Understanding social gradients in adverse health outcomes within high and low risk populations. J Epidemiol Community Health May 18, 2006 (responding to Lynch J, Davey Smith G, Harper S, Bainbridge K. Explaining the social gradient in coronary heart disease: comparing relative and absolute risk approaches. J Epidemiol Community Health 2006:60:436-441 (which may be found here).

This item was originally available on the by mean of this link. But revisions to the jech.bmj.com website made it no longer available. A 2009 follow-up comment titled "Effects of Standard Adjustment Approaches on Relative and Absolute Inequalities," may be found here. It discusses differences in result depending on whether adjustments for characteristics attribute one subgroup's risk profile to the other subgroup or attribute the risk profile of the total population to each subgroup.]

Understanding Social Gradients in Adverse Health Outcomes Within High and Low Risk Populations.

In seeking to resolve the seeming paradox whereby risk factors have been found to account for a very high proportion of coronary heart disease (CHD) but only a small part of the social gradient in CHD, Lynch et al. present the CHD rates among groups with different levels of education both for a population at large and for the part of that population without any risk factors.1 Comparing the large difference between absolute educational inequalities in CHD in the two populations with the small difference between relative educational inequalities in CHD in the two populations, the authors conclude that the proportion of educational inequalities in CHD accounted for by risk factors turns on whether one examines absolute or relative inequalities.

Yet, while the CHD rates of advantaged and disadvantaged groups in a population without risk factors do reflect what the rates for such groups would be in the entire population if there were no risk factors at all, that is a different thing from what the rates of disadvantaged and advantaged groups would be if disadvantaged groups had the same risk distributions as advantaged groups. It is the difference between the latter rates that standard adjustments for risk factors generally seek to show, and it is on the basis of such adjustments that one appraises the role of risk factors in explaining differences among groups. Lynch et al. describe their illustration as artificial because it would not be possible to eliminate all risk factors. But in fact the illustration is simply something different from the standard examination of the consequences of different risk profiles among different groups. And, while various approaches to such an adjustment yield somewhat different results, the information in Table 2 of the study allows one to calculate that, if the lowest education group had the same risk profile as the highest educated group, the CHD rate for the lowest education group in the entire population would be reduced from 194 per thousand to 177.4 per thousand. With a rate of 106 per thousand for the highest education group, this means that the excess absolute risk would be reduced from 88 per thousand to 71.4 per thousand, and the excess relative risk would be reduced from .830 to .674 – the same 19% percent reduction for each measure.

The authors are correct, however, in their view that reducing risk factors has much greater impact in terms of reducing absolute inequalities in CHD rates than in reducing relative inequalities, and their concern that the reduction pattern they observe might be peculiar to the

studied population is unwarranted. For what they have identified is the near inevitable consequence or reductions in risk factors with regard to relative and absolute differences between the rates at which advantaged and disadvantaged groups experience some adverse outcome.

By and large, the rarer an outcome, the greater the relative difference in experiencing it (though the smaller the relative difference in avoiding it).2,3,4,5. Because populations with few or no risk factors generally have low rates of adverse outcomes, such populations will tend to show large relative socioeconomic differences in experiencing those outcomes. The size of such differences typically will be comparable to or greater than the size of such differences within high risk populations, even when the socioeconomic variation among measures like average income and average education are smaller in the low risk population than in the high risk population. Depending on the differing distributions of advantaged and disadvantaged groups across risk levels, the relative socioeconomic difference in experiencing an adverse outcome within the low risk population can be larger or smaller than the relative difference in the population at large, though infrequently will it be dramatically lower. A good example may be found in studies of differences between black and white infant mortality rates in the United States broken down by education of mother. One study showed that relative racial differences were greater among infants of mothers with higher education (where overall rates were low) than among infants of mothers with lower education (where overall rates were higher).6 Another study showed relative racial differences solely among college-educated mothers (where overall rates were low) that were very close to those among the population at large (where overall rates were higher) and that may have in fact been larger than the relative racial differences among infants born to mothers with less education (where overall rates were higher than among the population at large).3,7. While in those settings education reflects the differing risk levels and race is the factor distinguishing the demographic groups being compared, the pattern will be the same when something like smoking is the risk factor and education is the factor distinguishing the demographic groups.

In any event, there is little reason to expect relative socioeconomic differences in experiencing adverse health outcomes to be substantially smaller within a low risk population than in the population at large. On the other hand, low risk populations, having low rates of experiencing adverse outcomes, tend to show much smaller absolute differences between rates of advantaged and disadvantaged groups than in the population at large. For, even when the relative differences are large, such differences translate into small absolute differences.

While the focus of Lynch et al. is on the reduction of risks among the disadvantaged, the consequences they show are simply the usual result of reducing risk factors, and, correspondingly, adverse outcomes, throughout society. For example, by and large, as mortality declines, relative differences in mortality rates increase while absolute differences tend to decline.2-5. Whether these changes are more than or less than the standard consequences of declining mortality, and hence may reflect some true change in the relative situation of disadvantaged groups with respect to the outcome, must be evaluated with an understanding of those consequences.

References

1. Lynch J, Davey Smith G, Harper S, Bainbridge K. Explaining the social gradient in coronary heart disease: comparing relative and absolute risk approaches. J Epidemiol Community Health 2006:60:436-441.

1. Scanlan JP. Can we actually measure health disparities? Chance. 2006:19(2): ____ (in press).

2. 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).

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

4. Scanlan JP. Divining difference. Chance. 1994;7(4):38-9, 48.

5. Singh GK, Yu SM. Infant mortality in the United States: trends, differentials and projections, 1950 through 2010. Am J Public Health. 1995;85:957-64.

6. Schoendorf KC, Hogue CJR, Kleinman JC, Rowley D. Mortalilty among infants of black as compared with white college-educated parents. N Engl J Med 1992;326:1522-6.