Cautiously Adjusting to the New Millennium: Changing to the 2000 Population Standard

Readers of the Journal are probably so accustomed to seeing age-adjusted rates and percentages in government reports on health that they scarcely give them a second thought. The value of recalibrating summary measures of health to eliminate confounding by differences in age distributions was recognized very early in the development of health statistics. The basic technique of age adjustment is generally attributed to the English actuary F.G.P. Neison, who advocated its use for comparing death rates of different geographic areas. Neison made this recommendation in a paper presented to the Statistical Society of London in 1844.1 His argument proved so convincing that the use of age-adjusted rates and ratios has been a standard feature of official publications of health data since the middle of the 19th century. It is one of the first techniques taught to students of epidemiology, biostatistics, and demography.2

WHY AGE-ADJUST?

The logic of age adjustment is compelling. Age adjustment assumes that the measures of interest are actually the age-specific rates, yet it recognizes that comparing a number of rates is cumbersome, particularly if more than one comparison is to be made. Such detailed comparisons run the risk of obscuring the forest for the trees. Summarizing the age-specific rates may therefore be necessary, but it is preferable that the summary measure selected not be “distorted” by the age distribution of the population. For example, in comparing mortality statistics for Mexico and the United States, we observe that all of the age-specific death rates in Mexico are higher than those in the United States. But Mexico’s crude death rate, an unadjusted summary measure, is lower than the crude death rate in the United States because the population of Mexico is younger.

Although age-adjusted measures are artificial constructs that have no intrinsic value and are useful only for comparison, they can be more valid reflections of underlying patterns of health disparities. The disparities of interest are those that result from differences in economic, social, and cultural conditions and from medical resources and practices, not differences in age distributions. From a practical perspective, age distributions are “givens,” not amenable to deliberate change by human intervention except by methods generally regarded as unacceptable. In contrast to the crude death rate comparison, Mexico’s age-adjusted death rate is higher than the age-adjusted rate in the United States, pointing to a poorer overall standard of living, less adequate health services, and other factors that, unlike the age distribution, are viewed as conditions requiring attention and intervention.

WHY CHANGE THE STANDARDS?

Our very acceptance of the usefulness of age-adjusting summary measures of health, and the ubiquity of the practice, may make it all the more difficult to confront problems inherent in the procedure. One problem is that choosing the standard population to use in age adjustment is somewhat arbitrary. For over half a century, the National Center for Health Statistics (NCHS) consistently used a standard based on the age distribution of the US population in 1940 to age-adjust...
death rates derived from the national vital statistics system. When the National Cancer Institute began publishing results from its Surveillance, Epidemiology, and End Results (SEER) Program in the early 1970s, the 1970 age distribution was used to adjust cancer incidence and death rates. More recently, other centers within the Centers for Disease Control and Prevention have used the 1980 age distribution to adjust age-specific death rates for the United States. In August 1998, the Secretary of Health and Human Services issued a policy memorandum directing all agencies and programs of the department to begin adjusting death rates by using the Census Bureau–projected US population for 2000. This new directive was the culmination of a nearly decade-long process of review and reconsideration that weighed the benefits and costs of adopting a single new standard population. Although it was generally agreed that there were no scientific or technical reasons for adopting a single standard, the change was seen as having a strong pragmatic justification, in that a “multiplicity of rates creates confusion among data users, including the media; and it imposes an unnecessary burden on State and local health data users who must produce several data series to be consistent with Federal data which are often used as benchmarks.”

**IMPLICATIONS OF THE CHANGE**

Although consistency was given as the primary reason for the change, the course of deliberations made it clear that there was sufficient discomfort with the 1940 age distribution to prevent it from being adopted as the single standard. In the end, the change to the 2000 population standard was justified as not only producing uniformity but also ensuring that “age-adjusted death rates reflect a more contemporary population structure.” Although the policy explicitly affects only the age adjustment of death rates, the underlying rationale was regarded as sufficiently persuasive to lead the NCHS to adopt the 2000 population standard for age-adjusting other health measures found in publications such as *Health, United States and Healthy People 2010 Objectives for Improving Health.*

Much of the hesitancy expressed in the prolonged review process preceding the directive came from recognizing concerns similar to those expressed in the article by Krieger and Williams in this issue of the Journal. From the beginning, it was acknowledged that moving to a more contemporary population standard for age adjustment would have the appearance of reducing the disparity between groups in cases where age-specific disparities are greater in younger age groups and smaller in older age groups. This is the pattern that characterizes both racial/ethnic and socioeconomic disparities in health, perhaps because race/ethnicity and socioeconomic status are so inextricably connected in the United States. Considerable concern was expressed that this “technical” reduction in apparent disparities could be viewed as a deliberate attempt to manipulate the data. Proponents of the new standard population argued that sufficiently publicizing the change and cautioning against comparing results based on adjustment to different age distributions could avoid such undesirable consequences. In the examples cited by Krieger and Williams, the apparent “reduction” in socioeconomic disparities in health can be achieved only through comparison of age-adjusted rates adjusted using different standard populations. If, instead, we extend a part of their analysis and examine the trend in disparities in self-assessed health status between 1985 and 1995, adjusting to a single standard population, whether it be the 1940, 1970, or 2000 standard, produces very similar results: a slight increase in income-related disparities for the non-Hispanic White population, a moderate increase for the Hispanic population, and a large increase for the non-Hispanic Black population.

