



## IS THERE A ROLE FOR RACE IN SCIENCE AND MEDICINE?

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**Editor's note:** *The following article is based on the Ethics and Philosophy Lecture presented at last year's Clinical Congress in Washington, DC.*

**T**he term “race” has been used loosely throughout history in many fields. Anthropologists, however, since 1996, have acknowledged that the term race should not be used to describe human populations.<sup>1,2</sup> The term is, in fact, a social construct that holds no true medical significance. Often, it is mistakenly used interchangeably with other terms, including “ethnicity.” Begley stated that “... race represents a uniform, closely inbred group...” and that “...these conditions are never realized in human types and impossible in large populations.”<sup>2</sup> Why, then, is the term race widely used in medicine? The U.S. Census Bureau even recognizes that the categories of race “are sociopolitical constructs and should not be interpreted as being scientific or anthropological in nature.”<sup>3</sup> If this term holds no true relevance, its use should be eliminated in science and medicine. In this article, the authors delineate the problem posed by the use of the term race in science and medicine by describing a brief history behind the use of the term, its contribution to health disparities, how it compares to the terms ethnicity and “culture,” and some of the current uses of the term race.

The question about whether race plays a role in science and medicine is relevant to all physicians because more attention is now being directed at eliminating health disparities. Current research efforts are aimed at iden-

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tifying where the disparities lie and how they can be diminished. Data gathered from such research can be applied to help mold the U.S.' changing health care system.

From a financial perspective, this topic is important because of outcomes-based reimbursement. If certain population groups—for example, those with limited access to health care—have poorer outcomes than their counterparts, how will this impact the financial reimbursement for those physicians dedicated to caring for these populations? Will they be punished for their humanitarian efforts and receive reduced financial reimbursement? The implications of this issue are remarkably significant and will affect present and future generations of surgeons. If physicians and surgeons are reimbursed less because they choose to tend to a population with poorer outcomes, this may create a culture among young surgeons that will cause them to shy away from caring for those groups.

This attitude will lead to frightening consequences. Reimbursement dependent on patient outcome will affect those patients who have poorer baseline outcomes compared with others. Since their outcomes will be poorer than others, those doctors will inevitably receive less financial reimbursement. Will this not disincentivize those physicians? It is important, therefore, to identify a clear system that outlines what the health disparities are and what population groups they impact. It is imperative that health care reimbursement allow for equity for all classes of patients and that it keep pace with the changing dynamics of the population. This process must occur without disincentivizing physicians and surgeons for having the courage to care for patients with finite access to health care, and thus, poorer health outcomes.

### **Historical perspective**

Systems have been used since the beginning of time to classify human beings into subgroups. The world's population was first described in biblical scriptures. Genesis, Chapter 10 of the Hebrew Bible, describes all flood survivors as descendants of Noah's three sons, Ham, Japheth, and Shem, demonstrating one of the first human subdivisions after creation.<sup>4</sup>

In 1758, Carl von Linnaeus, the Swedish taxonomist, categorized humans into four main groups, based on his own physical and psychological view, in *Systema Naturae*.<sup>2</sup> These four groups included Europeans, Americans, Asiatics, and Africans. Each group had distinct descriptions based on his impression of

each of the populations. Europeans were “fair...gentle, acute, inventive...governed by laws.” Americans were “copper-coloured...obstinate, content free...regulated by customs.” Asiatics were described as “sooty, severe, haughty, covetous...governed by opinions.” And Africans were described as “black...crafty, indolent, negligent...governed by caprice.”<sup>2</sup> Linnaeus' classification of humans had no biological basis, but instead were characterized primarily by physique and stereotype. Linnaeus' position supports the idea that race is a socially constructed word, and racial subcategories are historical in nature and do not naturally or organically occur or exist.

