American Journal of Industrial Medicine 13:3–4 (1988)

Control of Smoking in Occupational Epidemiologic Studies: Methods and Needs

Aaron Blair, PhD, Kyle Steenland, PhD, Carl Shy, MD, Maureen O'Berg, PhD, William Halperin, MD, and Terry Thomas, PhD*

Key words: epidemiology, risk model, cancer, cohort studies

Many occupational epidemiologic studies lack information on smoking habits of study subjects [Blair and Spirtas, 1981; Steenland et al, 1984]. In fact, it is unusual for cohort mortality studies to include information on tobacco use. The absence of information on smoking complicates interpretations since tobacco plays a major role in the etiology of many chronic diseases including cancers of the lung, esophagus, larynx, mouth, bladder, and other sites, as well as nonmalignant respiratory disease and cardiovascular disease as reported by the Surgeon General [1979]. Differences in smoking prevalence between particular occupations and the comparison population may result in inaccurate assessment of the relationship between disease and the occupational exposure of interest.

The historical nature of most occupational cohort studies makes it difficult to obtain information on smoking. Occupational cohorts are usually assembled from company or union records which consist primarily of work histories and rarely contain information on tobacco use. Today this is changing somewhat and it is not unusual to find some information on smoking available in medical records of employers. Recording of smoking habits is a fairly recent practice, however, and information is seldom available for before the mid-1970s. Procedures to obtain information on smoking habits of cohort members can be expensive and complicated since many subjects will have terminated employment, moved to new geographic locations, or died. Location of these subjects is a difficult process.

In the absence of information on smoking, any observed excesses of smoking-related diseases noted among particular occupational groups could be interpreted as due to heavy use of tobacco. Likewise, deficits of these diseases could be due to a

Occupational Studies Section, National Cancer Institute, Bethesda, MD (A.B., T.T.).
Industry-wide Studies Branch, National Institute for Occupational Safety and Health, Cincinnati, OH (K.S., W.H.).
Department of Epidemiology, University of North Carolina School of Public Health, Chapel Hill (C.S.).
E.I. DuPont de Nemours and Co., Inc., Wilmington, DE (M.O.).

*Organizing Committee for Workshop on Obtaining and Using Information on Smoking in Occupational Epidemiologic Studies, sponsored by the National Cancer Institute and the National Institute for Occupational Safety and Health, December 15–16, 1986, in Bethesda, Maryland.

Address reprint requests to Dr. Aaron Blair, Occupational Studies Section, National Cancer Institute, Landow Building, Room 4C16, Bethesda, MD 20892.
Accepted for publication July 28, 1987.

high proportion of nonsmokers in the cohort. Although the lack of smoking information is a limitation that complicates interpretations, this is not to say that these studies are invalid, a charge commonly made. On the contrary, we are unaware of any examples where a convincing association between occupation and disease was later found to be due to confounding from tobacco use. Comparison of crude and smoking-adjusted SMRs in a study of US veterans [Blair et al, 1985] showed the two measures to be remarkably similar. The correlation coefficients between crude and smoking-adjusted SMRS were .88 for lung cancer, .98 for bladder cancer, and .97 for colon cancer, indicating that the absence of information on smoking, even for studies of tobacco-related cancer, seldom confounds risk estimates.

Despite the close agreement between crude and smoking-adjusted SMRs there are, nonetheless, strong arguments for obtaining information on tobacco use in occupational studies. First, information on smoking is necessary to describe possible interactions between smoking and occupational exposures [Blair and Spirtas, 1981; Steenland et al, 1984]. Second, smoking information is needed to avoid false negative findings (eg, in the case of a cohort which has a lower prevalence of smoking than the comparison group) since further follow-up studies are seldom initiated when SMRs are less than 100. Finally, public confidence in the quality of occupational studies may suffer in the absence of information on smoking.

Given the increasing need for occupational studies due to the continued introduction of chemicals into the workplace and the need to thoroughly evaluate strategies for dealing with smoking in these studies, the National Cancer Institute and the National Institute for Occupational Safety and Health organized a workshop to bring together experts in the field of occupational epidemiology to review current techniques for handling smoking in occupational studies and to suggest new approaches. This collection of papers covers the major topics relevant to the issue of tobacco in occupational research including biologic effects, methods of obtaining data on smoking, and analytic strategies for handling confounding and interactions. All papers have been subjected to extensive peer review both at the workshop itself and subsequently. We believe the papers in this issue will prove useful to occupational epidemiologists.

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