• Statistical Health-Effects Study

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The main purpose of this program is to analyze the mortality of Hanford workers and to determine the effects of radiation exposure in this population. A secondary purpose is to improve methodology for assessing health effects of chronic low-level exposure to harmful agents or substances, particularly in an occupational setting. In the past year we have updated our analyses, submitted papers for publication in the two areas of methodological research, and have interacted with Hanford Environmental Health Foundation staff to improve data collection procedures.

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The primary objective of this program is to analyze the mortality of Hanford workers and particularly to assess the effect of radiation exposure in this population. Communication of both methodology and results is necessary to promote a clear understanding of the problems involved in drawing conclusions about the effects of low-level exposure. Therefore, results of the analyses of our recently updated files as well as a description of our methodology have been presented at a number of forums.

A second objective is to develop methodology appropriate to the analysis of data on low-level chronic exposure experienced by occupational populations. Two areas of research are currently being pursued. The first is a comparative investigation of various statistical approaches to the evaluation of health risks due to occupational exposures; the second is a study of the potentially biasing influence of variables other than radiation.

Updating, and subsequent validation, of the working master file at Pacific Northwest Laboratory was completed in September 1981. Various preliminary analyses have been performed on the resultant file, and procedures used in creating it have been documented.

A paper presenting results of a comparative investigation of various procedures for analyzing occupational exposures has been accepted for publication in the journal Biometrics. Questions of interest concern the advantages and disadvantages of using an external population for comparison, the development of expressions for the power of various procedures for detecting risks of differing magnitudes, and the relative merits of various analytical techniques and approaches to handling dosimetry data.

The impact of variables other than radiation (such as length of employment, job category, employment status, etc.) on mortality has been evaluated using computer software developed specifically for exposure analysis. Such variables are frequently correlated with exposure and can easily bias results when exposure is studied in an occupational setting. Such biases can be particularly severe when deaths are not related to the population at risk (proportional mortality analysis). The results of this research have been reported in a paper submitted to the American Journal of Epidemiology for publication.

Joint efforts with the staff of the Hanford Environmental Health Foundation, who are responsible for the data collection, are under way. This is to evaluate the potential usefulness of the data now in the file or under consideration for future acquisition, the adequacy of quality control procedures, and methods for maintaining files to achieve maximum utility and accessibility. Other questions being explored are the completeness of Social Security Administration death ascertainment and the quality of death certificate diagnosis. The second meeting of the Advisory Committee to the Hanford Health and Mortality Study was held in Richland in October 1981.