The “father of anthropology” and the first to use the term race was Johann Friedrich Blumenbach, who published the first of three editions of his thesis *De generis humani varietate nativa (On the Natural Variety of Mankind)* in 1775. Blumenbach first defined the varieties of humans based on geographic terms, and in his third edition, he characterized the five varieties of humans based on scientific methods that included the examination of skulls, fetuses, hair, anatomical preparations, and pictures and drawings.<sup>5</sup> Based on his scientific findings, he described five generic varieties to be the Caucasians, Mongolians, Ethiopians, Americans, and Malays. Although Blumenbach classified human beings into these five categories, he emphasized that there was not, in fact, a clear subdivision of the human species but that “varieties...run into one another by insensible degrees.”<sup>5</sup> Although Blumenbach described his theories and classification system based solely on scientific evidence, he did profess his own bias on beauty when he described the Caucasian skull of the Georgian female as “the most handsome and becoming.”<sup>5</sup> This bias, however, did not represent any color prejudice because Blumenbach argued that Ethiopians were not inferior to other races. He also wrote favorably about “negroes,” commenting on their beauty, abilities, and accomplishments. He owed the differences between groups to variations in opportunity, which was a viewpoint out of line with his time.

The most influential biological race theory was the One Drop Rule that was established in the 1600s and accepted by most Americans in the 1920s.<sup>6</sup> This rule identifies an individual as African American if they have one African-American ancestor. There has been no other group of individuals throughout U.S. history to have such a rule. This race theory has no established evolutionary or genetic basis and was solely constructed to establish race.

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The negative connotations of racism continued into the 1940s and were demonstrated by the notable Clark Doll Experiments in 1954 entitled, “Psychological effects of segregation on black children.” In this study, psychologist Kenneth Clark helped prove the case for the *Brown v Board of Education* Supreme Court case. Children were given both white and black dolls and asked which was the better doll. Both groups of children picked the white doll, leading Dr. Clark to conclude that prejudice, discrimination, and segregation caused black children to develop a sense of inferiority and self-hatred.<sup>7</sup> A 17-year-old film student, Kiri Davis, reproduced the study in a 2005 documentary entitled *A Girl Like Me*, and again found that both groups of children, white and black, stated that the white doll was “good and pretty” and the black doll was “bad.” This demonstrates that more than 50 years later, the sense of inferiority continues.

The Human Genome Project, completed in 2000, further supported the anthropologists’ statement in 1996 that there was no such thing as race. Other influences in the last decade that have sparked interest in the use of race in medicine are the use of pharmacogenetics in personalized medicine and the FDA-approved drug BiDil, which has been marketed exclusively for the “self-identified” black population.<sup>8</sup> The variations that exist with respect to prevalence of disease among human subpopulations, which are a result of geographic origins and migratory patterns, may be partly accounted for by differences in their genomic sequences. Genetics research has now identified that allele frequencies are, in fact, continuous; thus, we cannot account for a point at which one race begins and another ends.<sup>9</sup>

### **Health disparities**

Today in America, minority populations face a disparity in access to, and quality of, the health care they receive in comparison with their non-Hispanic, Caucasian counterparts. For most of this nation’s history, as the Kaiser Family Foundation noted in a 2005 brief, “few would disagree that [...] race was a major factor in determining if you got care, where that care was obtained, and the quality of medical care.”<sup>10</sup> The influence of this notion of race, unfortunately, still persists and is evident in scientific writings that demonstrate differences in health outcomes across population groups. Some of these alarming differences include African Americans having 40 percent

higher mortality rates from heart disease, Hispanics being almost twice as likely to die from diabetes than non-Hispanic whites, African-American infants being more than twice as likely to die than non-Hispanic Caucasian babies, and Hispanics being three times as likely as non-Hispanic Caucasians to die of HIV/AIDS.<sup>11</sup>

The differences across groups are not limited to differences in outcomes and disease prevalence, but also include differences in treatment. In 2003, the Institute of Medicine found that African Americans were less likely than their Caucasian counterparts to receive appropriate cardiac medication or to undergo coronary bypass surgery, were less likely to receive peritoneal dialysis and kidney transplantation, and were more likely to receive a lower quality of basic clinical services, even when variations in such factors as insurance status, income, age, comorbid conditions, and symptom expression were taken into account.<sup>12</sup> These findings have not changed drastically since then. Presumptions of the notion of race have continued to impact health status.

