Viewpoint: Race and Genomics: A Challenge to Medical Educators

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On April 14, 2003, the International Human Genome Sequencing Consortium, led in the United States by the National Human Genome Research Institute (NHGRI) of the National Institutes of Health and the U.S. Department of Energy, will announce the successful completion of the Human Genome Project. The project has produced a highly polished version of the human sequence, as complete as it can be within the limits of today's scientific technology.

This historic announcement, which coincides with the 50th anniversary of the Watson and Crick landmark description of DNA's double helix, provides those involved in genomic research a time to pause and celebrate these achievements. However, much remains to be done. The challenge now is to determine the genetic basis for health and the pathology of human disease. Over the next few decades, it is expected that genome-based research will enable medical science to develop highly effective diagnostic tools, to develop better therapies and preventive strategies for diseases that have a genetic component, and to better understand the health needs of individuals based on their genetic make-up.

This dawning of the era of the genome should also provide medical educators a sense of urgency to prepare students for the new world of medicine into which they will soon enter. As Francis Collins, M.D., Ph.D., leader of the Human Genome Project and director of the NHGRI, warned medical educators in a January 1999 article in Academic Medicine, "Time is short and there is much to do."

The pace of technology and genetic research has increased significantly during the four years since Dr. Collins issued that call to action to medical educators.

We must engage our students in understanding what this important - although at times confusing from the perspective of clinical practice - data mean in the care of their individual patients. Among the many unknowns: How are clinicians currently using this information in patient care? Ideally, how should this information be used? What should medical schools be teaching their students about such social and clinical issues as the ramifications of analyzing and utilizing information on genomics and race?

We have an obligation to prepare our students not only to understand the basic molecular function of the human genome, but also to analyze critically genetic variation research studies and whether they have meaning for clinical care of individual patients.

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Medical education is also faced with a responsibility to prepare students for the use, and potential misuse, of genomic information. We must teach medical students to question critically the use of racial labels within the context of medicine and biomedical research. We also should train our students not to use gross categorization, which is too often based upon skin color of population groups, to treat individual patients. In

simplest terms, all physicians need to be made aware that there are neither "black" genes, nor "white" genes.

Certainly, we must educate medical students about the concepts of genetic variation. It is scientific fact that, due to history and geography, certain alleles - a member of a pair or series of genes that occupy a specific position on a specific chromosome - are more common in some populations, but that does not mean they do not exist in other population groups. The doctors of tomorrow must understand that there are no genetic "bright lines" between population groups.

Along with the treasure trove of biomedical data that it has produced, the sequencing of the human genome has also made things much more complex. While it is exciting to explore all the newfound opportunities to improve health and reduce the burden of disease, we must also acknowledge the potential of this genomic data to be misused by some to separate us and perpetuate discrimination.

So, the field of medical education faces an enormous challenge: preparing students to use the benefits of genomic discoveries to improve the health of individual patients, without increasing disparities in health among socially defined racial groups in our society. Our country has a history of eugenics and racism that cannot be forgotten.

The ethical, legal, and social implications of genomic research must be incorporated swiftly into medical training. Furthermore, the physicians of tomorrow must be taught what genetic variation does - and does not - mean in the treatment of individual patients, whatever racial category a person may fit based upon a political or social construct of race or upon the frequency of polymorphisms and microsatellites in their genome.

Yes, we have much to do and time is short!