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ELECTRONICALLY TRANSMITTED

David B. Grusky, Director
Members of the Internal and External Boards
Senior Editors and Members of the Editorial Board of *Pathways*
Center on Poverty and Inequality
Stanford University
Building 370, 450 Serra Mall
Stanford, CA 94305

Re: Methodological Problems in the Stanford Center on Poverty and
Inequality *Poverty and Inequality Reports*

Dear Director Grusky, Members of the Internal and External Boards, and Senior Editors and
Members of the Editorial Board of *Pathways*:

For some weeks I have had a partial draft of a lengthy letter to the Stanford Center on
Poverty and Inequality regarding methodological problems in the 2014 and 2015 *Poverty and
Inequality Reports*. Both reports crucially suffer from failure to recognize patterns by which
measures of differences between outcome rates tend to be systematically affected by the
prevalence of an outcome. These include the pattern whereby the rarer an outcome the greater
tends to be the relative differences in experiencing it and the smaller tends to be the relative
difference in avoiding it, as well as the more complicated pattern by which absolute differences
between rates tend to be affected by the prevalence of an outcome. See my "[Race and Mortality
Revisited](#),"¹ *Society* (July/Aug. 2014) and my October 8, 2015 letter to the [American Statistical
Association](#) (ASA) for fairly comprehensive discussions of the pertinent issues. Succinct
treatments of key points, though focused on civil rights law enforcement issues rather than the
types of issues addressed in the Stanford reports and giving no or limited attention to absolute
difference issues, may be found in my "[Misunderstanding of Statistics Leads to Misguided Law
Enforcement Policies](#)," *Amstat News* (Dec. 2012), "[Things government doesn't know about](#)

¹ To facilitate consideration of issues raised in letters such as this I include links to referenced materials in electronic
copies of the letters. Electronic copies are available by means of the [Institutional Correspondence](#) subpage of the
[Measuring Health Disparities](#) page of jpscanlan.com and recent ones are posted on the ASA Connect portion of the
American Statistical Association website. In this case, electronic copies of the letter are being emailed to recipients.

[racial disparities](#),” *The Hill* (Jan. 28, 2014), and “[Things DoJ doesn’t know about racial disparities in Ferguson](#),” *The Hill* (Feb. 22, 2016).²

Yesterday, I discovered the recently-issued 2016 *Poverty and Inequality Report* titled “[State of the Union](#).” The issuance of that report caused me to recognize that the Center may be issuing a variety of materials to which the statistical issues I raise are pertinent before I actually complete the planned letter. Therefore, I have decided immediately to send this short letter outlining certain crucial issues without at this time detailing each problem in the 2014 and 2015 reports.³

² Numerous graphical and tabular illustrations of the pertinent patterns may be found in the following methods workshops at American universities: “[The Mismeasure of Health Disparities in Massachusetts and Less Affluent Places](#),” Department of Quantitative Health Sciences, University of Massachusetts Medical School (Nov. 18, 2015); “[The Mismeasure of Discrimination](#),” Center for Demographic and Social Analysis, University of California, Irvine (Jan. 20, 2015); “[The Mismeasure of Demographic Differences in Outcome Rates](#)” Public Sociology Association of George Mason University (Oct. 18, 2014); “[Rethinking the Measurement of Demographic Differences in Outcome Rates](#),” Maryland Population Research Center of the University of Maryland (Oct. 10, 2014); “[The Mismeasure of Association: The Unsoundness of the Rate Ratio and Other Measures That Are Affected by the Prevalence of an Outcome](#),” Minnesota Population Center and Division of Epidemiology and Community Health of the School of Public Health of the University of Minnesota (Sept. 5, 2014); “[The Mismeasure of Group Differences in the Law and the Social and Medical Sciences](#),” Institute for Quantitative Social Science at Harvard University (Oct. 17, 2012); “[The Mismeasure of Group Differences in the Law and the Social and Medical Sciences](#),” Department of Mathematics and Statistics of American University (Sept. 25, 2012).

