

From: Scanlan, James <jps@jpscanlan.com>

To: ralph@bu.edu, dhunter@hsph.harvard.edu,
lagakos@biostat.harvard.edu, ware@hsph.harvard.edu

Cc:

Date: Tuesday, March 04, 2008 07:17 pm

Subject: NEJM articles on health disparities

Certain of the references in this email are to online comments on Journal Review (which has ceased to exist) or Lancet (which has ceased to maintain its online comments). The items are now available on jpscanlan.com and links to the items are found in a text box at the end of the email.

Dear Professors D'Agostino, Hunter, Lagakos, and Ware:

I write to you in your roles as statistical consultants for the *New England Journal of Medicine* (*NEJM*).

NEJM publishes a fair amount of material on health and healthcare disparities, with a notable example being the three articles and commentary on healthcare disparities in the August 18, 2005 issue (references 1-4 after the signature). Presumably, given the increasing attention being generally accorded to health and healthcare disparities, the *NEJM* will be publishing some material in this area in the next year or so, and I imagine that many articles on these issues are currently under review and some number may be in press.

The purpose of my note is to urge that in your future review of such material you give attention to certain statistical issues that call into question the reasoning in those four references and most other health disparities research to date. Virtually all health disparities research has failed to consider the ways each of the standard measures of difference between rates tends to change as the overall prevalence of an outcome changes. In particular, as an outcome increases in prevalence relative differences in experiencing it tend to decline, while relative differences in failing to experience it tend to increase. Roughly, when a relatively uncommon outcome increases absolute differences between rates tend to increase; when a relatively common outcome increases, absolute differences tend to decline. Odds ratios tend to change in the opposite direction of absolute differences.

My point, it is important to keep in mind, is not that different measures tend to give different results as to changes of direction over time (or the comparative size of disparities in different settings), though that certainly is a matter of some consequence. The point, rather, is that none of these measures can, without more, identify patterns of changes in differences between rates that are other than the standard results of changes in overall prevalence of an outcome.

Reference 5, a guest editorial in the Spring 2006 issue of the American Statistical Association magazine *Chance*, is one of the more succinct illustrations of these tendencies. References 6-10 are published expressions of the same ideas going back to 1987, and reference 11 may be the most comprehensive treatment to date (though lacking some of the detail of discussion of patterns of changes in absolute differences in some more recent commentary discussed below).

The 2005 recommendation of the National Center for Health Statistics (NCHS) that all disparities be measured in terms of relative differences in adverse outcomes,[12] which is discussed in a *NEJM* letter [13] responding to reference 3, has been acknowledged by NCHS to be a response to my pointing out in reference 7 (a 2000 article in *Society* styled "Race and Mortality") that increasing overall rates of beneficial health procedures would tend to be accompanied by declining relative differences in those outcomes (though, as discussed in many places, a very misguided response). Race and Mortality also discussed a much-publicized 1992 *NEJM* article [14] that

found large racial differences in infant mortality among college-educated parents; Race and Mortality explained that large relative differences in infant mortality rates, though small relative differences in infant survival rates, would be expected among college-educated parents simply because infant mortality is very low among the college-educated. The article also alludes to a 1987 *NEJM* article [15] finding larger racial differences in low birthweight among low-risk than high-risk groups; Race and Mortality explained that large relative differences in low-birthweight, but small relative difference differences in avoiding low birthweight, are to be expected among low risk groups simply because low birthweight is rare among such groups.

(An extensive unpublished piece [16] written in the early 1990s discusses the bearing of these tendencies on a quite a few *NEJM* articles or letters that had appeared in the late 1980s and early 1990s (beyond those mentioned in the preceding paragraph). Reference 16a discusses a much-publicized and controversial (but still much cited) 1999 *NEJM* article, though the subject of this note is a minor aspect of the comment. But, since recent treatments of these issues involving the articles of August 18, 2005 satisfactorily illustrate my principal points, it is not necessary to give extended attention here to these earlier *NEJM* articles (though I do note that reference 16a raises some important statistical issues overlooked in other criticisms of the 1999 article).

