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Environmental Cancer

Last year the National Cancer Institute published an atlas of cancer mortality in the United States based on an analysis of death certificates for the period 1950 to 1969.* The atlas contains maps of the United States with each county color-coded to show the mortality rate for different types of cancer. From these maps it is quickly apparent that there are large variations in cancer death rates. Although part of the variation may be genetic, much of it is thought to be due to variations in exposure to environmental carcinogens—some natural, such as sunlight or molds; some due to personal habits, such as cigarette smoking; and some due to carcinogens in air, water, and diet. Recently, for example, increased bladder cancer rates were found in certain counties where chemical industries were concentrated. If estimates are correct that 60 percent or more of all human cancers are due to environmental agents, then about 500,000 cases per year may be involved. The benefit to human health that would accrue from controlling the carcinogens responsible for even a fraction of those cases is obvious.

To determine whether known or possible carcinogens are in the environment of populations with high cancer mortality, the resources of governments, industry, and academia should be applied through a variety of approaches. The U.S. Environmental Protection Agency (EPA) is committed to undertake an integrated assessment of population exposure to environmental carcinogens. The objective of the program is to detect the carcinogens that EPA is responsible for assessing and controlling. A new part of EPA's program will first focus on carefully selected types of cancer and certain well-characterized counties where the mortality rate for those cancers is either significantly higher or lower than the U.S. average rate. Samples of air, water, and food will be analyzed for specific chemicals that are hypothesized to account for local differences in cancer rates. Differences in the results of these analyses between the high-rate and low-rate counties plus leads developed from case-control studies in the high-rate areas may also suggest new candidates for animal carcinogenicity tests. If the approach is successful, it will be used in additional areas and with other types of cancer.

It is hoped that these studies will yield insights into the problem of low-level, chronic exposure to carcinogens. In addition, they may provide an approach for systematic studies of the role of environmental chemicals in causing illnesses other than cancer. Chemicals in the environment have been implicated as causes of diseases other than cancer which, like cancer, may be irreversible, delayed in onset for many years after exposure, and caused by low levels of chemicals that produce no acute distress. Such chemicals include mutagens, teratogens, and some agents that damage the central nervous system.

To provide a scientific basis for the regulation of hazardous environmental chemicals, EPA needs the assistance of a larger segment of the scientific community. Skills of many types of specialists and the close cooperation of all engaged in related endeavors are required. Expertise and data bases in other institutions, combined with EPA's environmental monitoring capability, will constitute potent tools for seeking agents whose control would prevent the development of cancer and other diseases in many persons.—

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*T. J. Mason, F. W. McKay, R. Hoover, W. J. Bolt, T. F. Fraumeni, *Atlas of Cancer Mortality for U.S. Counties: 1950–1969* [Publ. (NIH) 75-780, Department of Health, Education and Welfare, Washington, D.C., 1976].