³ The letter to ASA, like a September 8, 2015 letter the [Chief Data Scientist of White House Office of Science and Technology Policy](#), in addition to suggesting that the organization form a committee to address the range of shortcomings in standard analyses of demographic differences in outcome rates, urges ASA to explain to the federal government that, contrary to the belief underlying many federal civil rights enforcement policies, reducing the frequency of an adverse outcome will tend to (a) increase relative differences in rates at which advantaged and disadvantaged groups experience the outcome and (b) increase the proportion more susceptible groups make up of persons experiencing the outcome. The instant letter and any longer counterpart are better compared to the letters to the following institutions or organizations regarding problems in analyses of demographic difference that the recipients conduct or provide guidance on or that otherwise pertain to the recipients’ activities: [Robert Wood Johnson Foundation](#) (Apr. 8, 2009), [National Quality Forum](#) (Oct. 22, 2009), [Institute of Medicine](#) (June 1, 2010), [The Commonwealth Fund](#) (June 1, 2010), [United States Department of Education](#) (Apr. 18, 2012), [United States Department of Justice](#) (Apr. 23, 2012), [Board of Governors of the Federal Reserve System](#) (Mar. 4, 2013), [Harvard University](#) (Oct. 9, 2012), [Harvard Medical School, Massachusetts General Hospital, et al.](#) (Oct. 26, 2012), [Senate Committee on Health, Education, Labor and Pensions](#) (Apr. 1, 2013), [Mailman School of Public Health of Columbia University](#) (May 24, 2013), [Investigations and Oversight Subcommittee of House Finance Committee](#) (Dec. 4, 2013), [Education Trust](#) (April 30, 2014), [Annie E. Casey Foundation](#) (May 13, 2014), [Institute of Medicine II](#) (May 28, 2014), [IDEA Data Center](#) (Aug. 11, 2014), [Education Law Center](#) (Aug. 14, 2014), [Financial Markets and Community Investment Program, Government Accountability Office](#) (Sept. 9, 2014), [Wisconsin Council on Families and Children’s Race to Equity Project](#) (Dec. 23, 2014), [Portland, Oregon Board of Education](#) (Feb. 25, 2015), [Vermont Senate Committee on Education](#) (Feb. 26, 2015), [United States Department of Justice and City of Ferguson, Missouri](#) (Mar. 9, 2015), [Senate Committee on Health, Education, Labor and Pensions II](#) (Mar. 20, 2015), [Texas Appleseed](#) (Apr. 7, 2015), [City of Minneapolis, Minnesota](#) (June 8, 2015), [Agency for Healthcare Research and Quality](#) (July 1, 2015), [Department of Health and Human Services and Department of Education](#) (Aug. 24, 2015), [McKinney, Texas Independent School District](#) (Aug. 31, 2015), [House Judiciary Committee](#) (Oct. 19, 2015), [Boston Lawyers’ Committee for Civil Rights and Economic Justice](#) (Nov. 12, 2015), [Houston Independent School District](#) (Jan. 5, 2016), [City of Boulder, Colorado](#) (Mar. 5, 2015).

As with the great majority of analyses of demographic differences in outcome rates, all efforts to appraise the comparative size of differences in outcome rates, and changes in disparities concerning outcome rates over time, in the 2014 and 2015 *Poverty and Inequality Reports* have been undermined by a failure to recognize patterns by which the measures employed in the reports tend to be affected by the prevalence of the outcome. A cursory examination of the 2016 report leads me to believe that it contains the same problems as the earlier reports, though it seems to give less attention to outcomes rates than the earlier reports.

