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## Winkleby and Colleagues Respond

It is apparent from the literature cited by Dr. Leigh that the powerful link between socioeconomic status (SES) and

health has generated research from multiple disciplines. We reviewed the references cited by Dr. Leigh and agree that all share some similarities with our topic. However, we did not find any replication of our research that quantifies the independent associations between the three main dimensions of SES (education, income, and occupation) and a set of risk factors for disease.

Dr. Leigh observes that many economists who have examined associations between schooling and indicators of health over the last several decades have emphasized that "education is more important than income in its association with health." Furthermore, he points out that economists have stressed that only when all three dimensions of SES are simultaneously accounted for can unbiased estimated associations be obtained.

The multidisciplinary finding that education is more strongly associated with health than are income or occupation has generated diverse hypotheses regarding the mechanisms through which education may positively influence health. We agree that it may not be years of education per se that confer a health advantage. It is the challenge of future researchers to assess the role of education by evaluating Fuchs' hypothesis that education is a proxy for ability to delay gratification, our hypothesis that education protects against disease (by facilitating an individual's acquisition of positive social, psychological, and economic skills), and other hypotheses. □

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## Computerized Multiple Cause-of-Death Information Available from NCHS

We were pleased to see the discussion by Cottrell et al.<sup>1</sup> regarding the utility of multiple cause-of-death information as a surveillance tool for occupation-related deaths. However, we would like to point out an error. The authors state that due to the "lack of access to computerized multiple cause-of-death files . . ." the use of these data is limited.<sup>P119</sup> In fact, the National Center for Health Statistics (NCHS) of the Centers for Disease Control annually prepares publicly available computer-

ized multiple cause-of-death tapes for the United States and the states, separately identified.<sup>2</sup> The tapes can be obtained from the National Technical Information Service. Furthermore, since 1985, the usual occupation and industry of the decedent has been included on these tapes for an increasing number of states, although not for the District of Columbia.

Using the publicly available 1987 multiple cause-of-death tape, I identified for the District of Columbia one death due to asbestosis (ICD-9 501) and four deaths due to mesothelioma (ICD-9 163.9). This is the same number identified for 1987 by Cottrell et al.<sup>1</sup> and reflects, presumably, the same individuals. Therefore, the NCHS tapes provide information similar to that determined by manual review. (Of these individuals, only two would have been identified if the underlying cause of death had been used.)

Using national statistics, I discussed some time ago the importance of and problems associated with using multiple cause-of-death information for occupational health epidemiology.<sup>3</sup> Furthermore, national statistics are regularly reported for the diseases noted in the article by Cottrell et al.<sup>1</sup> in the annual publication *Health United States*. In *Health United States, 1990*<sup>4</sup> data on sentinel occupation-related deaths among men aged 25 years or older are presented for 1980 through 1986, excluding 1981 and 1982, for which years only half of the multiple cause-of-death information was processed by NCHS because of budget constraints. For these years, only 83% of malignant neoplasms of the peritoneum and pleura deaths (an approximation to mesothelioma neoplasms), 36% of coal workers' pneumoconiosis deaths, 25% of asbestosis deaths, and 44% of silicosis deaths were identified through the underlying cause of death. These figures are not substantially different from the 15/48 (31%) of occupation-related deaths that were identified by Cottrell et al.<sup>1</sup> through the underlying cause of death. Therefore, the national experience is similar to the District of Columbia experience. □

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