The misguided NCHS response to Race and Mortality, as well as the burgeoning attention to health disparities generally, prompted me to give a great deal of attention to this issue in recent years. That attention to date has included eleven presentations at public health or statistical conferences here or in Europe over the last two years and about 50 on-line letters to medical or health policy journals. These are listed in section B and D of this web page:
<http://www.jpscanlan.com/homepage/measuringhlthdisp.html>

And I shall be giving comparable attention to these issues at least for a short time, particularly now that it is being suggested that healthcare disparities be considered in the context of pay-for-performance programs in Massachusetts and elsewhere.[16b, 16c]

A good deal of this attention involves criticism of NCHS and the Agency for Healthcare Research and Quality (AHRQ) for their decision to measure health and healthcare disparities in terms of relative differences in adverse outcomes, as well as their apparent failure to recognize that changes in overall rates have any effect on measures of differences between rates.[17-26] Such material emphasizes that, while AHRQ maintains that improvements in health will tend to reduce healthcare disparities, in fact improvement will tend to increase the relative differences in adverse outcomes rates that NCHS and AHRQ generally use to measure healthcare disparities. Much of that material gives particular attention to the group of above-mentioned *NEJM* articles of August 18, 2005. In broad summary, such material (initially in some detail in reference 17, with some discussion in most of references 18-26), explains that Jha et al.[2] usually found disparities in certain healthcare outcomes (measured in terms of absolute differences) to be increasing mainly because Jha et al. examined disparities in outcomes where black and white rates were in ranges where increasing overall rates tend to increase absolute differences between rates; Trivedi et al. found disparities (also measured in absolute differences) to be decreasing mainly because Trivedi et al. examined outcomes where black and white rates were in ranges where overall increases tend to reduce absolute differences. Less attention is given to Vaccarino et al., which relied on relative differences in receiving certain types of care, but found little change in disparities in recent years. The explanation in that instance (and one almost universally applicable where overall rates do not change much) is that, given that observed changes in differences between rates (however measured) tend usually to be largely functions of changes in overall prevalence, since there had

been minor changes in overall prevalence of the outcomes examined by Vaccarino et al., it was understandable that there should be minor changes in differences between rates.

On recognizing that Trivedi et al. was being often cited for finding improvements in health to be more likely to reduce disparities in process outcomes than clinical (control) outcomes, in the more recent of these references, I explained that said difference in patterns was to be expected because the former outcomes more often involved black and white rates in ranges where overall increases reduced absolute differences while the latter outcomes more often involved black and white rates where overall increases typically increased absolute difference.[20,21,24]

As to whether the points I have been making are necessarily correct, your colleague professor Alan Zaslavsky of the Health Policy department of Harvard Medical School (a coauthor of the referenced article by Trivedi et al. and of another article by Trivedi et al. that is the subject of reference 21, and the discussant for the session where reference 24 was recently presented) may have some views. Professor Thomas McGuire of the same department, whose 2004 *American Journal of Public Health* article is subject of reference 27 (which reference discusses why decreases in relative differences in certain procedures observed in that study, and perceived as declines in disparity, were what would be expected in the circumstances of increasing overall prevalence) may also have some views. Christopher Winship, who is familiar with *Race and Mortality*, may also have some views.

Reference 9 has been used in a statistics course at the Massachusetts Institute of Technology since 1997, where, according to the syllabus, the validity of its reasoning is not questioned.

In a health disparities measurement handbook issued in 2005,[28 (at 172) one prominent English commentator on the measurement of health inequalities, relying on a 2001 presentation in Oslo, [29] explicitly accepted the reasoning of *Race and Mortality* (though, as I have mentioned in a few places, without seeming to recognize the implications of that acceptance with respect to the remainder of the lengthy handbook.