All three reports are matters of special interest to me for one reason, and the Health section of the 2015 report is a matter of special interest to me for another reason. The three reports are of special interest to me for the following reason. Though the matter does not appear to be reflected in the sections of the reports authored by Stanford Professor Sean Reardon, Professor Reardon and his colleague Harvard Professor Andrew Ho are among the few people who have independently recognized patterns by which measures of differences between outcome rates tend to be affected by the prevalence of an outcome or the implications of those patterns regarding the appraisal of demographic differences. Figure 2 (at 353) of Professor Ho's 2008 paper⁴ is conceptually comparable to Table 5 (at 335) of "Race and Mortality Revisited" and Table 5 (at 22) of the ASA letter and is essentially the same thing as Figure 2 (at 21) of the ASA letter with respect to demonstrating the effects of the prevalence of an outcome on measures of differences between outcome rates. See also Table 1 (at 21) and Figure 4 (at 24) of my 2006 British Society for Population Studies paper "[The Misinterpretation of Health Inequalities in the United Kingdom](#)."⁵ Further, technical nuances aside, the reasoning of the 2012 paper co-authored by Professors Ho and Reardon cited at page 45 of the 2015 report⁶ is consistent with my reasoning reflected in "Race and Mortality Revisited," the ASA letter, and numerous other works.

Thus, I urge you to carefully address with Professor Reardon the issues raised in "Race and Mortality Revisited" and the ASA letter with a focus on whether, after due consideration, he

⁴ Ho, Andrew D. 2008. "[The problem with 'proficiency': Limitations of statistics and policy under No Child Left Behind](#)," *Educational Researcher*, 37,351–360.

⁵ While Professor Ho's Figure 2 merely tracks absolute differences at different cut points, from those differences and Dr. Ho's specification one may derive the underlying rates for each group, which then provide a basis for deriving the rate ratios for favorable and adverse outcomes and the odds ratios shown in the referenced tables. Illustrations of patterns absolute similar to those identified by Professor Ho on the basis of hypothetical test score data may also be found in Figure 4 (at 50) of my "[Can We Actually Measure Health Disparities?](#)," *Chance* (Spring 2006) (based on income data) and in Figure 4 (at 4) of Houweling TAJ, Kunst AE, Huisman M, Mackenbach JP. 2007. "[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* 6:15 (based on cross-national data on various healthcare outcomes).

⁶ Ho, Andrew D., and Reardon, Sean F. 2012. "[Estimating Achievement Gaps From Test Scores Reported in Ordinal 'Proficiency' Categories](#)," *Journal of Educational and Behavioral Statistics*, 37(4), 489–517.

would agree both (a) that standard measures of differences between outcome rates cannot effectively quantify the differences in the circumstances of two groups without consideration of the way each measure tends to be affected by the prevalence of the outcome and (b) that the only effective method of quantifying that difference is to derive from outcome rates an estimation of the relationship between the underlying distributions of factors associated with experiencing or avoiding an outcome.

The focused insight of Professor Reardon could be especially valuable two reasons. First, most observers analyzing demographic differences in outcomes rate do so utterly without recognition of the patterns by which measures tend to be affected by the prevalence of an outcome. Observers relying on a relative difference to appraise such things as changes in health and healthcare disparities over time commonly do so while unaware that it is even possible for the two relative differences to change in opposite as the prevalence of an outcome changes, much less that this will tend to occur systematically. Observers discussing the choice between a relative difference and the absolute difference in appraising a change in disparity over time invariably do so without recognizing that anytime a relative difference and the absolute difference change in opposite directions, the other relative difference will necessarily have changed in the opposite direction of the first relative difference and the same direction as the absolute difference. Second, even observers who have lately recognized patterns by which measures tend to be affected by the prevalence of an outcome commonly rely on those measures without thought to determining the extent to which observed patterns are functions of changes in the prevalence of the outcome and the extent to which the patterns may reflect something significant about underlying processes.⁷ The work of Professor Reardon, in collaboration with Professor Ho, suggests that Professor Reardon should both readily recognize the range of patterns by which measures tend to be affected by the prevalence of an outcome and readily appreciate why demographic differences cannot be usefully analyzed while ignoring those patterns.

