

A Public Health Perspective

Nature vs. Nurture: An Unnecessary Debate

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“Much publicity attended the pronouncement that 90 percent of cancer is environmentally caused (Higginson, 1960) ... It is easy to show that 100 percent of any disease is environmentally caused, and 100 percent is inherited, as well.”
(Kenneth Rothman, *Modern Epidemiology* [Boston: Little Brown, 1986], 14).

The findings of a study, “Environmental and Heritable Factors in the Causation of Cancer—Analyses of Cohorts of Twins from Sweden, Denmark, and Finland,” and a related editorial, “Cancer—Nature, Nurture, or Both,” each published in the July 13, 2000 issue of the *New England Journal of Medicine* seem to have ignited the old recurring nature vs. nurture debate—an unnecessary debate in terms of using genetic information to improve health and prevent disease.

Virtually all human disease is the result of the interaction of genetic factors and modifiable environmental and behavioral factors. Rarely does a single gene variant lead to the development of disease. Common diseases, such as cancer and diabetes, result from the complex interplay of genes and environment, and cannot be classified as only genetic or environmental. To label a disease as genetic-only is to propagate the idea that an individual is doomed to live with his or her genetic makeup. Conversely, classifying disease as environmental-only does not explain the role of genetic variations that increase susceptibility to environmental factors. These labels serve no purpose and are misleading.

While twin studies have inherent scientific value, they can lead to potential confusion when they attempt to assign percentage values to the roles of genetics and environment in causing disease. News stories published in the popular press after the release of the twin study exemplify this confusion. Although all of the stories were based on the same study, the headlines were conflicting. One headline read, “Study Ties Most Cancer to Lifestyle, Not Genetics” and another announced, “Study Says Genes Account for More Than One-quarter of Cancer Cases.” Assigning percentage values implicates both genes and environment in the development of disease. However, the subtleties of gene-environment interaction are not adequately described in this manner. A more thorough description of the process of gene-environment interaction is necessary to target appropriate intervention strategies.

We already know that the answer to the nature vs. nurture debate is, of course, that both nature and nurture are important. However, the ways that genes interact with each other and with environmental factors to influence an individual’s susceptibility to disease are largely unknown. Clinical and epidemiological studies are necessary to identify and better characterize genetic and environmental factors. This information can then be used to target appropriate interventions and achieve public health’s real goal, which is to prevent disease and improve health.