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lagakos@biostat.harvard.edu, ware@hsph.harvard.edu

Cc:

Date: Thursday, May 07, 2009 06:06 pm

Subject: NEJM statistical issues

Certain of the references in this email are to online comments on Journal Review, which has ceased to exist. 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:

This follows on the notes I sent you in March 2008 regarding some statistical issues and their relevance to publications in the *New England Journal of Medicine* particularly with regard to health disparities. I add here a few points partly about subsequent developments.

1. Subgroup Effects.

I am familiar with the work of Drs. Lagakos and Ware cautioning against the overinterpretation of statistically significant subgroup effects. A corollary to the main point that I write about – that the rarer an outcome, the greater tends to be the relative difference in experiencing it and the smaller tends to be the relative difference in avoiding it – is that, solely for statistical reasons a factor that similarly affects two groups will show different proportionate changes in the rates of groups with different baseline rates. More specifically, a factor that reduces an adverse outcome will tend to show a proportionately greater reduction in the outcome for the group with the lower base rate (though a larger proportionate increase in the favorable outcome for the other groups). In other words, what seem to be differential subgroup effects may simply be statistically driven consequence of the different base rates (though that still leaves unaddressed the clinical implications of observed differences).

Preparatory to addressing this issue more fully at the August 2009 JSM I have created a web page sketching the issue. It may be found as the Subgroup Effects/Interaction sub-page of the Scanlan's Rule page of jpscanlan.com or directly at:
<http://www.jpscanlan.com/scanlansrule/subgroupeffects.html>

Probably before the JSM, I will publish a comment on one NEJM article that bears on this points I'll be making (item 1 after the signature). In any event, in light of the attention you have given to the area of subgroup effects, I hope you will find the sketch of some interest.

2. Times Greater Issues.

For some years I have been troubled by the way, say, where one group's rate is 9% and the other group's rate is 3%, observers will state that the former rate is 3 times greater (or 3 times higher) than the latter – rather than 3 times as great (or 2 times greater). Recently, I started to look at the matter systematically and was surprised at the extent to which the incorrect usage predominates in the major American and European scientific journals – with the sole exception being the NEJM. I recently created a web page on this issue – the Times Higher Issues sub-page of page of the Vignettes page of jpscanlan.com, accessible directly at:
<http://www.jpscanlan.com/vignettes/timeshigherissues.html>

I think that you will find the information in Tables 2-4 interesting. The puzzling question to me is, given that the NEJM has obviously given thought to this usage issue and over the last decade has endeavored to do things correctly, why it ever allows the incorrect usage.

3. Mackenbach et al. article.

So far as I am aware, the NEJM has published only one health disparities article since my notes of March 2008 (along with a commentary on the article). The article (item 2 after the signature) is by co-authors of reference 33 in my earlier note (item 3 below), which in my note I had described as an instance where the leading European authorities on the measurement of health disparities had somewhat grudgingly recognized that overall prevalence must be taken into account in an effort to appraise the size of health disparities and which recognition I maintained called the authors' previous work into question. Item 2 is thus curious. For while their work in item 3 calls the reasoning of item 2 seriously into question, the authors do not cite item 3 or even show an awareness of the things item 3 indicated they understood. I just published an on-line comment on item 2, addressing the main problem with its failure to recognize the role of prevalence that its authors previously, and addressing some flaws in its reasoning as to secondary points. See item 4.

4. Scanlan's Rule.

As discussed in item 4 and on the Scanlan's Rule page of jpscanlan.com, researchers in the UK recently referred to the statistical tendency I have been writing about since 1987 as Scanlan's rule. Happy enough with that usage, I have created the Scanlan's rule page to address the nuances of the tendency. In doing so, and addressing also the effects of overall prevalence on absolute differences between rates, I modified somewhat my the treatment of such effects from that in a comment on a NEJM article (reference 17 in the earlier letter and reference 5 below) and certain other places. I think it important to keep track of the places where I have stated something that may be incorrect and eventually I shall make an adjustment to that comment. Further, however, the recent recognition of Scanlan's rule increases somewhat the likelihood that my reasoning in this area will eventually be universally accepted. And if that reasoning is to be eventually accepted, it is better that that occur sooner rather than later and better that less flawed research is published in the meantime.

5. Solutions.

I regard the ideas I have expressed about the effects of overall prevalence on measures of differences between rates to be quite important, since they call into question virtually all research into health inequalities and much other research as well. At the end of my prior note, I discussed a method of avoiding the problems with standard measures, though I stated that issues as to the utility of the approach were of minor significance to the main point of my note. Since sending that note, however, I have become increasingly persuaded that the approach I discussed there – or something closely akin to it – is the only sound way to appraise the size of differences between rates of experiencing an outcome. Thus, the approach may be just as important as the work in undermining standard ways of measuring differences between rates. In any event, in addition to giving several presentations on the approach at conferences here and in Europe and posting a number of on-line comments applying the approach, I have created a web page devoted to the approach. Such page is the Solutions sub-page to the Measuring Health Disparities page of jpscanlan.com (directly accessible at:

<http://www.jpscanlan.com/measuringhealthdisp/solutions.html>). I have also created and posted a downloadable database enabling one to implement that approach. See Solutions Database sub-page to the Measuring Health Disparities page of jpscanlan.com (directly accessible at: <http://www.jpscanlan.com/measuringhealthdisp/solutionsdatabase.html>)

Best regards,
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1. Haimon CA, Stram DO, Wilkens LR, et al. Ethnic and racial differences in the smoking related risk of lung cancer. *N Engl J Med* 2006;354:333-42.
2. Mackenbach JP, Stirbu I, Roskam AJ, et al. Socioeconomic inequalities in health in 22 European countries. *N Engl J Med* 2008;358:2468-2481.
3. 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/6/1/15>
4. Scanlan JP. Measurement lessons learned, then forgotten. *Journal Review* May 6, 2009:
<http://journalreview.org/v2/articles/view/18525043.html>
5. Scanlan JP. 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

Attachments:

4. http://jpscanlan.com/images/Comment_on_Mackenbach.pdf
5. http://jpscanlan.com/images/Vaccarino_NEJM_2005.pdf