An example of its continued impact can be seen in a study done by Prus and colleagues in 2010, which compared the health status of immigrants in the U.S. to those in Canada.<sup>13</sup> The study suggested that native and foreign-born ethnic minorities 45–64 years of age in the U.S. have lower health outcomes, regardless of socio-demographic status, socioeconomic status (SES), health insurance status, and lifestyle. Deep-seated racism was determined to be the most important variable accounting for these differences. Ethnic minorities in the U.S. are simply more likely to experience discrimination, marginalization, poverty, and joblessness than ethnic minorities in Canada.<sup>13</sup>

Racism, however, as strong a factor as it has been in the formation of health disparities, has not been the sole proponent of them. Health disparities have developed from myriad interactions between a seemingly endless array of variables, from social and economic barriers, differences in cultural beliefs, and individual values, to dissimilar environmental exposures, poverty, and genetics.

It is not surprising that some individuals, like Harold P. Freeman, MD, believe certain variables to have played larger roles in the creation of today’s current health disparities than others. In 2003, Freeman argued that poverty has been the major determinant of health disparities.<sup>6</sup> Poverty, he states, “is associated with a lack of resources, information, and

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knowledge; substandard living conditions; very often, a risk promoting lifestyle; and diminished access to health care.” However, the misuse of race in science and medicine, as well as society, for that matter, often encompasses such factors as poverty. Race, according to Dr. Freeman, often serves as a proxy not just for poverty, but also for “class, education, discriminatory experiences, and certain behaviors, among other factors.”

### ***Culture and ethnicity***

It is important to define culture and ethnicity, two terms often used interchangeably with race, while all three are unique and separate entities. Culture, as defined by the *American College Dictionary*, is “the totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thoughts.”<sup>14</sup> The word’s use is often meant to denote a shared communication system, similarities in physical and social environment, beliefs, values, traditions, worldview, lifestyle attitudes, and behaviors. Many cultures can exist within any so-called racial or ethnic group.

Ethnicity, on the other hand, is often defined as the state of belonging to a social group that has a common national tradition. Members of an ethnic group are often believed to share common genealogy or ancestry. Ethnic groups are usually united by certain common cultural, behavioral, linguistic, and ritualistic or religious traits. In this sense, ethnic groups, such as Hispanic, Asian, African American, and Caucasian, are cultural communities.

With these terms defined, it is important to point out that the concepts of ethnicity and race are often used to create subdivisions within given populations. These subdivisions are often called “subpopulations.” West-Indian, Irish, and East-Indian Americans are examples of subpopulations. While individuals within these subpopulations often share similarities, it is important to realize that all individuals within a given subpopulation are not the same; “there is no single Black culture, just as there is no single White, Hispanic, or Asian culture.”<sup>15</sup> This article will refer to the Hispanic/Latino ethnic group (due to the fact that it is the largest minority group in the U.S.) to further elucidate this concept and shed light on the notion that Spanish-speaking individuals should be categorized by their country of origin.

Coined by the U.S. Census Bureau in 1970, the term “Hispanic” is often used to describe people of

Spanish-speaking origin.<sup>16</sup> The term is often used as an umbrella for Spanish-speaking groups of individuals, from Mexicans to Peruvians. It is not, however, a term that originated from within the Latino/Spanish culture.<sup>16</sup> The term’s use has been primarily by people who have been raised and educated in the U.S., as they are more accustomed to the term by education or family custom, while Latin nationals and recent immigrants to the U.S. typically do not self-identify as Hispanic.<sup>16</sup> The term “Latino,” on the other hand, is a term that is often used interchangeably with the term Hispanic; it is used to refer to people of Latin American descent, as distinct from Spanish descent (people originating from Spain).<sup>16</sup> Nevertheless, using the terms Hispanic or Latino in science and medicine is incorrect.

