

PAUSTENBACH - ABSTRACT

THE ROLE OF DOSE RECONSTRUCTION AND SIMULATION STUDIES IN UNDERSTANDING HISTORICAL EXPOSURE TO ASBESTOS

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Asbestos has been used in thousands of products over the last century. Because it was easily manipulated, inexpensive, flame-retardant, compressible, heat-resistant, and an effective sealant, asbestos was historically a preferred material for a number of products including, insulation, friction products, gaskets and packing materials and coatings, mastics and adhesives. However, questions have been raised about the health risks to persons that have been occupationally exposed to asbestos-containing products. Dose reconstruction and simulation studies have been used over the last 20 years as a way to characterize historical exposures under different product use scenarios. In designing and conducting a simulation study, a number of considerations need to be made when measuring airborne asbestos concentrations under different product use settings. Results from studies which evaluated asbestos exposures from repairing or manipulating asbestos-containing products, such as automobile brakes, gaskets/packings, mastics, and Bakelite, will be reviewed. These studies will be used demonstrate the methodological components that need to be incorporated in simulation studies involving asbestos, including characterization of background concentrations, air exchange rates, worker and bystander exposures, as well as utilization of analytical methods that not only are comparable to the occupational standards, but also provide information about fiber morphology and respirability. Simulation studies have shown that occupational exposure to asbestos associated with handling the above-mentioned asbestos-containing products are below contemporaneous and current occupational standards. Further, epidemiologic studies indicate that asbestos exposures at these levels are not associated with an increased risk of asbestos-related disease, including mesothelioma. This could be due to one or a number of factors: the airborne concentration of chrysotile asbestos and the duration of exposure are too small to be significant, the chrysotile fibers are too short to be biologically important, that chrysotile fibers are substantially less potent than amphibole fibers in inducing lung cancer and mesothelioma, or other yet-to-be-understood factors. Ultimately, simulation studies are a valuable tool for characterizing and reconstructing exposures to asbestos and assessing potential health risks when historical industrial hygiene data are lacking or incomplete.