Epidemiologic Research on Health Disparities: Some Thoughts on History and Current Developments

Sherman A. James

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In this introduction to volume 31 of *Epidemiologic Reviews*, the author traces the history of health disparities research in epidemiology and situates the 10 review articles comprising this edition within this history. With the aid of a conceptual model describing the key determinants of health disparities, he offers several suggestions for improving future epidemiologic research on health disparities.

Abbreviations: NHOPI(s), Native Hawaiians and other Pacific Islander(s); SEP, socioeconomic position.

FROM RESEARCH ON HEALTH DIFFERENCES TO RESEARCH ON HEALTH DISPARITIES: A BRIEF HISTORY

Identifying and controlling environmental, behavioral, and host risk factors that give rise to mass disease in human populations is the raison d'etre of the science of epidemiology (1, 2), and socially patterned differences (by race/ethnicity, age, gender, socioeconomic position (SEP), geographic location, etc.) in disease occurrence provide the strongest clues to the complex etiology of every mass disease (3). In his foundational text, *On Airs, Waters, and Places* (4), Hippocrates, the “father” of epidemiology, was especially attuned to how the physical environment—through its prepotent effects on the food supply, physical stature, inventiveness, fertility, and social relationships—of peoples in the ancient world shaped their differential susceptibility to disease and premature death. Nearly 2,000 years later, in the mid- to late 19th century, a similar appreciation by pioneers of the sanitary reform movement in the United Kingdom (5, 6) and the United States (7) of how ecologically unsound human activities can give rise to new and deadly diseases (8) led them to concentrate on improving sanitation, housing, and nutritional status as the most effective means of controlling infectious diseases (9).

Unfortunately, at the turn of the 20th century and for decades thereafter, entrenched notions about the supposed biologic superiority of whites over peoples of color (10, 11) meant that the sanitary reform movement would be applied unevenly in fast-growing, racially segregated cities like Baltimore, Maryland, with the predictable result that tuberculosis—essentially a disease of poverty, crowded living quarters, and malnutrition—took an unnecessarily heavy toll on the health of city-dwelling African Americans (12). Identifying the forces that led epidemiologists (especially in the United States) to become increasingly concerned in the middle of the 20th century with racial as well as social class differences in health is a task perhaps best left to historians. However, I recently speculated (13) that the racially motivated horrors of World War II probably transformed the racial consciousness of many epidemiologists (among others), setting in motion a slow but growing commitment to developing a more socially informed, multifactorial paradigm for studying racial/ethnic differences in health—in contrast to the nearly exclusive prewar emphasis on presumed innate biologic differences among races (14).

While the framework for studying racial/ethnic differences in health, a topic that has always received more attention in the United States than in Europe (15) or Latin America (16), became more multifactorial in the 1960s and 1970s, Braverman (17) correctly noted that it was rare for public health researchers to make *explicit* connections between their research questions and any social justice concerns that may have motivated their work. During this important “transitional period,” differences in health status by race (or by gender, social class, or place of residence) were...
called just that—“differences,” or less frequently (except in Europe and Latin America) “inequalities” in health.

Braverman (17) went on to suggest that it was not until the mid-1990s that the term “health disparities” came into widespread use. Citing Whitehead’s seminal 1991 article (18), she noted that the term “health disparities” should refer to group differences in health that were unnecessary, preventable, and unjust. Seeking to make even clearer the research and policy implications of Whitehead’s definition of “health disparities,” Braverman offered this elaboration: “A health disparity/inequality is a particular type of difference in health or in the most important influences on health that could potentially be shaped by policies; it is a difference in which disadvantaged social groups (such as the poor, racial/ethnic minorities, women, or other groups that have persistently experienced social disadvantage or discrimination) systematically experience worse health or greater health risks than more advantaged groups” (17, p. 180).

Concurrent with Whitehead’s writings in the early/mid-1990s, US-based researchers were beginning to make explicit conceptual (19) and empirical (20–22) connections between racial (and other forms of) discrimination and perennial differences in health between socially dominant groups and subordinated groups. By the late 1990s, a clear shift in the research frameworks and public discourse of researchers and policy-makers concerned with understanding, and then reducing/eliminating, health disparities in Whitehead’s (18) sense of the term was visible. By the early 2000s, in both the United States and the United Kingdom, this shift found expression in official policy statements (23–26) as well as new institutional structures (27), signaling that reducing/eliminating health disparities had become national health policy.