The leading European authorities on the measurement of health disparities in Europe are Anton Kunst and Johan Mackenbach. But references 5,11,30-32 have been critical of their failure to recognize overall prevalence affects the size of a disparity, particularly with regard to a landmark 1997 *Lancet* article finding comparatively large social inequalities in mortality in Norway and Sweden. Very recently, however, Drs. Kunst and Mackenbach co-authored an article (Houweling et al.[33]) in part, responding to *Race and Mortality*. I will eventually express certain criticisms of the Houweling article for its failure to address *Race and Mortality*'s treatment of the reasons why certain patterns would typically occur and why they sometimes would sometimes not occur, as well as for the overlooking numerous works from 2005 to 2007 applying that same reasoning to explain patterns of changes in absolute differences (and, perhaps most important, for its mistaken impression that odds ratios may offer a satisfactory solution to the problem that measures tend to change solely because of changes in prevalence). But, while the article seems to disagree with *Race and Mortality* in some respects, it nevertheless concludes that both relative and absolute differences will tend to exhibit systematic correlations with the prevalence of an outcome and that it therefore is necessary to take overall prevalence into account. Thus, as with my own work, the article calls into question virtually every analysis of the size of disparities in different settings to date, including the 1997 *Lancet* article.[34,35].

So quite apart from my own continuing efforts in this area, I think that eventually the validity of the points I have been trying to make will be universally recognized. Thus, it would be useful if a journal like *NEJM* would give thought to these points in evaluating future submissions on health and healthcare disparities.

A couple of concluding points:

First, it is important to understand that the existence of many departures from the patterns I describe does not materially detract from my points. Such departures in no way undermine the reasons to believe that patterns of differences between rates will tend usually to change in somewhat systematic manner solely because of changes in prevalence. The difficulty of knowing the precise contours of the tendencies in a particular setting will call into question whether one can in fact reliably measure disparities while taking the tendencies into account. But it makes no sense to continue to try and appraise the size of disparities while ignoring such tendencies. The last point would hold even if the underlying tendencies were quite different from those I have described.

Second, much of the referenced work expresses skepticism as to whether binary variables can be used to measure health disparities reliably enough to make substantial research in the area worthwhile. More recently, however, as in references 23,24,27,34,36, I have suggested approaches that, even if possessing serious weaknesses, may be better than anything else and certainly better than relying on standard measures without even acknowledging that prevalence may have play some role. The utility of such approaches, however, is of very minor relevance to the purpose of my note to you. Calling these issues to your attention in your roles, as the *NEJM* statistical consultants, relates, not to the validity of efforts to take these tendencies into account, but to whether the *NEJM* should publish studies that express no appreciation of the implications of the tendencies.

Sincerely,

James P. Scanlan,
Attorney at Law
1529 Wisconsin Avenue, NW
Suite 300
Washington, DC 20007
Phone: 202.338.9224
Fax: 202.338.9225
e-mail jps@jpscanlan.com

1. Vaccarino V, Rathore SS, Wenger NK, et al. Sex and racial differences in the management of acute myocardial infarction, 1994 through 2002. *N Engl J Med* 2005;353:671-682.
2. Jha AK, Fisher ES, Li Z, Orav EJ, Epstein AM. Racial trends in the use of major procedures among the elderly. *N Engl J Med* 2005;353:683-691.
3. Trivedi AN, Zaslavsky AM, Schneider EC, Ayanian JZ. Trends in the quality of care and racial disparities in Medicare managed care. *N Engl J Med* 2005;353:692-700.
4. Lurie N. Health disparities – less talk, more action. *N Engl J Med* 2005;353:727-729.
5. Can we actually measure health disparities? *Chance* 2006;19(2):47-51:
http://www.jpscanlan.com/images/Can_We_Actually_Measure_Health_Disparities.pdf

