

# Preface

The word diaspora is a biblical concept that was first used for the migration of Jews from Palestine after the Babylonian captivity around the sixth century B.C. Since then, there have been many diasporas throughout the world. Perhaps the largest migration in modern human history and the most widely documented is that of the African diaspora from their native African continent to the Western Hemisphere as part of the slave trade that occurred between the sixteenth and the eighteenth centuries.

The process of migration and settling into a host country can, and in many ways does, play an adverse role in the health of the diasporic communities in comparison to the populations of either their countries of origin or their host countries. Since the days of slavery, the African diaspora in America has experienced poor health compared to Caucasians or European-Americans and all other Americans. The overriding theme is that of disparity and disadvantage. The African diaspora is disproportionately affected by conditions including: premature birth, low birth weight, high infant mortality, obesity, diabetes mellitus, HIV/AIDS, stroke, cardiovascular diseases, hypertension, Alzheimer's disease, violence, suicide, malignant neoplasms, and lead poisoning. The life expectancy for the African diaspora is shorter than that for European-Americans, and this disparity has persisted for almost 400 years.

Most people commonly think of physical health as being affected by age, gender, and biological factors, and some people also realize that health can be affected by lifestyle choices, exercise, diet, and unhealthy habits such as smoking and excessive alcohol consumption, as well as by low health literacy. Some reports suggest that social determinants are the root causes of health disparities, noting that factors such as economic hardship, psychosocial stress, and racial discrimination are causes of bad health. These social determinants derive from the environments and communities in which people are born, live, grow, work, and age. These circumstances are further shaped by the distribution of wealth, power, and resources at the global, national, and local levels, which can themselves be influenced by government policy.

However, these factors are only the tip of the iceberg of what affects health disparities. There are other factors, in particular psychological factors. There is evidence that psychological patterns such as psychosocial stress and adversity can have multi-generational consequences directly tied to low socioeconomic status, racial segregation and discrimination, incarceration rates, fatherlessness, unemployment, housing, substance abuse, under-education, poor working conditions, teen births, poor access to healthy nutrition, and the list goes on and on. There is scientific data to indicate that the maternal, in-utero conditions, as well as early life exposures, such as poor or insufficient nutrition during critical periods of development or poor environmental exposures may set the stage for at-risk psychosocial, behavioral, and biological characteristics that correlate with increased incidences of various adult-onset diseases, including obesity and diabetes, in the African diaspora.

Genetic and biological factors contribute to virtually every human disease by way of increased susceptibility or altered resistance that affects the severity or progress of disease, with variance in different populations that can also help explain why the African diaspora disproportionately suffers from some diseases compared to other groups. Genetic studies, particularly GWAS (genome-wide association studies) that examine many common genetic variants in different individuals to seek variants associated with a trait, hold the possibility to identify common and rare variants in different populations that affect disease risk, the choices of therapeutics, and drug sensitivity/resistance profiles.

GWAS hold the promise of increasing our understanding of how genetic variants influence the differential gene expression associated with various diseases. In addition to the genetic factor, epigenetic events contribute to health disparities. The fate of a gene is not defined only by the DNA sequence per se but also by the manner by which the gene is marked and programmed by the epigenome phenomenon such as chromatin modification, DNA methylation, and noncoding RNA resulting in diversity of gene expression. At least some heritable epigenetic markers are responsive to social determinants, such as diet, psychosocial stress, or exposure to environmental toxins including drugs of abuse. Thus epigenetics has kindled excitement because nutrition, psychosocial stress, and environmental toxicant exposure can alter epigenetic markers that link environment and gene expression to physical health. In some instances, exposure effects may persist across the life course and may be transmitted to offspring via epigenetic inheritance. An emerging phenomenon posits that epigenetic processes have the potential to link social and environmental influences and patterns of health and disease found within and across societies. The current scientific data supports the notion that there cannot be health equity without an appreciation of how individual genetics or the differential genetic variation in individuals belonging to one population or different populations contributes to health. To attribute all the problems of health disparities to genetic predisposition is to ignore the underlying social and economic determinants that can influence gene expression. An appreciation of the role of epigenetic alterations is also warranted. The role of genetic variation and how different environmental exposures that affect gene expression occur by modulating epigenetic changes—the

so-called ‘gene-environment’ interaction—is a major thread in this book that seeks to draw the reader’s attention to understanding the important contribution of epigenetic alterations in addressing how social determinants can influence individual genetics and disease outcomes as well as disease disparities.

*“Health Outcomes in a Foreign Land—A Role for Epigenomic and Environmental Interaction”* is a book that examines the avoidable or unavoidable factors in the health disparities of the African diaspora. Regardless of causes, health disparities are unfair, because they put already disadvantaged groups at a further disadvantage in their health. Eliminating health disparities should be any nations’ priority to improve the quality of health for all citizens. What if we had eliminated such disparities 100 years ago? There would be fewer black deaths, improved life expectancy, and better social determinants of health that, in their absence, otherwise may lead to drug use and homicides. Two historic periods of American history has sought to address and correct race-based health disparities. The first period (1865–1872) was linked to Freedmen’s Bureau legislation, and the second (1965–1975) coincided with the Civil Rights Movement across America. Both had dramatic and positive effects on the health status and outcome of African Americans, but were discontinued too soon and failed to eliminate race-based health disparities. Although African-American health status and outcomes are slowly improving, the health status of the African diaspora as compared to that of European-Americans has generally stagnated or even deteriorated since 1980. If we are going to eliminate health disparities, there have to be dramatic changes in health-system policy, financing, and structure, and a directed effort to produce a culturally competent health system and direct health care to areas where it is needed the most, as well as to empower the workforce—all of which address health disparities at multiple points of interaction, such as the interactions of social and biological factors. There must be policies directed towards the desegregation of racial communities and/or improvement of the existing communities for African-American and other US minorities such as providing safe environments for the residents to engage in exercise and access grocery shops and fresh fruit and vegetable markets.

The book is divided into three parts: Part I contains chapters that discuss the genetic basis and the role of epigenetics in health disparities; Part II contains chapters that discuss the non-genetic determinants of health disparities, including chapters on: economic factors, social determinants, behavior, health literacy deficits, and the impact of culture and psychological issues and how they affect disparities; and, Part III contains chapters on: the role of gene-environment interactions, race—a biological or social concept; and, translating health disparities. The book is structured as such to give the reader an appreciation of the plethora of multifactorial causes of health disparities, and it discusses steps that can be taken to reduce these disparities.

Perhaps most critically, the book focuses on current scientific evidence of the potential role of epigenetic changes in linking the interactions of genetic and environmental factors and how this phenomenon can be explored to address eliminating health disparities. The goal of this book, then, is to present the simple, easy-to-understand scientific evidence underlying health disparities for public

health and community workers, students, physicians, and scientists alike to gain an appreciation of the complex interaction between social determinants and genetics and its contribution to health disparities. By elucidating the genetic factors (and genetic variants) and the epigenetic events that are associated with increased risks of infectious diseases and non-communicable diseases, as well as the environmental factors such as behavioral/lifestyle choices that exacerbate these conditions, I believe we are heading in the right direction in addressing and reducing health disparities.

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