# VIEWPOINT

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# **Culturally Competent Science**

Although social norms have eliminated many forms of overt discrimination, more subtle forms of bias persist. Unfortunately, the scientific community, and particularly those of us in the health sciences, may be unintentionally contributing to many of these biases. The study of population differences is important for the understanding of health outcomes. However, studies of population differences can be, and have been, negatively influenced by subjective value judgments. This has historically taken the form of the majority population being ascribed as having "normal" traits and being used to set norms for disease definitions and treatment standards. We hypothesize that this subtle "majority is normal" bias has resulted from a lack of broad-based participation in the scientific process. Although there have been great efforts to promote culturally competent care, less has been done to encourage culturally competent science. The former focuses on practicing physicians delivering culturally competent bedside care, such as accommodating language differences. The latter goes beyond this and involves physician-scientists striving to incorporate cultural competency into the scientific process that ultimately develops the knowledge base that underpins bedside care. This would involve incorporating cultural awareness in hypothesis generation, study design, and data interpretation and being open to the possibility that scientific findings from one population (eg, concepts of disease and harm and appropriateness of treatment) may not be generalizable to other populations. Our concerns are similar to those prompted by recent awareness regarding sex bias in clinical research, which has led to the unfounded extension of scientific findings in men to women and has resulted in harm to female patients.<sup>1</sup>Culturally competent science requires that physician-scientists identify and understand their own biases and how those biases might influence the scientific process, and it necessitates the training and support of diverse physician-scientists.

### From Past to Present

History is littered with examples of biased and dangerous interpretations of natural and neutral differences between people that were justified with scientific evidence. The idea of a racial hierarchy was long upheld by phrenology's claim, at the turn of the 20th century, that intelligence could be estimated on the basis of the shape of a person's skull.<sup>2</sup> The prohibition of interracial marriage was also supported by biased scientific evidence. In *Perez v Sharp*, Los Angeles County argued that interracial marriage was a public health threat.<sup>3</sup> Similarly, homosexuality was codified as a mental health disorder until the 1970s, and treatment included attempts to change sexual orientation.<sup>4</sup>

Modern medicine is not immune to this problem. Studies have observed that, in transplant surgery, donor race negatively affects patient survival among white patients when kidneys from black donors are transplanted to white recipients; however, outcome differences by donor ethnicity did not exist when organs from black or white donors were transplanted to patients from other racial groups, suggesting that the original findings may be limited to the pairing of black donors and white recipients. This finding should raise the question of whether the negative association with survival is attributable to issues related to black organ donors, or to the immunotolerance of white recipients.<sup>5</sup> In the revised US Preventive Services Task Force breast cancer screening guidelines, the screening age was raised to 50 years to reflect the finding that the majority of women in the United States who develop breast cancer receive a diagnosis in their 60s. However, it was recently noted that this incidence pattern is only applicable to white women; among nonwhite women, the peak incidence of breast cancer is among women who are in their 40s.<sup>6</sup> In pediatrics, racial differences in the prevalence of attention-deficit/hyperactivity disorder have been interpreted to represent underdiagnosis among nonwhite patients. However, an equally plausible interpretation is that rates of attention-deficit/ hyperactivity disorder among nonwhite patients are the norm, whereas the disorder is being overdiagnosed in white patients.<sup>7</sup> Other examples of potential bias include how we designate what is normal vs what is average; in discussing characteristics such as height, for example, this can affect patients with dwarfism. Similarly, some individuals in the deaf community oppose cochlear implants and consider them to be a threat to their way of life.

One factor that likely contributes to the persistence of these biases may be the assumption that science is objective. However, the scientific process can be as subjective as lawmaking. Although scientific data may be objective, scientists bring their own biases to the process of interpreting data. These interpretations are often in the eye of the beholder and may be subject to confirmation bias, or the human tendency to seek only confirmatory conclusions and discount any contradictory data. The lack of appreciation that science can fall prey to subjectivity likely contributes to the unquestioning acceptance of, and deference to, scientific experts.

#### What Can We Do?

On an immediate, technical level, the scientific community can better incorporate the concept of heterogeneity of treatment effects, an emerging concept that is still not broadly appreciated in health services research. Lack of diversity in study populations has long been recognized as a flaw of the clinical literature to date. However, diversifying the study population does not truly address the generalizability problem because traditional clinical research assumes that there is only one conclusion that can be applied equally across the entire population. However, physician-scientists are increasingly recognizing that what works for one population or in one health system may not work in another. This concern must be actively considered in study design and analysis by examining interaction effects to explore the possibility that patient and/or health system factors modify treatment effects. Moreover, to the extent possible, we should explore the use of alternate reference groups in statistical analyses rather than automatically default to the use of the white male patient group as the reference group.

A long-term solution may only come when the scientific community borrows a lesson from civic life. The human experiment with democracy espoused that broad-based participation in the legislative process is necessary to ensure just laws. Inclusion of all segments of society is needed for true representation of diverse interests and prejudices. The same is likely true in science. We need to encourage students from diverse backgrounds to be interested in becoming not just physicians but also physicianscientists. It is hard to imagine that conclusions of racial superiority based on phrenology would have been accepted had nonwhite scientists been involved in the process that led to those conclusions. The democratization of society with regard to historically marginalized populations led to the revision of discriminatory laws. It is only through a parallel democratization in science that we can ensure that health care professionals do not unknowingly become supporters of social biases.

Training a more diverse population of physician-scientists, however, may not be sufficient. Physician-scientists are analogous to legislators in civic life; they can formally alter our practices through scientific publications and textbooks. However, grassroots participation in scientific debates by the lay public is equally important. Patients must be empowered, and their perspectives must be recognized as equal in validity to those of health care professionals. Recent efforts by the Patient-Centered Outcomes Research Institute to encourage patients to serve not merely as advisors but as co-principal investigators are noteworthy. Participation of nonscientists in the grant review process, as is done in the Congressionally Directed Medical Research Programs, is another example that should be replicated.

# Conclusions

The lack of diversity in our scientific community may be the source of many biases that ultimately harm our patients. As with any institution in a democratic society, the scientific community needs to better reflect the diverse community that it represents. And so if we truly want to deliver culturally competent care to all patients, we need to increase our efforts to recruit a diverse community of physician-scientists globally, to help develop and execute more culturally competent scientific agendas. Culturally competent care begins with culturally competent science.

# ARTICLE INFORMATION

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