HEALTH EFFECTS OF NATURAL AND MINERAL DUST: THE ROLE OF TRACE ELEMENTS AND COMPOUNDS

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Abstract: This presentation will review the health effects of trace elements carried in natural and mineral dusts of geologic or geochemical origin. Exposure to mineral and natural dusts can cause a wide range of respiratory problems. At a small-scale level, these exposures can occur because of local processes, such as the dusts generated by mining hard rocks or coals, use of fine-grained mineral matter in sand-blasting, and formation of smoke plumes from fires (both natural and man-made). Dust exposure may also affect much larger geographical regions, such as the dust stirred up by earthquakes in the arid regions of the southwestern U.S. and northern Mexico. This dust carries spores of a fungus (Coccidioides immitis) that causes Valley Fever, a serious respiratory problem that can lead to fatigue, cough, fever, rash, including damage to internal organs and tissues such as skin, bones and joints. Dust exposure can even take global dimensions, ash ejected from volcanic eruptions can travel many times around the world, and recent satellite images have shown windblown dust picked up from the Sahara and Gobi deserts blown more than halfway around the world. The principal elements and compounds, which may be present in natural and mineral dusts and which are of concern to respiratory health are: trace metals (including Pb, Hg, As, Cd, and Fe); radioactive elements (radon, uranium); fluoride; silicates; asbestos and natural asbestiform compounds, such as zeolites (not including sources from mining). Of greatest concern for effects upon human health are the finer particles of the respirable (inhalable) dusts. In this regard, considerable work is being conducted in identifying dust particles derived from soils, sediments, and weathered rock surfaces.

Keywords: Dust, trace elements, trace metals, asbestos, respirable dusts, human health

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