

LUNG CANCER MORTALITY RISK AMONG AN OCCUPATIONAL COHORT EXPOSED TO A MIXTURE OF COMMERCIAL AND NON-COMMERCIAL AMPHIBOLE ASBESTOS FROM VERMICULITE MINING OPERATIONS IN LIBBY, MONTANA

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Background and Aims: Vermiculite mining and milling in Libby, MT supplied the majority of North American demand for vermiculite during the 20th century. Libby vermiculite is contaminated with amphibole asbestos, including, winchite, richterite and tremolite. Libby workers and residents in the community were exposed to this mixture of largely non-commercial asbestos fibers for decades. Several million homes in North America may have vermiculite attic insulation from the Libby, MT mine.

Methods: Our analysis is based on 880 workers hired after 1959 when fiber concentrations were lower and possibly more consistent with potential environmental exposure. We used Cox proportional hazards models with time-dependent covariates to assess the effects of Libby amphibole asbestos on lung cancer mortality. Multiple exposure metrics including cumulative exposure, residency-time weighted exposure, and metrics mathematically allowing for effects of fiber clearance or translocation were evaluated. We compared lung cancer potency results using slopes and their corresponding risks with the slopes and risks from other investigations of the Libby worker cohort.

Results: There are four researchers who have recently published lung cancer potency results for the Libby amphibole asbestos worker cohort: Sullivan (2007), Berman and Crump (2008), Larson et al. (2010) and Moolgavkar et al. (2010). The adjusted lung cancer mortality slopes per calendar year from these four studies ranged from 1.6×10^{-3} to 4.2×10^{-3} per fiber/cc-year. Risks derived through life tables based on age-specific cancer mortality rates from these four studies ranged from 0.01 to 0.08 per fiber/cc. Uncertainties in the application of these epidemiologic data are discussed.

Conclusions: Libby amphibole asbestos, a mixture composed primarily of non-commercial amphibole asbestos, has repeatedly been shown to be associated with lung cancer mortality by different investigators using varying definitions of this occupational cohort.

Disclaimer: This abstract does not necessarily reflect EPA policy.

References:

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