

Low Exposure To Asbestos-like Mineral From Montana Vermiculite May Up Lung Disease Risk

ScienceDaily (Mar. 18, 2008) — Workers exposed to low levels of an asbestos-like mineral from Montana more than two decades ago are at an increased risk for lung disease today, according to research from the University of Cincinnati (UC).

Vermiculite is a mineral with a flaky, fluffy-looking structure. Previous studies revealed that the vermiculite ore mined in Libby, Mont., contained increased levels of an asbestos-like mineral fiber that can become airborne and inhaled when used in manufacturing.

In a 25-year follow-up study of workers at a plant which stopped using Libby vermiculite in 1980, current chest X-rays revealed that 20 percent of workers who experienced low cumulative exposure to these fibers had changes in the lining around their lungs. In the group with the highest exposure, changes on chest X-rays were noted in 54 percent of workers.

James Lockey, MD, senior research investigator, says the study indicates that this particular asbestos-like mineral contained in the Libby vermiculite ore can cause chest X-ray changes at previously unrecognized lower exposure levels.

"Workers with low-level exposures to Libby vermiculite ore may not have obvious health effects right away, but the past exposure is something of which their physicians should be aware," says Lockey, a UC professor of pulmonary and environmental health.

"Once inhaled, these fibers are very persistent and stay in the lung for a long time," he explains. "They lodge in the lung tissue and the tissue that lines the chest wall and cause inflammation, which can lead to chronic lung problems and diseases."

Records show that until the Montana mine was closed in 1990, it provided up to 80 percent of the world's vermiculite supply--which was widely used in both commercial and residential applications, including home insulation, packing materials, construction materials and gardening products. Vermiculite ore is now mined from other sources that reportedly do not contain similar asbestos-like mineral fibers. "The chest X-ray changes associated with the low cumulative fiber exposure are a public health concern," Lockey adds. "The Libby vermiculite ore was widely distributed across the United States for residential and commercial use, which means it could impact not only the workers who processed it but also consumers who used it for home insulation."

Lockey's team conducted a 25-year review of available data on workers who used the Libby vermiculite as an inert carrier for lawn care products. About 84 percent of the original 513 workers were living and 280 workers were able to participate fully in the study.

Former workers were asked to get a current chest X-ray and complete an interview with researchers about their lung health and job history since the original study was conducted. Chest X-rays were taken and reviewed independently by three radiologists to determine the extent of changes in the chest cavity.

"Our findings indicate that exposure within an industrial process to Libby vermiculite ore is associated with pleural thickening at low lifetime cumulative fiber exposure levels," says Lockey. "We've discovered the high propensity of these asbestos-like fibers in Libby vermiculite to dramatically increase the prevalence of pleural changes 25 years after exposure ended."

"This study serves as a reminder that there are naturally occurring asbestos-like mineral fibers in our environment that are not currently regulated," he adds. "More attention should be given to this issue so we can properly regulate and control these substances to minimize human health exposure risks."

Findings are reported in the March 15, 2008, issue of American Journal of Respiratory and Critical Care. Members of the research team included UC's Amy Rohs, MD; Kari Dunning, PhD; Rakesh Shukla, PhD; Huihao Fan; Tim Hilbert; Eric Borton; Jerome Wiot, MD; Ralph Shipley, MD; and Grace LeMasters, PhD. Former UC faculty member Cristopher Meyer, MD, and Vikas Kapil, DO, of the CDC, were also involved in the study.

Funding for this study was provided by the Centers for Disease Control and Prevention's Agency for Toxic Substances and Disease Registry and National Institute of Environmental Health Sciences.