PERCEIVED VS. ACTUAL RISKS:
THE PROBLEM OF MULTIPLE CONFOUNDING*

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A critical evaluation of a number of discussions, each of which attempts to apportion a certain amount of risk to smoking, is neither easy nor rewarding. Claims about the consequences of smoking are issues that have the potential for flaring tempers, evoking emotions, and calling forth moral convictions that convert scientific exchanges into adversarial encounters. Thus, before engaging in my analysis of the preceding papers, I note three important guideposts I will follow:

1. All criticisms which I shall voice are scientific and not personal.

2. I do not intend to speculate but lean heavily on data (and in doing that I shall bring in data, some of them new but others that ought to have been but were not referred to by the preceding speakers).

3. I insist on evaluating observations of effects to exposure to cigarette smoke within a spectrum of all the different types of microchemical environments to which we are exposed.

Perhaps the most striking observation about the papers in this session is that the word occupation has been singularly absent.

*Based on the discussion of presentations in the session on Smoking Cigarettes of the International Workshop on the Analysis of Actual vs. Perceived Risks, Washington, D.C., June, 1981.
Nowadays the importance of such an omission hardly needs discussion, especially when attempts are made to assess risk due to smoking. Because it is well known that smokers are subject much more than nonsmokers to occupational hazards [1, 2, 3, 4, 5, 6]. The statistical confounding between occupation, on one hand, and smoking, on the other, has now been established with sufficient research that variables related to occupation somehow must be adjusted for, or standardized, before computation of risks due to cigarette smoking may be attempted. Only now only do we know that among smokers there is a much higher proportion of blue-collar workers than among nonsmokers, a much higher proportion of workers who in their occupation are exposed to toxic fumes, dusts, and other hazards at the workplace (see especially Ref. 6). We also know that this is true for wives of smokers (whether the wives smoke or not) and for children of smokers. Thus even nonsmoking wives and children whose husbands and fathers are smokers also may be exposed to toxic dusts brought home on the hair, skin, and clothing of that member of the family. Also, occupation is a major determinant of social class with attendant differences in lifestyle, nutrition and exposure to other hazards. Thus, the occupation (and socioeconomic class) of the smoker and nonsmoker and their family are major factors for any calculus of risk.

We are able to demonstrate the effect of the statistical confounding on the evaluation of smoking risks due to occupation by a convincing example. This example was made possible by the recent work of Bonham and Wilson [7], who evaluated age adjusted rates of restricted activity days of children in homes in which there was smoking. We shall use the identical data file (the Public Use Tape of the Health Interview Survey of the National Center for Health Statistics for 1970, which includes information on respondents' occupation and smoking).

The following tables come from our study on familial effect of occupational exposure of head of household [8]. They are based on 25,647 children from 10,980 households in which there were 0, 1, or 2 smokers, and on 3,698 households with nonsmoking and nonworking women whose husbands' smoking habits were known. All households came from two occupational groups:

Group BC: These were blue-collar occupations in which the employee was likely to bring home varieties of dusts on clothing, hair, or skin. (For example: laborers, construction.)

Group PM: These were professional and managerial occupations in which the employee was not likely to be exposed to any dusts (For example: architectural, draftsman.)

The numbers of restricted activity days for acute or chronic respiratory or nonrespiratory conditions were used as indices of disease. (These indices are identical to those used by Bonham and Wilson, to which the reader is referred for further explanations.)