Although a spate of recent publications (28–32) documenting large, even increasing, health disparities in various locales and populations has tempered optimism about the ease with which health disparities linked to race/ethnicity, gender, SEP, or geographic location can be significantly reduced (not to mention eliminated), the current global attention (33) on health disparities reduction is arguably best understood as the legacy of an implicit human rights-inspired paradigm shift in epidemiologic research that began in the middle of the 20th century.

CONTENTS OF THE CURRENT ISSUE

No single edition of Epidemiologic Reviews can do justice to the broad array of topics that qualify as “health disparities” research; however, the 10 articles in the current issue thoughtfully engage several topics of long-standing interest to epidemiologists, as well as topics that have received serious attention only within the past decade or so. Racial (34) or racial/ethnic (35) disparities in birth outcomes, for example, can be included among the former, while the impact of racial discrimination on the mental health of Asian Americans (36) can be included among the latter. The potentially powerful influence of the built environment on US racial/ethnic health disparities is a common theme among several papers in this issue. Kramer and Hogue (37), for example, critique recent studies dealing with racial residential segregation and the health of African Americans. These authors note unresolved questions regarding how segregation should be measured; how, and under what circumstances, residential segregation undermines the health of African Americans; and how research on racial residential segregation interfaces with the broader body of research on neighborhood effects on health. They also ask what improvements in study design might be needed to permit the isolation of adverse health effects due to racial residential segregation from neighborhood-level variance in health status due to selection.

In their second paper, Kramer and Hogue (34) summarize recent literature dealing with black-white racial disparities in very preterm birth. Several studies, they note, suggest that living in poor, racially segregated neighborhoods that are also low in social cohesion could increase risk for very preterm birth among pregnant black women through the impact of distal social stressors on their preconceptional health. They acknowledge a potential role for genetic factors in the well-established black-white racial differences in very preterm birth but suggest that, going forward, research that utilizes an epigenetic perspective (wherein gene expression is conditioned on environmental exposures) will not only yield more valid scientific insights but will also have stronger implications for primary prevention. In a similar vein, Miranda et al. (35) conclude that racial/ethnic differences in the cumulative, toxic burden of adverse physical environmental exposures (e.g., high concentrations of ambient air pollution and tobacco smoke) could interact with a woman’s genotype, socioeconomic resources, and, in the case of Hispanic immigrants, length of residence in the United States to shape current and future patterns of US birth outcomes by race and ethnicity.

An impressive body of research now implicates the built environment as a major “upstream” risk factor in the obesity epidemic affecting both children and adults in the United States and other high- and middle-income countries (38–40). Seeking to fill a gap in this literature, Lovasi et al. (41) reviewed studies that focused specifically on the built environment and risk of obesity in 3 historically disadvantaged US populations: African Americans, Hispanics, and persons of low SEP in general. The authors conclude that because of their likely synergistic impact on dietary habits and physical activity, the lack of access to supermarkets and to safe, attractive, walkable neighborhoods—features of an “obesiogenic” environment—are probably the most important drivers of the obesity epidemic in these populations (41).

More often than not, growing up in an obesiogenic environment will place children so exposed on an accelerated trajectory to becoming obese in adulthood. Longitudinal research is needed to substantiate this expectation, but such an inference seems reasonable given the growing number of studies documenting fairly robust associations between low childhood SEP and increased risk of obesity in adulthood (39, 40, 42–44), as Senese et al. (45) determined. The authors also note that the association between low childhood SEP and adult obesity is curiously stronger, and more consistent, in females than in males (45). Most research on this important topic, they emphasize, has been carried out in...
Europe and the United States and has focused almost exclusively on populations of European descent.