6. 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
7. Race and mortality. *Society* 2000;37(2):19-35 (reprinted in *Current* 2000 (Feb)): http://www.jpscanlan.com/images/Race_and_Mortality.pdf.
8. Divining difference. *Chance* 1994;7(4):38-9,48: http://jpscanlan.com/images/Divining_Difference.pdf.
9. The perils of provocative statistics. *The Public Interest* 1991;102:3 14: http://jpscanlan.com/images/The_Perils_of_Provocative_Stat.pdf
10. The “feminization of poverty” is misunderstood. *The Plain Dealer* Nov 11, 1987 (reprinted in *Current* 1988;302(May):16-18 and *Annual Editions: Social Problems* 1988/89. Dushkin1988: http://www.jpscanlan.com/images/Poverty_and_Women.pdf
11. The Misinterpretation of Health Inequalities in the United Kingdom, presented at the British Society for Populations Studies Conference 2006, Southampton, England, Sept. 18-20, 2006.
- Oral presentation:
http://www.jpscanlan.com/images/BSPS_2006_Oral.pdf
- PowerPoint presentation:
http://www.jpscanlan.com/images/Scanlan_BSPS_Presentation.ppt
- Complete paper:
http://www.jpscanlan.com/images/BSPS_2006_Complete_Paper.pdf.
12. 10. Keppel KG, Percy JN, Klein RJ. Measuring progress in Healthy People 2010. Healthy People statistical notes. No. 25. Hyattsville, Md.: National Center for Health Statistics: <http://www.cdc.gov/nchs/data/statnt/statnt25.pdf>
13. Keppel kg, Percy JN, Weissman JS. Untitled letter. *N Engl J Med* 2005;353:2082-2083:
14. Schoendorf KC, Hogue CJR, Kleinman JC, Rowley D. Mortality among infants of black as compared with white college-educated parents. *N Engl J Med* 1992; 326:1522-6.
15. Kleinman JC, Kessel SS. Racial differences in low birthweight. *N Engl J Med* 1987; 317:749-53.
- 16 The relationship between declining mortality and increasing racial and socioeconomic disparities in mortality. 1992:
http://www.jpscanlan.com/images/Relationship_Between_Decl_Mort_and_Incr_Disparities.pdf
- 16a. A study with a variety of problems. *Journal Review* June 2, 2007 (responding to Schulman KA, Berlin JA, Harless, et al. The effect of race and sex on physicians’ recommendations for cardiac catheterization. *N Engl J Med* 1999;340:618-26):[http://www.journalreview.org/view_pubmed_article.php?pmid=10029647&specialty_id=](http://www.journalreview.org/view_pubmed_article.php?pmid=10029647&specialty_id=16b) 16b. 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. Journal Review Feb. 8, 2008 (responding to Werner, RM, Asch DA, Polsky D. Racial profiling: The unintended consequences of coronary artery bypass graft report cards. Circulation 2005;111:1257-63):

http://www.journalreview.org/view_pubmed_article.php?pmid=15769766&specialty_id=

16c. Inclusion of healthcare disparities issues in pay-for-performance programs should await development of reliable means of measuring changes in disparities over time. Journal Review Feb. 16, 2008 (responding to Casalino LP, Elster A, Eisenberg A, et al. Will pay-for-performance and quality reporting affect health care disparities? Health Affairs 2007;26(3):405-414):

http://www.journalreview.org/view_pubmed_article.php?pmid=17426053&specialty_id=0

17. Effects of choice measure on determination of whether health care disparities are increasing or decreasing. Journal Review May 1, 2007, responding to Trivedi AN, Zaslavsky AM, Schneider EC, Ayanian JZ. Trends in the quality of care and racial disparities in Medicare managed care. N Engl J Med 2005;353:692-700 (and several other articles in the same issue):http://www.journalreview.org/view_pubmed_article.php?pmid=16107620&webenv=00P_2r_IHBKZPkExnEkCR_j5-u8waNcJ-87aLnoSJWxvN_ljFKstOR3CAx%402B600907661FF950_0034SID&qkey=1&rescnt=2&retstart=0&q=%22vaccarino+v%22+%22rathore+ss%22

18. Correction to statements concerning the measurement of healthcare disparities in the National Healthcare Disparities Reports in earlier comment on Vaccarino et al. Journal Review Nov. 6, 2007: http://www.journalreview.org/view_pubmed_article.php?pmid=16107620&specialty_id=

