Recognizing the role of the prevalence of an outcome in comparing the size of relative differences in experiencing or failing to experience the outcome.

The results of the study by Gan et al.[1] of differences between rates at which men and women received certain types of treatment for acute myocardial infarction need to be appraised with a recognition of the statistical tendency whereby the rarer an outcome, the greater the relative difference between rates of experiencing the outcome and the smaller the relative difference between rates of avoiding the outcome.[2-5] For example, one of the study's most notable finding is that relative differences between male and female rates of cardiac catheterization increase with age. But this is to be expected simply because of the overall rates of cardiac catheterization decline with age. One would expect as well that the relative differences between rates of failing to receive cardiac catheterization would decline with age. One will in fact find such a pattern in Table 3 of the study. For example, in the two youngest age groups, where the female-male unadjusted relative risks of cardiac catheterization are .93 and .91 (adjusted to .94 and .91), the female-male unadjusted relative risks of not receiving cardiac catheterization are approximately 1.11; for the oldest age group, where the unadjusted relative risk of cardiac catheterization is .72 (adjusted to .75), the relative risk of not receiving cardiac catheterization is 1.03.

Further, in concluding that gender differences were smaller for treatments other than cardiac catheterization, the authors overlooked that the relative differences would tend to smaller for such treatments simply because they were more common than cardiac catheterization. Table 3 also shows that, at least for the three most common of those procedures, the unadjusted relative risks of failing to receive the treatment were greater than any of the relative risks of failing to receive cardiac catheterization.

Thus, even allowing that the referenced tendencies do not comprise the entire story (and that, like the adjusted relative differences in receiving the treatments, the adjusted relative difference in failure to receive the procedure would be smaller than the unadjusted differences), any conclusion that certain of the disparities were larger than others based on relative difference in rates of receiving the treatment are suspect, just as would be the opposite conclusions based on the sizes of relative differences in failure to receive such procedures. It warrants note, moreover, that the National Center for Health Statistics (NCHS)) has recommended that all health disparities, including disparities in receipt of beneficial procedures, be measured in terms of relative differences in adverse outcomes (i.e., in the case of beneficial procedures, rates of failing to receive the procedures)[6-8] If such recommendations were followed, most of the conclusions of Gan et al. concerning the comparative size of differences would be the opposite of what they are. The NCHS recommendations are unsound, however, among other reasons, for the failure to recognize that relative differences in the rates of receiving a treatment and failing to

receive a treatment tend to vary systematically in opposite directions depending on the prevalence the treatment.[2-3]

Finally, in endeavoring to eliminate confounding factors, the authors restricted their analyses to patients considered ideal candidates for the treatment analyzed. This may indeed have been a useful way of reducing the role of confounding factors. But it needs to be recognized that such restriction leads to higher treatment rates than found in other populations, and that higher rates typically would lead to smaller relative differences in rates of receiving a treatment though larger relative differences in rates of failing to receive a treatment. Such tendency would have to be borne mind in any effort to compare the sizes of differences observed in this study with those observed in studies that did not similarly restrict the population analyzed.

References:

1. 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.

2. 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

3. Scanlan JP. Measuring health disparities. J Public Health Manag Pract 2006;12(3):294 [Lttr]: http://www.nursingcenter.com/library/JournalArticle.asp?Article_ID=641470

4. Scanlan JP. Race and Mortality. Society 2000;37(2):19-35: http://www.jpscanlan.com/images/Race_and_Mortality.pdf

5. Scanlan JP. Divining difference. Chance1994;7(4):38-9,48: http://jpscanlan.com/images/Divining_Difference.pdf

6. Keppel KG, Pearcy 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/series/sr_02/sr02_141.pdf

7. Keppel KG, Pamuk E, Lynch J, et al. Methodological issues in measuring health disparities. Vital and health statistics. Series 2. No. 141. Washington, D.C.: Government Printing Office, 2005. (DHHS publication no. (PHS) 2005-1341.): http://www.cdc.gov/nchs/data/series/sr_02/sr02_141.pdf

8. Keppel, KG, Pearcy JN. Measuring health disparities in terms of adverse outcomes. J Public Health Management Practice. 2005:11(6): 479-83.