### ***Current use of the term race***

Censuses, databases, and hospital records often misuse the term race when collecting information on large groups of people, which is unfortunate, considering the fact that this data serves as a good source of information regarding the morbidity and mortality rates in particular populations.<sup>17</sup> An example of the importance of this is in the field of public health. Information about health across populations is critical in order to adjust health policy based on the increased risk for morbidity and mortality for those particular populations.

A drawback to the system currently in place is that there is not complete congruency in the terms used; there are different classification systems employed across the various fields. There is not a standard classification system used across all these databases, therefore it is difficult to accurately assess this information. Individuals who are included in a particular group in one survey may be included in a different group in another survey.

Another drawback to the current classification system had to do with the fact that most of the systems rely on self-identification by the individual. This reliance poses a problem because many factors can affect how individuals self-identify and can raise important questions, including the following: If a person is of multiple races, does their upbringing, more than genetics, affect how they self-identify? If they were raised in a household with individuals from only one of their races, will these individuals only self-identify with that one side or will they acknowledge both? Or if an individual is biracial, but has the physical

characteristics associated more with one race, do they only self-identify with that race?

### Use in epidemiology

When describing disease patterns across the population, it is important to be aware of the higher prevalence of certain conditions in specific population groups. An advantage of grouping individuals is that one can easily identify what individuals are at increased risk for certain conditions. The benefit of this is clear; provided this information, physicians can perform screening tests to determine the disease status of the person and, possibly, treat prophylactically to prevent the complications of some of these conditions.

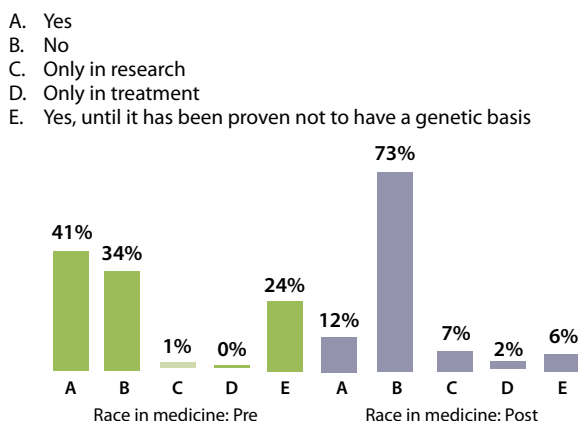
While it is necessary to somehow delineate the population characteristics and identify these individuals who are at increased risk, categorizing them by race is not appropriate or helpful.

Another drawback about this grouping system is that health care providers may mistakenly use the information about disease prevalence. A person's physical appearance may affect the physician's assessment of the patient. Bonham and Knerr found that "health care providers may also unknowingly interpret symptoms differently based on the race and ethnicity of the patient, arriving at different clinical decisions and making different treatment recommendations."<sup>18</sup> This practice could prove to be harmful if a life-threatening diagnosis is missed. While physicians should keep in mind that certain conditions are more prevalent in some populations, such conditions should not be ruled out or ignored simply because of the patient's apparent ethnic background.