19. Recognizing the role of the prevalence of an outcome in comparing the size of relative differences in experiencing or failing to experience the outcome. Journal Review May 31, 200, responding to Gan SC, Beaver SK, Houck PM, et al. Treatment of acute myocardial infarction and 30-day mortality among women and men. N Engl J Med 2000;343:8-15:http://www.journalreview.org/view_pubmed_article.php?pmid=10882763&webenv=0aoJ5mGfxigOPFhKrRoFZMOOpA0kPxYlWamclX0JZD4SRW9YZ-ZAu4AUdt%402B6007EE661FED70_0024SID&qkey=1&rescnt=1&retstart=0&q=%22gan+sc%22+%22beaver+sk%22

20. Understanding the ways improvements in quality affect different measures of disparities in healthcare outcomes regardless of meaningful changes in the relationships between two groups' distributions of factors associated with the outcome. Journal Review Aug. 30, 2007, responding to Sequist TD, Adams AS, Zhang F, Ross-Degnan D, Ayanian JZ. The effect of quality improvement on racial disparities in diabetes care. Arch Intern Med. 2006;166:675-681:
http://www.journalreview.org/view_pubmed_article.php?pmid=16567608&specialty_id=

21. Understanding patterns of correlations between plan quality and different measures of healthcare disparities. Journal review Aug. 30, 2007, responding to Trivedi AN, Zaslavsky AM, Schneider EC, Ayanian JZ. Relationship between quality of care and racial disparities in Medicare health plans. JAMA 2006;296:1998-2004:
http://www.journalreview.org/view_pubmed_article.php?pmid=17062863&specialty_id=

22. Recognizing the way correlations between improvements in healthcare and reductions in healthcare disparities tend to turn on the choice of disparities measure. Journal Review Nov. 9, 2007, responding to Kaytur FA, Clancy CM. Improving quality and reducing disparities. JAMA

2003;289:1033-34: http://www.journalreview.org/view_pubmed_article.php?pmid=12597759&specialty_id=22

23. Comparing health inequalities across time and place with an understanding of the usual correlations between various measures of difference and overall prevalences. Journal Review Jan. 30, 2008, responding to Moser K, Frost C, Leon D. Comparing health inequalities across time and place—rate ratios and rate differences lead to different conclusions: analysis of cross-sectional data from 22 countries 1991–200. Int J Epidemiol 2007;36:1285-1291:

http://www.journalreview.org/view_pubmed_article.php?pmid=17898027&specialty_id=0

24. 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;

Oral Presentation: http://www.jpscanlan.com/images/2008_ICHPS_Oral.pdf

25. 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: http://www.jpscanlan.com/images/APHA_2007_Presentation.ppt; Oral

Presentation: http://www.jpscanlan.com/images/ORAL_ANNOTATED.pdf 26. 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; Oral Presentation:

http://www.jpscanlan.com/images/2007_BSPS_Oral_Presentation.pdf

27. Perceptions of changes in healthcare disparities among the elderly dependant on choice of measure. Journal Review Feb. 12, 2008 (responding to Escarce JJ, McGuire TG. Changes in racial differences in use of medical procedures and diagnostic tests among elderly persons: 1986-1997. Am J Public Health 2004;94:1795-1799):

http://www.journalreview.org/view_pubmed_article.php?pmid=15451752&specialty_id=0

28. Carr-Hill R, Chalmers-Dixon P. The Public Health Observatory Handbook of Health Inequalities Measurement. Oxford: SEPHO; 2005:

http://www.sepho.org.uk/extras/rch_handbook.aspx

29. The Misunderstood Relationship Between Declining Mortality and Increasing Racial and Socioeconomic Disparities in Mortality Rates, presented at the conference "Making a Difference: Is the Health Gap Widening?" sponsored by the Norwegian National Institute of Public Health, Oslo Norway, May 14, 2001.

