.jpscanlan.com/images/2007\\_BSPS\\_Presentation.ppt](http://www.jpscanlan.com/images/2007_BSPS_Presentation.ppt)

Oral Presentation: [http://www.jpscanlan.com/images/2007\\_BSPS\\_Oral\\_Presentation.pdf](http://www.jpscanlan.com/images/2007_BSPS_Oral_Presentation.pdf)

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[http://jpscanlan.com/images/Vaccarino\\_NEJM\\_2005.pdf](http://jpscanlan.com/images/Vaccarino_NEJM_2005.pdf)

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