Being at high risk for adulthood obesity may be one of the pathways through which low childhood SEP accelerates biologic aging over the life course (38), one consequence of which may be reduced survival among persons diagnosed with a life-threatening disease. McKenzie and Jeffreys (46) reviewed international publications on racial/ethnic differences in breast cancer survival. Predictably, tumor histology varied across racial/ethnic populations. In New Zealand, for example, Maori and Pacific Island women were more likely than white New Zealanders to have estrogen receptor- and progesterone receptor-negative tumors. In the United States, Hispanic women were more likely than non-Hispanic white women to have estrogen receptor- and progesterone receptor-negative tumors, while African-American women were more likely than white women to have triple-negative tumors, the latter being one of the most aggressive forms of breast cancer. Even so, when comparisons were restricted to women with triple-negative tumors, black women still had a lower 5-year survival rate. The authors conclude that the generally higher body mass indices of black women, plus racial disparities in the utilization (or receipt) of quality medical care, could be contributing factors to their shorter survival times following a breast cancer diagnosis (46).

Three reviews deal with health disparities affecting non-black US racial/ethnic minorities. Mau et al. (47) discuss cardiometabolic health disparities among Native Hawaiians and other Pacific Islanders (NHOPIs); Vega et al. (48) review major health disparities among Latinos; and Gee et al. (36) focus on Asian Americans. Not until the 2000 US Census did NHOPIs become a separate racial category for enumeration purposes. Hence, the review by Mau et al. (47) represents a kind of baseline summary of the descriptive epidemiology of risk factors for cardiovascular disease and diabetes in this population. Unfortunately, the descriptive epidemiology—which the authors equate with the health legacy of colonialism—contains few surprises. Relative to non-NHOPIs, this population suffers from very low SEP, elevated levels of obesity, hypertension, blood glucose, smoking, and depression, and poor access to culturally competent medical care. Mau et al. see a need for more longitudinal research, as well as community intervention research (ideally led by NHOPI investigators), that incorporates the cultural values of NHOPI peoples (47).

Vega et al. (48) discuss 8 health disparity conditions that affect Latinos disproportionately; they conclude that poverty, menial and unstable unemployment, chronic social stressors, and a lack of access to quality medical care represent a nexus of risk factors that accumulate over the life course to not only erode the health of low-skilled Latino immigrants but also to effectively limit upward social mobility opportunities for subsequent generations.

If institutional and interpersonal discrimination based on Hispanic ethnicity (especially if additionally marked by brown skin color) is the unnamed chronic stressor in the summary by Vega et al. (48), Gee et al. (36) face the issue of racial discrimination and its impact on the mental health

**Figure 1.** Key determinants of health disparities.
of Asian Americans head-on. Their provocative concept of the “discrimination iceberg” captures the multiple levels at which racial/ethnic discrimination operates. According to the authors, the tip of the iceberg represents the visible, easily labeled forms of discrimination, such as hate crimes, name-calling, and overt poor treatment. However, there are other forms of discrimination that lie below the metaphorical “water line” and are thus more difficult to see clearly. These include covert/symbolic discrimination, as well as what the authors call “structural” discrimination (36), one example of which is social and economic policy-driven racial residential segregation; other examples include redlining practices by banks and predatory lending by mortgage brokers that specifically target racial/ethnic minorities. In addition to detailing evidence that discrimination against Asian Americans is not uncommon in US society and that their reports of being discriminated against are correlated with lower scores on various indicators of mental health, the authors note that most existing measures of racial discrimination (which were designed for African Americans, mainly) do not fully capture the kinds of discrimination faced by Asian Americans. Hence, future research would benefit from improved measures of the experience of racial discrimination by Asian Americans. In addition, more longitudinal studies of risk and protective factors vis-à-vis both physical and mental health are needed; and, finally, purposeful oversampling of numerically small Asian-American populations in health disparities research is needed (36).

