Evaluation of Potential Health Risks Associated with the Ingestion of Asbestos

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Abstract:
The inhalation of asbestos, depending on the fiber type and dose, is associated with the development of mesothelioma and other asbestos-related diseases. However, little is known about the risk and development of asbestos-related disease associated with the ingestion of asbestos, which can occur through multiple exposure pathways. There is evidence of release of asbestos fibers from asbestos-cement pipes used in water distribution systems that potentially contaminate drinking water. Data from animal and human studies were analyzed using a weight-of-evidence approach to make conclusions regarding the potential risk of disease associated with asbestos ingestion. Human and animal studies that evaluated exposure due to ingestion were identified by peer-reviewed literature searches. Disease endpoints of interest included all gastrointestinal-related cancers. Regarding animal studies, our analysis identified 23 studies that examined multiple organ-specific cancer pathologies after ingestion of various asbestos fiber types; most studies exposed animals to asbestos-containing food. These studies employed a variety of doses in multiple animal species. Inconsistent dosing protocols made it difficult to compare doses between studies that used different protocols (e.g. 0-360 mg/week versus a 1-10% diet). Regardless of this challenge, the studies reported that the asbestos fibers, irrespective of fiber type and dose, failed to produce any definitive gastrointestinal carcinogenic effect. Our analysis also identified 19 studies that examined the influence of ingestion of asbestos-contaminated water, for concentrations from 1 to 71,350 million fibers per liter (MFL), on the incidence of cancer in humans for different sources of asbestos and cohorts from world-wide. A majority of the epidemiology studies reported statistically significant increases in multiple organ-specific cancers for concentrations much higher than the EPA’s maximum concentration level of 7 MFL. However, these findings are inconclusive due to several critical study limitations including flawed study design, small sample size, selection bias, lack of individual exposure history, lack of adequate latency, and the inability to account for confounders including occupational history, diet, and smoking history. Based on our analysis, there is no evidence of a relationship between ingestion of asbestos and an increased incidence of gastrointestinal tract cancers.