In the latter regard, I note that interest in what data on demographic differences indicate about underlying processes is presumably the reason for the title *Pathways* of the journal publishing the *Poverty and Inequality Reports*, and efforts to understand processes driving differences between rates are a distinctive feature of the 2014 and 2015 reports, as in the case of the Health section of the 2015 report.

Regarding my special interest in the Health section of the 2015 report, in order to understand that interest one must understand that in 2004-2005 the National Center for Health Statistics (NCHS) recognized that improvements in health and healthcare tend to increase relative differences in adverse health and healthcare outcomes while reducing relative differences in the corresponding favorable health and healthcare outcomes. But NCHS did not regard such pattern as calling into question the utility of either relative difference for quantifying the difference in the circumstances of advantaged and disadvantaged groups reflected by their

⁷ See Mackenbach JP. 2015. "Should we aim to reduce relative or absolute inequalities in mortality?," *Eur J Pub Health* 25(2):185, and my [Comment](#) thereon.

favorable or adverse outcome rates. Rather, NCHS simply determined that, for purpose of evaluating progress in achieving the health disparities reduction goals of Health People 2010, all health and healthcare disparities would be measured in terms of relative differences in adverse outcomes (meaning, in the cases of healthcare, relative differences in non-receipt of care rather than receipt of care, relative differences in uninsurance rates rather than insurance rates, *etc.*). See "Race and Mortality Revisited" at 331-335. One must also understand that in the summer of 2015, NCHS reversed that recommendation with regard to healthcare, so that, for purposes of evaluating progress in achieving the health disparities reduction goals of Healthy People 2020, healthcare disparities would be measured in terms of relative differences in favorable outcomes. See my August 24, 2015 letter to [Department of Health and Human Services and Department of Education](#) at 12.⁸

The Health section of the 2015 report, consistent with 2004-05 NCHS recommendation, and consistent with approach of the 2007 article by Keppel *et al.*⁹ cited in the 2015 report at 54, discusses all healthcare disparities in terms of relative differences in adverse outcomes. The section also draws inferences about processes on the basis of the comparative size of certain relative differences in adverse outcomes. Such drawing of inferences pointedly highlights the problematic nature of relative differences as a measure of association, given that the comparative size of relative differences in the opposite outcome would commonly support an opposite inference. See "Race and Mortality Revisited" at 339-41.¹⁰

Further, this particular discussion in a report funded by the Department of Health and Human Services highlights the following anomaly resulting from the failure of the federal health

⁸ See also Talih M, Huang D. [Measuring progress toward target attainment and the elimination of health disparities in Healthy People 2020](#). Healthy People Statistical Notes, no 27. Hyattsville, MD: National Center for Health Statistics. 2016.

⁹ Keppel, Kenneth, Linda Bilheimer, and Leda Gurley. 2007. "Improving Population Health and Reducing Health Care Disparities." *Health Affairs*, 26(5), 1281–1292.

¹⁰ At page 50, the report discusses uninsurance issues in the following terms (emphasis added):

But this overall income disparity in coverage [by which the authors mean non-coverage] disguises much variability across states. As shown in Figure 2, low-income individuals in the most equal states were three times more likely than higher-income individuals to be uninsured, whereas low-income individuals in the most unequal states were nearly twelve times more likely than higher income individuals to be uninsured. Notably, some of the smallest income disparities are found in the South and West, where overall non-coverage rates are the highest (cf. Figure 1). *As we shall see, this somewhat counterintuitive pattern occurs for several of our indicators, a result suggesting that higher-income individuals in low-access states cannot exploit the advantage that money tends to provide in other states. The barriers are too large, in other words, for even the relatively well-off to overcome them.*

The highlighted material involves a situation where typically (and very likely in this case, though the underlying data are not shown) one would reach an opposite conclusion if one were examining insurance rates rather than uninsurance rates. That is, high-access states would show smaller relative difference in insurance rates by income than low-access states. See discussion *infra* regarding self-rated health.

