Asbestos Exposure and Cancer Mortality among Petroleum Refinery Workers: A Poisson Regression Analysis of Updated Data

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ABSTRACT. In this study, the authors investigated the relationship between asbestos exposure and respiratory cancer mortality in maintenance workers and other blue collar workers at an Italian oil refinery. The cohort contained 931 men, 29,511 person-years, and 489 deaths. Poisson regression analysis using white-collar workers as an internal referent group provided relative risks (RRs) for main causes of death, adjusted for age, age at hiring, calendar period, length of exposure, and latency. Among maintenance workers RRs from all tumors (RR = 1.50), digestive system cancers (RR = 1.41), lung cancers (RR = 1.53), and nonmalignant respiratory diseases (RR = 1.71) were significantly increased (p < 0.05); no significant excess was found for all causes and among both maintenance (RR = 1.12) and other blue-collar workers (RR = 1.01). Results confirm the increased risk of death from respiratory diseases and cancer among maintenance workers exposed to asbestos, whereas other smoking-related diseases (circulatory system) appear not statistically different among groups.

<Key words: asbestos, lung cancer, oil industry, respiratory diseases, smoking>

WORK IN OIL REFINERIES and petrochemical plants carries with it the likelihood of exposure to various substances, most of which are considered human carcinogens. Cancer risk among oil refinery workers has, as a consequence, been the subject of a great deal of scientific literature. Despite this attention, however, a thorough understanding of asbestos exposure effects on workers in this industrial sector has yet to be achieved. In fact, although studies have long linked asbestos exposure to lung cancer mortality for mesothelioma (which may reach 24 times above baseline, suggesting that inhalation of fibers occurred), evidence on lung cancer mortality varies from a significant reduction in the overall population of workers to a pronounced increase among blue-collar workers and maintenance workers (a large subgroup of workers involved in the use of asbestos). Finally, Rosamilia et al. observed nonsignificant increased odds ratios for long-term workers (25+ yr) in selected maintenance jobs (pipe, boiler).

To gain new insight into the health effects of exposure to both asbestos and other carcinogens in a recently updated Italian oil refinery cohort, we analyzed the main causes of death and adjusted the estimates for main confounding factors among three subgroups of oil refinery workers: (a) maintenance workers, (b) other blue-collar workers, and (c) white-collar workers.

Subjects and Methods

Description of the cohort. The cohort consisted of 931 male workers employed in an Italian oil refinery located in La Spezia, Italy, that shut down in 1977. Company