Race and genetics: How our ancestry both limits and exacerbates disease risks

An Asian American born in Connecticut in 2009 could expect to live 89.1 years. An African American, on the other hand, could expect to live 77.8 years. It's seldom surprising to see large discrepancies when comparing life expectancies in developed and developing nations, considering the vast differences in available health care. But how do we explain such a wide variance between two populations or ethnic groups living in the same region?

The complicated relationship between population, ethnicity and 'race'–and how it impacts our health –involves a complex equation of factors, including medicine, economics, psychology, anthropology, sociology and geography. But it also seems clear that there are so-called race-related genetic factors in play .

Cultures and health behaviors

At this point in the history of medicine, there are a handful of behaviors with well-established impacts on our health. Among this is tobacco smoking, which has been linked unequivocally to lung cancer and chronic obstructive pulmonary disease (COPD). It's also associated with cardiovascular and cerebrovascular conditions (leading to high blood pressure, atherosclerosis, heart disease, and strokes), and a host of non-pulmonary cancers. Yet different ethnic groups react differently to prolonged exposure.

Consider that the rate of smoking among Native Americans is higher than for any other group in North America, at 26.1 percent, according to American Lung Association. At the other end of the smoking spectrum are Asian Americans, at 9.6 percent, and Hispanics at 12.1 percent. In the middle are African Americans, 18.3 percent, and Caucasians, 19.4 percent.

smoking
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Source: American Lung Association

Based on smoking rates alone, you'd expect Asians and Latinos to have lower lung cancer rates, and they do. However, you'd also expect Native Americans to have higher lung cancer rates. Yet their lung cancer rates are only slightly worse than those of Latinos. Strikingly, the ethnic group with the highest lung cancer rate is African Americans, according to the Center for Disease Control (CDC).

A similar phenomenon is seen in alcohol use. According to the National Institute of Alcohol Abuse and Alcoholism (NIAAA), the most common drinkers are white males, 74.27 percent, while Asian-American women were the least common, at 36.11 percent. In terms of "daily heavy drinking," the highest rates were recorded among Hispanic males, at 40.48 percent, while Asian American men had the lowest rate, at 18.84 percent. Alcohol abuse relates to liver disease, nutritional disorders, and various cancers, but as with smoking the disease rates among ethnic groups do not correlate precisely with consumption.

Black men (25.81 percent) and women (19.02 percent), for example, reported lower rates of daily heavy drinking, when compared to white men and women. Yet, African Americans have a higher risk of developing alcohol-related liver disease, according to the National Institutes of Health.

Health genetics

With major killers like heart disease and stroke, there are a multitude of genetic factors, making for complex relationships between genetics and disease. For example, despite having a relatively high risk of developing cardiovascular disease, Latinos have a lower risk of actually dying from the disease. Thus, studies are constantly underway to examine genetic risk factors and markers. African Americans have a notoriously high rate of high blood pressure compared with other ethnic groups, and for decades there has been a debate regarding whether genetic factors or environmental factors are more important.

What about discrimination?

A potentially troubling possibility emerged from a University of Florida study published in December 2016 in the journal *PLOS ONE*. By interviewing 157 African American subjects in creative ways, researchers were able to show a relationship between the feeling of discrimination and high blood pressure. The study pointed to eight genetic variants of five genes previously known to be associated with cardiovascular disease. The cause of high blood pressure is complex, given that it's related both to physical phenomena such as factors controlling how tightly blood vessels squeeze, as well as psychological factors, since blood pressure rises in nearly everyone when they become anxious or stressed.

Putting all of these factors into a coherent picture of how diseases are generated appears to be a daunting task. Year by year, month by month, the science community is inundated with new data, especially from genomic studies. Various new instruments are in use too, and yet, when the goal is to assess anything related to ethnicity or race, the task grows progressively more difficult.

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