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Understanding widening socioeconomic differences in child mortality

The article by Singh and Kogan[1] on widening socioeconomic inequalities in child mortality overlooks the statistical tendency whereby the rarer an outcome, the greater the relative difference between rates of experiencing it and the smaller the relative difference between rates of avoiding it.[2-6] In the abstract and the beginning of the text of the article the authors observe that inequalities in child mortality have increased despite overall declines in child mortality. Yet, as mortality declines, one should expect relative differences in mortality rates usually to increase (though relative differences in survival rates to decline). But neither pattern necessarily indicates a meaningful worsening (or improvement) of the relative situation of lower socioeconomic groups. Similarly, the authors several times note that declines in child mortality have been greater for higher socioeconomic groups. But that is simply a corollary to the tendency just described. Whenever an outcome declines, the group with the lower base rate tends to experience a greater relative decline in its rate of experiencing the outcome, though a smaller relative increase in rates of avoiding the outcome.[4,5]

Thus, it should be no surprise that Figure 1 shows that, in the case of injury deaths, which consistently declined during the period examined, relative socioeconomic differences in mortality consistently increased. Similarly, it is understandable that Figure 1 also shows that in the case of homicides, which often increased during the period, the relative socioeconomic difference in mortality often declined.

The statistical tendency at work is of sufficient force that even programs that seem particularly beneficial to disadvantaged groups often will increase relative differences in experiencing adverse outcome. An article appearing The American Journal of Public Health in 2005 is illustrative. Pickett et al.[7] examined changes in socioeconomic differences in rates of Sudden Infant Death Syndrome (SIDS) in the United States as a result of a program of educating the public about the advantages of having infants sleep on their backs. The program was deemed by the authors as one that should reduce socioeconomic disparities in SIDS rates since there would be few barriers to universal implementation of the recommendations. Contrary to the authors' expectation, the study found that, while SIDS decreased substantially for all socioeconomic groups, socioeconomic differences in SIDS rates increased. In fact, however, the increase in those differences was pretty much what one should expect as the result of a successful program like this that increasingly restricted avoidable SIDS mortality to the very most disadvantaged segments of the population.

The described statistical tendency also underlies certain other patterns identified by Singh and Kogan. They note, and illustrate in Table 2, that the socioeconomic gradient for child mortality is greater among whites than among blacks. But this is to be expected simply because whites have lower child mortality rates than blacks, just as, for example, we observe greater relative differences between poverty rates of single-parent and married-

couple families among whites (where poverty is lower) than among blacks (where poverty is higher) – though relative differences in avoiding poverty are smaller among whites than among blacks.[6] Presumably, the underlying data tables (which apparently are not yet online) will show that socioeconomic differences in survival rates are greater among blacks than among whites. Similarly, one would expect to observe greater racial differences in child mortality (though smaller racial differences in survival rates) among higher socioeconomic groups (where mortality is lower). Both of these sets of expected patterns - i.e., socioeconomic differences within racial groups and racial differences within socioeconomic groups – can be observed with respect to infant mortality (with education as the socioeconomic indicator) in a prior work by Singh (with Yu) that appeared in 1995.[8]

This is not to say that there have been no meaningful changes in socioeconomic disparities in child mortality. But it is not possible to identify such changes without recognizing the tendencies described above and attempting to take them into account. Effectively taking those tendencies into account, however, is a difficult thing to do. Moreover, there does not appear to be an alternative approach to measuring disparities in binary variables like mortality that avoids similar problems.[2,3] The same holds for other efforts to appraise the sizes of disparities in different settings when the overall prevalence of an outcome varies from setting to setting.

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