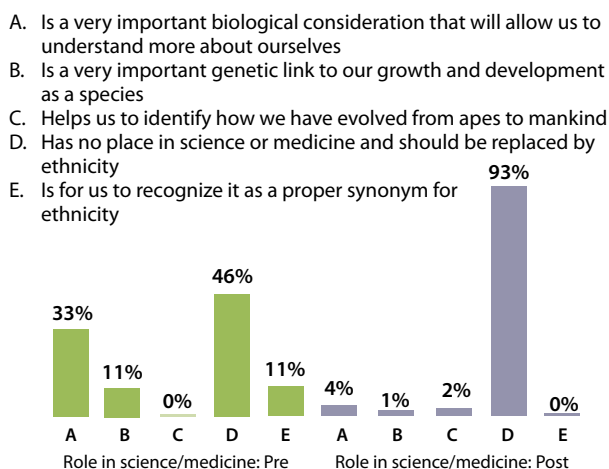
### Use in research

A classification system is necessary in medical research in order to collect information on differences in outcomes across population groups, if they do, in fact, exist. Clive O. Callender, MD, FACS, coauthor of this lecture, and colleagues found that there are differences among ethnic groups in organ donation.<sup>19</sup> They concluded that organs donated from African Americans were only associated with higher relative risk for African-American and Caucasian recipients, but not for Hispanic, Asian, or other ethnic minority recipients. Such information is essential when it comes to surgical decision making. It is important to collect such data in order to accurately assess the risk associated with outcomes across population groups.

**Figure 1.**  
Pre- and post-presentation results comparison for "Should race play a role in medicine?"



**Figure 2.**  
Pre- and post-presentation results comparison for "The proper role for race in science and medicine."



Moreover, with the wave of eliminating health disparities in full force, it is extremely important that there be an accurate system in place to highlight where the disparities lie and what the barriers are for equality in care.

The problem with the use of race in research lies in the fact that humans cannot be structured into geographical races on the basis of genetic variation. Keita and colleagues reported:



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Modern human genetic variation does not structure into phylogenetic subspecies (geographical “races”), nor do the taxa from the most common racial subclassifications of classical anthropology qualify as “races.” The social or ethnoancestral groups of the U.S. and Latin America are not “races,” and it has not been demonstrated that any human breeding population is sufficiently divergent to be taxonomically recognized by the standards of modern molecular systematics.<sup>9</sup>

Although a system is necessary, the system currently used in many research settings is not correct or appropriate.

### **Conclusions and recommendations**

It is not a novel concept that health disparities pose a serious problem in health care. Recently, much attention has been focused on eliminating these disparities and providing equity in health care for patients. With the changing climate in health care, it is essential to highlight those issues that contribute to health disparities in order to target and efface them. The misuse of the term race in science and medicine is one such issue. By misclassifying individuals into nonexistent racial groups, the negative connotations associated with these terms will continue to thrive. These must be eliminated to aid health care professionals in the battle to overcome health disparities.

Although throughout history classification systems have been in place to categorize individuals based on a variety of criteria, the U.S. population cannot be structured into racial groups because the term race does not exist as a biological term. The argument that there should be a classification system is valid. A classification scheme is needed in order to manage an efficient health care system. There are differences in disease prevalence, progression, and outcome across population groups. This concept has been established repeatedly in the scientific literature. Rather than investigating the impact of a person’s race on disease processes, research should focus on the impact of environmental and genetic variance on disease processes. When designing treatment plans for patients, the specific ancestral histories of individuals should be considered during group studies.

In 1997, Raj Bhopal published recommendations that parallel ours and deserve mentioning; he reported that race is not ethnicity and should not be used synonymously or interchangeably.<sup>20</sup> Ethnicity is a multifaceted and fluid term and reports that classify

ethnic groups should explicitly state how the classifications were identified. It was also mentioned that it is important to recognize the potential for personal influences by investigators, including ethnocentricity. This study cautioned investigators when generalizing results based on ethnicity, due to the fluid and dynamic nature of the term ethnicity. The recommendations included an assessment of environmental, lifestyle, cultural, and genetic influences when there are variations in disease.

The Institute of Medicine to the National Institutes of Health and the Office of Management and Budget recommend that the term race be replaced with ethnicity in all scientific writings and publications.<sup>21</sup> Future research and censuses should properly address ethnicity, culture, genetics, subpopulations, and SES. Figures 1 and 2, page 16, demonstrate the impact of discourse on this topic. They illustrate the changes of attitudes of an audience following a presentation

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on the subject at the 96th American College of Surgeons Clinical Congress in Washington, DC. The authors of this article are of the position that with the proper communication of the recommendations, physicians, scientists, and researchers will agree and act accordingly.

