Effects of standard adjustment approaches on relative and absolute inequalities. *J Epidemiol and Community Health* Nov. 2, 2009 (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): http://jech.BMJ.com/cgi/eletters/60/5/436

[The material below could originally be found on the link indicated above. But such comments are apparently no longer maintained on the Journal of Epidemilogy and Community Health website. Brackets indicate correction. I am not sure whether the comment reflected the title above or that below. A PDF of the Lynch et al. article may be found here: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2563981/]

Circumstances where even standard adjustment approaches may yield different reductions in relative and absolute inequalities[.]

In an earlier comment [1] on the article by Lynch et al.,[2] I pointed out that the authors' findings of different contributions of risk factors to relative and absolute inequalities in CHD rates were functions of the fact that the authors studied the effects of the elimination of risk factors rather the effects of adjusting for the implications of differing risk profiles in different education groups. In making this point, I noted that "while various approaches to such an adjustment yield somewhat different results," information available in the Lynch article showed that an adjustment that attributed the risk profile of the highest education group to the lowest education group yielded exactly the same 19% percent reduction of relative and absolute inequalities in CHD. The quoted language was meant merely to suggest that the percentage reductions in the two inequalities effected by one adjustment method might differ from those effected by another method. The intended implication, however, was that under any standard approach to adjustment for risk factors, the percentage reduction of the relative difference between rates would be the same as the percentage reduction of the absolute difference between rates.

In a comment in a different forum on another article that had made an argument similar to that in Lynch et al.,[3] I pointed out that adjusting for differing risk profiles by attributing the advantaged group's risk profile to the disadvantaged group and by attributing the disadvantaged group's risk profile to the advantaged group, while yielding somewhat different results, yield exactly the same percentage reduction in the absolute difference between rates that they yield for the relative difference between rates. There, too, the point was the all standard adjustment techniques yield the same percentage reductions in relative and absolute differences between rates. But the point is not correct.

In a 2008 article in *Epidemiology*, Singh-Manoux et al.[4] addressed the article by Lynch et al., making points similar to those in my comment on Lynch et al.. They also explained that adjusting for risk factors by attributing the risk profile of the advantaged group to the disadvantaged group yields exactly the same percentage reductions of relative and absolute risk differences. But the authors' main adjustment approach (which they applied to data from the Whitehall II study) involved attributing the risk profile of the entire population both to the

advantaged and to the disadvantaged groups. Such approach yielded similar percentage reductions in relative and absolute differences.

The authors' point was that standard approaches to adjustment yielded similar percentage reductions in relative and absolute inequalities and that the findings by Lynch et al. of substantially different percentage reductions in relative and absolute inequalities were the consequence of addressing a different question from that addressed by standard approaches to adjustment for risk factors. But the fact is that Singh-Manoux et al. found only similar, not identical, percentage reductions in relative and absolute differences.

Thus, whereas adjusting for risk factors either by attributing the advantaged group's risk profile to the disadvantaged group or by attributing the disadvantaged group's risk profile to the advantaged group yields exactly the same percentage reductions in relative and absolute differences between rates, adjusting for risk factors by attributing the entire population's risk profile to both groups apparently does not. Further, while Singh-Manoux et al. seem to read their results as indicating that adjusting for risk factors in such a manner typically will yield similar reductions in relative and absolute differences, that will not necessarily be the case. Singh-Manoux et al. examined a setting where 29,121 person years were analysed for the advantaged group but only 3,387 person years were analyzed for the disadvantaged group. Hence, the risk profile of the entire population that underlay the authors' adjustment approach was based on a population that was almost entirely (94.7%) comprised of the advantaged group. In such circumstances, adjusting according to the risk profile of the entire population will tend to yield results that are little different from adjusting according to the advantaged group's profile – both with respect to the size of the reduction generally and with respect to the extent to which the percentage reductions in the relative and absolute differences are similar. Neither of these patterns will necessarily hold when the disadvantaged group comprises a much larger proportion of the entire population than was the case in the Singh-Manoux study.

The fact that adjustment according [to] the risk profile of the entire population can yield different relative and absolute risk reductions would seem to militate against use of that adjustment approach – even though, as I have discussed in reference 5 and many other places, both relative and absolute differences between rates are problematic measures of the size of inequalities since each is affected by the overall prevalence of an outcome. The fact that, whatever the measure of inequality, the relative size of the groups being compared may generally affect the size of an adjustment for differing risk profiles would seem even more strongly to militate against that approach. Further, an important reason society is interested in learning the contribution of differing risk factors to health inequalities is to assess the impact of efforts to bring the disadvantaged group's risk profile into line with the advantaged group's risk profile. There is no similarly practical purpose in learning the implications of causing the advantaged group's risk profile to worsen at the same time that the disadvantaged group's risk profile improves, since no society would undertake to do so.

At any rate, the suggestion in my earlier comment that any standard approach to adjustment for risk factors will yield the same percentage change in the relative difference between rates that it yields for the absolute difference between rates is not correct.

References:

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3. Scanlan JP. Study shows different adjustment approaches rather than different relative and absolute perspectives. *Journal Review* May 1, 2008 (responding to Khang YH, Lynch JW, Jung-Choi K, Cho HJ. Explaining age-specific inequalities in mortality from all causes, cardiovascular disease and ischaemic heart disease among South Korean public servants: relative and absolute perspectives. *Heart* 2008;94:75-82):http://journalreview.org/v2/articles/view/17591645.html

4. Singh-Manoux A, Nabi H, Shipley M, et al. The role of conventional risk factors in explaining social inequalities in coronary heart disease – the relative and absolute approaches. *Epidemiology* 2008;19:599-605

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