Abstract: http://www.jpscanlan.com/images/OSLO_ABSTRACT.pdf

PowerPoint presentation: http://www.jpscanlan.com/images/Oslo_presentation.ppt

30. The Misinterpretation of Health Inequalities in Nordic Countries, presented at: 5th Nordic Health Promotion Research Conference, Esbjerg, Denmark, June 15-17, 2006.

Abstract: http://www.jpscanlan.com/images/Abstract_-_Misinterpretation_of_Nordic_Health_Inequalities.pdf

Oral presentation: http://www.jpscanlan.com/images/Esbjerg_Oral.pdf

31. Explanation for large health inequalities in Nordic countries (responding to Hemmingsson T, Lundberg I. Can large relative mortality differences between socioeconomic groups among Swedish men be explained by risk indicator-associated social mobility? Eur J Public Health

200515:518 -522):. Eur J Public Health. Nov. 1, 2006:
<http://eurpub.oxfordjournals.org/cgi/eletters/15/5/518#22>

32. Why we should expect Nordic countries to show large relative socioeconomic inequalities in mortality. Lancet Oct. 7, 2006 (responding to Wilkinson R. The politics of health. Lancet 2006;368:1229-1230):

<http://www.thelancet.com/journals/lancet/article/PIIS0140673606695019/comments?action=view&totalComments=1>

33. Houweling TAJ, Kunst AE, Huisman M, Mackenbach JP. Using relative and absolute measures for monitoring health inequalities: experiences from cross-national analyses on maternal and child health. International Journal for Equity in Health 2007;6:15:

<http://www.equityhealthj.com/content/6/1/1533>.

34. Comparing the size of inequalities in dichotomous measures in light of the standard correlations between such measures and the prevalence of an outcome. Journal Review Jan. 14, 2008, responding to Boström G, Rosén M. Measuring social inequalities in health – politics or science? Scan J Public Health 2003;31:211-215:

http://www.journalreview.org/view_pubmed_article.php?pmid=12850975&specialty_id=

(version with properly formatted tables:

http://www.jpscanlan.com/images/Bostrom_and_Rosen_Comment.pdf)

35. Reconsidering a landmark study. Lancet Feb. 25, 2008 (responding to Mackenbach, JP, Kunst, AE, Cavelaars, et al. Socioeconomic inequalities in morbidity and mortality in western Europe, Lancet 1997; 349: 1655-59):

<http://www.thelancet.com/journals/lancet/article/PIIS0140673696072261/comments?action=view&totalComments=1>

36. Comparing health inequalities across time and place with an understanding of the usual correlations between various measures of difference and overall prevalences. Journal Review Jan. 30, 2008, responding to Moser K, Frost C, Leon D. Comparing health inequalities across time and place—rate ratios and rate differences lead to different conclusions: analysis of cross-sectional data from 22 countries 1991–200. Int J Epidemiol 2007;36:1285-1291:

http://www.journalreview.org/view_pubmed_article.php?pmid=17898027&specialty_id=0

Attachments:

Corrected links

16. http://jpscanlan.com/images/Schulman_NEJM_1999.pdf
- 16b. http://jpscanlan.com/images/Werner_Circulation_2005.pdf
16. c http://jpscanlan.com/images/Casalino_Health_Affairs_2007.pdf
17. http://jpscanlan.com/images/Vaccarino_NEJM_2005.pdf
19. http://jpscanlan.com/images/Gan_NEJM_2000.pdf
20. http://jpscanlan.com/images/Sequist_Archives_Int_Med_2006.pdf
21. http://jpscanlan.com/images/Trivedi_JAMA_2006.pdf
22. http://jpscanlan.com/images/Aaron_Clancy_JAMA_2003.pdf
23. http://jpscanlan.com/images/Moser_IJE_2007.pdf
27. http://jpscanlan.com/images/Escarce_McGuire_2004.pdf
32. http://jpscanlan.com/images/Wilkinson_Lancet_2006_Nordic_.pdf
35. http://jpscanlan.com/images/Mackenbach_Lancet_1997.pdf
36. http://jpscanlan.com/images/Moser_IJE_2007.pdf