Finally, the paper by Beckfield and Krieger (49) deals with perhaps the highest-order “social determinant” of health disparities; namely, the socioeconomic and political organization of nation-states. The authors posit, quite reasonably, that the magnitude of health disparities between and within countries is historically contingent. They draw upon complementary theories in social epidemiology and political sociology to assess whether the emerging literature in what some might call “political epidemiology” supports their a priori expectation that “types of states and their political priorities should be causally linked to the magnitude of health inequities” (49, p. 152). They identify 4 extant socioeconomic and political configurations (see their article for detailed descriptions): transition to capitalism; neoliberal (market-oriented) restructuring; the welfare state (which has diverse forms); and political incorporation of subordinated groups. As the authors acknowledge, considerable work remains to be done to further the maturation of this new line of inquiry, but the overall pattern of results that has emerged provides some preliminary empirical support for the ancient but always important notion that a country’s governance structure and overarching political philosophy, the strength of its social safety nets, and the degree of income, racial, ethnic, and gender inequality it tolerates presage the magnitude of health disparities within its borders, as well as its standing in the community of nations on key indices of population health.

Figure 1 shows a model of the key determinants of health disparities. The model aims to be as general as possible; that is, it transcends particulars of geography, race, ethnicity, gender, sexual orientation, and nationality—the conventional health disparity categories. The model presumes that health disparities which are linked in an enduring way to any 1 of the above social identifiers result from major inequalities in the joint distribution of key determinants of the disparity under consideration. Three determinants (host, environment, and behavior) interact to influence disparities in disease incidence; a fourth (medical care) influences disparities in (premature) mortality through its effects on case fatality; and a fifth (political and economic structures) determines the availability of environmental resources that promote health—the major driver of population differences in mortality.

The authors of several articles in this volume (34, 35, 37, 41) discuss the central role the built environment plays in racial/ethnic health disparities, especially in the United States. Figure 1 distinguishes between the sociophysical and economic dimensions of the built environment and lists several attributes of each that are receiving increased attention by health disparities researchers. In several articles, authors emphasize interactions between the built environment and host factors (34, 35) in the social patterning of disease incidence, while other authors give greater emphasis to interactions between the built environment and health behaviors (41, 45) as major determinants of the obesity epidemic. Seeking to exploit the potential complementarity of genomics science and health disparities research, several authors (34, 35) call for a greater emphasis on theory-driven (but socially and historically conscious) epigenetics research on racial/ethnic health disparities, Institutional and interpersonal racial/ethnic-gender discrimination (which causes psychological stress, limits upward mobility, and inhibits timely use of medical care) is a major focus of several reviews (36, 46–49). The importance of a life-course perspective in health disparities research is emphasized in the majority of reviews (34–37, 41, 45, 47–49), but none of the authors conceptualize health disparities as a product of group variations in the balance of risk and protective factors as these factors accumulate over the life course. Figure 1 underscores the potential importance of such a conceptualization. Measuring these dynamic processes with an acceptable degree of accuracy will present formidable challenges, and standard regression techniques may prove inadequate to the task (50). Going forward, however, the conceptual models of disease causation and related methods used by epidemiologists should be more cognizant of the political economy of health (49) and should mirror as closely as possible the complex interactions among host, environmental, and behavioral risk factors for disease that are on daily display in the natural world. Hippocrates’ 2,500-year-old admonition (4) to epidemiologists still holds.

**CONCLUDING THOUGHTS**

The 10 articles in this issue are but a small sample of the rich diversity of topics that currently engage “health disparities” researchers in epidemiology and allied disciplines. The term is placed in quotation marks to acknowledge that, despite past efforts (17, 18) to define it precisely, it is likely that the term still means different things to different people. This residual ambiguity could be a good
thing, because, like the oft-cited fictional character who suddenly discovers he has been speaking prose all of his life, there may be numerous researchers who are engaged in “health disparities” research but for various reasons do not label it as such. This could be one of those rare situations, therefore, where too much precision of language is actually counterproductive.

Nevertheless, there can be little doubt that the increasing emphasis by national health policy-makers on the reduction of unnecessary and unjust inequalities in health (the core meaning of health disparities) has energized the epidemiologic research community, given that the ultimate determination of what is “unnecessary” and “unjust” will be influenced by insights from epidemiologic research in combination with insights from moral reasoning. Viewed collectively, the key findings from the articles in the current issue of Epidemiologic Reviews suggest a model for the kind of interdisciplinary, multilevel research on health disparities that is most likely to produce valid and useful scientific insights in the years ahead.

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Author affiliation: Sanford School of Public Policy, Duke University, Durham, North Carolina.

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REFERENCES