Although the potential for confusion and misuse associated with the introduction of the new standard was seen as a legitimate concern, in the end, the advantages of the change were deemed to outweigh this disadvantage. One compelling argument that surfaced again and again throughout the deliberations was that age-adjusting to different standard populations produces different results only when relative differences are not consistent across age groups, as with racial/ethnic or socioeconomic group comparisons. In this situation, it is arguable that summarizing the age-specific rates with a single age-adjusted rate is simply not appropriate or, at a minimum, not a sufficient analysis.

**SHOULD WE AGE-ADJUST?**

Fundamentally, the problems and concerns related to the change to a new population standard for age adjustment really distill down to the more basic question inherent in any procedure for summarizing data: where is the appropriate dividing line in the trade-off between the simplicity of a summarizing statistic and the loss of information it implies? Health data analysts, particularly those who consume or produce routine statistics for a wide variety of data, may have developed an unwarranted complacency regarding age adjustment. We might all do well to consider that overreliance on age-adjusted summary statistics may, in some cases, cause us to overlook or de-emphasize important aspects of the data. For example, if we had only the age-adjusted percentage in “fair or poor” health for each income group shown in the article by Krieger and Williams, we would not be aware that among the poor, and only among the poor, ill health is as common for middle-aged individuals as for the elderly. More generally, perhaps we really should be addressing why socioeconomic disparities in health attenuate at older ages, examining the relative contributions of selective survival, cohort effects, and the effect of increasingly limiting social “safety nets” (such as Social Security and Medicare) to the elderly population. To the extent that the change in the standard population prompts both the consumer and producer of health statistics to evaluate the adequacy of the methods used, the new policy may ultimately prove more beneficial than problematic.

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In this issue of the Journal, Wolfe et al. describe an outbreak of syphilis in an Alabama prison system.1 Their study demonstrates that inmates in correctional facilities do have sexual contact with each other and that unprotected sex can have devastating consequences. In this investigation, syphilis was transmitted when inmates had sex in a jail (a short-stay facility for inmates awaiting trial) and then returned to prison (a long-term facility for convicted offenders) and had contact with new partners there. Fortunately, no HIV was transmitted in this outbreak, although risk factors for such a spread were, of course, present.

**REDUCING SYPHILIS TRANSMISSION IN JAILS AND PRISONS**

Wolfe et al. provide insight into ways of curbing syphilis epidemics in jails and prisons. The frequency of syphilis testing should be increased—each prisoner should be tested during an annual screening, during an outbreak in the facility, and on transfer between prisons or return to a prison from a jail. Health services in correctional facilities should eliminate treatment delays; such delays (e.g., laboratory results were not returned on time, and follow-up visits were delayed for 3 months) may partially account for the epidemic described by Wolfe et al. Department of Corrections health services should forge better links with public health services in the community—especially for inmates who return to the community quickly. Better yet, correctional health services should quicken the turnaround for test results in jails. Both health departments and correctional facilities benefit from a partnership that facilitates sexually transmitted disease (STD) testing and treatment in jails in areas with high rates of syphilis.2

Complacency about an infection that disproportionally affects people of color and the poor is unconscionable when these populations constitute the principal clientele of health services based in prisons. Control of syphilis—to the point where no sustained transmission occurs—should be a priority of correctional health services everywhere. Nowhere in the United States is this more true than in the Southeast.3 Alabama was the site of the notorious Tuskegee study; the Alabama Department of Corrections sits in one of the areas hardest hit by syphilis.

**TAILORING PREVENTION TO THE CORRECTIONAL SETTING**

As Wolfe et al. correctly note, “Reducing sexual transmission of disease in correctional settings is a public health priority and will require innovative prevention strategies.”4,5,6,7 We in academia and public health have too long neglected correctional facilities as a key locus for developing and evaluating effective prevention strategies for inmates, both in jail and on release into the community. The assumption that interventions that work in the community will automatically work in prisons is flawed.

Sex in the community is more likely to be consensual, whereas sex behind bars can be a mutually desired activity or coercive—a tool used to establish a hierarchy. Is there an opportunity for negotiating condom use in the latter situation? It is difficult to study what proportion of liaisons between inmates are coercive, especially among men who do not identify themselves as homosexual.8 Some publications dealing with the topic of coercive sexual relations in

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**References**