

Non-Hodgkin's Lymphoma Among Workers Potentially Exposed to Benzene

Workers in the petroleum industry are exposed to benzene and benzene-containing products. Numerous studies throughout the world have investigated this population and have reported on the relationship between benzene and non-Hodgkin's lymphoma (NHL). In a multinational cohort of 308,000 petroleum workers with potential exposure to benzene, investigators pooled the data from these studies in a systematic review of the issue (Wong et al., 2000). The study identified 26 cohorts of petroleum workers in the United States, Canada, the United Kingdom, Italy, Finland and Australia, the combination of which contributed to an observation period spanning from 1937 to 1996 and over 6.6 million person-years. In the merged cohort, a total of 506 NHL deaths were observed while 562 were expected. The standardized mortality ratio reflected this statistically significant deficit (SMR: 0.90 95% CI: 0.82-0.98). Stratum-specific analysis by the type of facility and industrial processes were 0.96 (95% CI: 0.86-1.07) for US refinery workers, 1.12 (95% CI: 0.90-1.37) for non-US refinery workers, 0.64 (95% CI: 0.50-0.82) for gasoline distribution workers and 0.68 (95% CI: 0.47-0.95) for crude workers. When considering each of the contributing studies individually, none of the studies showed a significant dose-response relationship. Wong et al. concluded the results from the individual studies, as well as the pooled analysis, indicated that petroleum workers were not at an increased risk of NHL as a result of benzene exposure in their work environments. In an update of the Australian cohort, the investigators found no increase in NHL mortality in the worker population (SMR: 0.82 95% CI: 0.40-1.47). Again, the conclusion drawn was that potentially benzene exposed petroleum workers did not show an increased mortality due to NHL.

A collaborative study conducted by researchers from the Chinese Academy of Preventive Medicine and the US National Cancer Institute reported a non-significant relative risk for non-Hodgkin's lymphoma (RR=3.0, 95% CI: 0.9-10.5) among Chinese workers exposed to benzene and other chemicals. Results of this study have been questioned due to a number of methodological problems of this study. In particular, this study population came from a wide spectrum of industries with heterogeneous exposures, including the food industry, textiles, paper products, agricultural chemicals, pharmaceutical, rubber and plastic, and electrical equipment. The study results were also based on potentially biased outcome classification, as the data collection team was aware of the exposure status of the workers. The study also used a small ad

hoc cohort of non-exposed workers as the comparison group instead of the more accepted comparison to a national cohort.

Currently, there is a lack of evidence to support the association between benzene exposure and non-Hodgkin's lymphoma. More definitive answers are anticipated in the near future, as the Shanghai Health Study, a prospective case control study based on cancer incidence, will conclude in 2007.

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