It is important for the medical profession to acknowledge that current race-associated differences are suggestive of other factors, namely differences in ethnicity, culture, genetics, SES, and so on. The term race is a social construct and should not be considered a biologic determinant with reference to science and medicine. As such, the term ethnicity should be used in place of race in all medical and scientific writings. The fact remains that we are all one race—the human race. 

## References

1. Begley S. Three is not enough: Surprising new lessons from the controversial science of race. *Newsweek*. 1995;125n7(Feb 13):67-69.
2. Witzig R. The medicalization of race: Scientific legitimization of a flawed social construct. *Ann Intern Med*. 1996;125(8):675-679.
3. U.S. Census Bureau. State and county quickfacts. Available at: [http://quickfacts.census.gov/qfd/meta/long\\_RHI125200.htm](http://quickfacts.census.gov/qfd/meta/long_RHI125200.htm). Accessed September 28, 2010.
4. Marks J. Science and race. *Am Behav Sci*. 1996;40(2):123-133.
5. Bhopal R. The beautiful skull and Blumenbach's errors. *BMJ*. 2007;335(7633):1308-1309.
6. Freeman HP. Commentary on the meaning of race in science. *Cancer Epidemiol Biomarkers Prev*. 2003;12:232s-236s.
7. Keppel B, Kenneth B. Clark in the patterns of American culture. *Am Psychol*. 2002;57(1):29-37.
8. Bhopal R. Medicine and health in a multiethnic world. *J Public Health*. 2009;31(3):315-21.
9. Keita SO, Kittles RA, Royal CD, Bonney GE, Furbert-Harris P, Dunston GM, Rotimi CN. Conceptualizing human variation. *Nat Genet*. 2004;36(11 Suppl):S17-20.
10. Kaiser Family Foundation. Policy challenges and opportunities in closing the racial/ethnic divide in health care. Menlo Park, CA. Available at: <http://www.kff.org/minorityhealth/7293.cfm>. Accessed September 25, 2010.
11. The Office of Minority Health. Data/Statistics. Rockville, MD. Available at: <http://minorityhealth.hhs.gov/templates/browse.aspx?lvl=1&lvlID=2>. Accessed September 25, 2010.
12. Smedley B, Stith A, Nelson AN. Introduction and Literature Review. In *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare*. Washington, DC: National Academies Press; 2003:29-79.
13. Prus SG, Tfaily R, Lin Z. Comparing racial and immigrant health status and health care access in later life in Canada and the United States. *Can J Aging*. 2010;29(3):383-395.
14. The American College Dictionary. In *Encyclopædia Britannica*. Available at: <http://www.britannica.com/EBchecked/topic/19580/The-American-College-Dictionary>. Accessed September 28, 2010.
15. Jones CP. Invited Commentary: "Race," racism, and the practice of epidemiology. *Am J Epidemiol*. 2001;154(4):299-304.
16. Cross Culture Communications. Latino or Hispanic panic: Which term should we use? Available at: <http://www.cross-culturecommunications.com/resources.html>. Accessed September 28, 2010.
17. Mays VM, Ponce NA, Washington DL, Cochran SD. Classification of race and ethnicity: Implications for public health. *Annu Rev Public Health*. 2003;24:83-110.
18. Bonham VL, Knerr S. Social and ethical implications of genomics, race, ethnicity, and health inequities. *Semin Oncol Nurs*. 2008;24(4):254-61.
19. Callender CO, Cherikh WS, Traverso P, Hernandez A, Oyetunji T, Chang D. Effect of donor ethnicity on kidney survival in different recipient pairs: An analysis of the OPTN/UNOS database. *Transplant Proc*. 2009;41(10):4125-30.
20. Bhopal R. Is research into ethnicity and health racist, unsound, or important science? *BMJ*. 1997;314(7096):1751-1756.
21. Haynes MA, Smedley BS, eds. *The Unequal Burden of Cancer: An Assessment of NIH Research and Programs for Ethnic Minorities and the Underserved*. Washington, DC: National Academy Press; 1999:83.

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