disparities research establishment to understand patterns by which measures tend to be affected by the prevalence of an outcome and the implications of those patterns, the consequences of government guidance, or the need to prominently and clearly communicate such guidance along with advice on the implications of the guidance. For, as indicated above, prior to the October 2015 issuance of the Stanford report, NCHS has already reversed its position regarding the measurement of healthcare disparities and was now recommending that they be measured in terms of relative difference in favorable outcomes. This effectively repudiated a decade of *National Healthcare Disparities Reports* issued by the Agency for Healthcare Research and Quality (AHRQ), which had been attempting to measure healthcare disparities in the reports in terms of relative differences in adverse outcomes in accordance with the NCHS recommendation,¹¹ as well as the work of researchers like the authors of the Health section of the 2015 Stanford report who had followed NCHS guidance in analyzing healthcare disparities in terms of relative differences in adverse outcomes. And the 2015 government-funded report was almost certainly (though presumably unknowingly) reaching opposite conclusions from those the government would reach.

Thus, the Health section of the 2015 usefully illustrates the disarray in health disparities research that I discuss at length in "Race and Mortality Revisited," the ASA letter, and many other places. See especially my Federal Committee on Statistical Methodology 2013 Research Conference paper "[Measuring Health and Healthcare Disparities](#)" at 24-32. I emphasize, however, that far more important than the confusion about methods is that none of the methods is sound.

I have not examined the 2016 *Poverty and Inequality Report* in any detail. But I note that it apparently attempts to make cross-country and cross-state comparisons regarding the size of disparities based on relative differences in adverse outcomes. For more than a quarter century I have been pointing out the problems in attempting to make comparisons of the sizes of relative difference in different populations or subpopulations without recognizing that relative differences in adverse outcomes tend to be large, while relative differences in the corresponding favorable outcomes tend to be small, among comparatively advantaged populations/subpopulations (*e.g.*, the countries of Norway and Sweden and the states of Massachusetts and Minnesota, the young, British civil servants, persons with high income and high education, married-couple families, advantaged racial/ethnic groups), where adverse outcome tend to be rare, than among the corresponding comparatively disadvantaged populations/subpopulations where the adverse outcome are more common. In addition to the items mentioned above, see my "[The Perils of Provocative Statistics](#)," *Public Interest* (Winter

¹¹ AHRQ has not always been successful in following NCHS guidance. See the July 1, 2015 letter to [AHRQ](#) regarding the way that confusion over the measurement of disparities caused the agency, on the basis of the comparative size of absolute changes in rates of the groups being compared, to report as some of the largest reductions in healthcare disparities in the 2010 *National Healthcare Disparities Report* situations where the agency would nevertheless find much larger disparities at the end of the period than the beginning of the period. The letter to AHRQ was written before I recognized that NCHS was reversing its recommendation regarding which relative difference one examined in appraising healthcare disparities.

1991), "[Race and Mortality](#)," *Society* (Jan./Feb. 2000), "[Can We Actually Measure Health Disparities?](#)," *Chance* (Spring 2006), my October 9, 2012 letter to [Harvard University](#) (at 16-17), and my 2006 Fifth Nordic Health Promotion Conference presentation "[The Misinterpretation of Health Inequalities in Nordic Countries](#)."¹²

The following statement in the Health section (at 59) particularly caught my attention:

A stark exception to this pattern is Massachusetts, which has a low prevalence of poor health (0.11) and by far the highest amount of inequality (with a relative risk ratio of 15.61). This staggering health inequity persists today and has been recognized by the Massachusetts Department of Public Health as a pressing policy concern.

The perception in the statement is a matter of special interest to me because in November 2015 I gave a methods seminar at the University of Massachusetts Medical School focused on the failure to understand that places like Massachusetts tend to show large relative differences in adverse outcome because adverse outcomes tend to be rare there. See the [abstract](#) to the University of Massachusetts Medical School workshop referenced in note 2. See also my November 12, 2015 letter to the [Boston Lawyers' Committee for Civil Rights and Economic Justice](#) (regarding the failure to recognize the connection between large relative differences in suspension rates in Massachusetts and the state's low suspension rates), my "[It's easy to misunderstand gaps and mistake good fortune for a crisis](#)," *Minneapolis StarTribune* (Feb. 8, 2014) (where Massachusetts could be substituted for Minnesota), and my "[The 'Feminization of Poverty' is Misunderstood](#)," *Plain Dealer* (Nov 11, 1987) (discussing that poverty is more feminized among whites in Massachusetts than among blacks in Mississippi because Massachusetts is a wealthy state while Mississippi is a poor state).

The situation regarding large relative differences in dichotomized poor health (and presumably small relative differences in good health, though the report does not provide the data to verify that) in Massachusetts may be compared to the situation shown in Figures 4 and 5 (slides 65 and 66) of the University of Massachusetts Medical School [workshop](#), where relative racial differences in poor health are greater, while relative racial differences in good health are smaller, among persons with high income than persons with low income. The information in the figures necessarily also means that relative income differences in poor health are greater, while relative income differences in good health are smaller, among whites than among blacks. See also the discussion in "Race and Mortality Revisited" (at 339) regarding the way chronic conditions tend to increase poor self-rated health proportionately more among the better-educated while reducing good self-rated health proportionately more among the less-educated.¹³

¹² See also Eikemo TA, Skalicka V, Avendano M. 2009. "[Variations in health inequalities: are they a mathematical artifact?](#)" *International Journal for Equity in Health* 8,32 (and my [Comment](#) thereon) and Huijts T, Eikemo TA. 2009. "Causality, social selectivity or artefacts? Why socioeconomic inequalities in health are not smallest in the Nordic countries." *Eur J Pub Health* 19, 452-53 (and my [Comment](#) thereon).

¹³ See also the [Reporting Heterogeneity](#) subpage of the [Measuring Health Disparities](#) page of [jpscanlan.com](#). These issues apply to all efforts to identify subgroup effects, both in and out of clinical settings, as discussed in "Race and

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As suggested by the fact that the pattern the 2016 report discusses for Massachusetts is an exception, the report apparently is identifying patterns that are contrary to the pattern of relative differences I describe. Such departure may reflect a variety of things and those things may be quite important to understand. But the fact remains that it is not possible to understand patterns of demographic differences, or draw inferences about them, without understanding the influence of the prevalence-related patterns I describe.

Thus, I hope that the Center will carefully consider the issues discussed in this letter and the materials it references before producing further analyses of demographic differences in outcome rates.

At some point, I will presumably be contacting the funding entities regarding the methodological problems in the *Poverty and Inequality Reports*. But I urge the Center to contact those entities directly regarding the points I raise about the reports, the validity of the points I raise, and how work going forward will address those points. Further, I urge the Center to explain these issues at length to the Department of Health and Human Services (HHS). As reflected by the August 24, 2015 letter to the HHS and the Department of Education, if the leadership of HHS could simply be made to recognize that, contrary to the "[Policy Statement on Expulsion and Suspension Policies in Early Childhood Settings](#)" jointly issued by the two agencies in December 2014, generally reducing suspension rates tends to increase, not decrease, the proportion disadvantaged groups make up of suspended students, that would be a salutary achievement. If HHS leadership can be made to recognize the pervasive shortcoming of HHS-funded health and healthcare disparities research to date and the need to reform that research, that could avoid the waste of vast resources in coming years as well as dramatically improve the quality of research into demographic differences in health, healthcare, and varied other outcomes. While I engage in a variety of activities to achieve these same ends, efforts by an entity of the Center's prominence could be far more effective.

Sincerely,

/s/ **James P. Scanlan**

James P. Scanlan