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Coal Is Linked to Cancer in China Province

By SINDYA N. BHANOO

Nonsmoking women in an area of China's Yunnan province die of lung [cancer](#) at a rate 20 times that of their counterparts in other regions of the country — and higher than anywhere else in the world.

A group of scientists now say they have a possible explanation: the burning of coal formed during volcanic eruptions hundreds of millions of years ago.

Coal in that part of China contains high concentrations of silica, a suspected carcinogen, the [scientists reported](#) in a recent edition of the journal Environmental Science & Technology.

Like others in rural China, the families of Xuanwei County use coal for heat and for cooking. As the coal burns, particles of silica are released with the vapor and inhaled. Women, who do the cooking, face the greatest exposure.

"There is more silica in this coal than in 99.9 percent of all the samples we analyzed," said an author of the study, Robert B. Finkelman, a professor of geology at the University of Texas at Dallas.

Dr. Finkelman and his colleagues found that quartz, of which silica is the primary component, made up 13.5 percent of the coal samples taken from Xuanwei County. In normal coal samples, quartz and other minerals are found only in trace amounts.

The grains of quartz were so small they were only visible through an electron microscope, Dr. Finkelman said. Strikingly, the coal found in neighboring villages did not contain quartz at the same high levels or with such fine grain.

When the volcanic eruptions occurred 250 million years ago, they set off a mass extinction and released acid gases, leading to a variety of changes in the earth's environment, including acid rain. Dr. Finkelman speculated that the rain might have dissolved surface rocks composed of silica, which then might have worked its way into developing formations of coal.

The high cancer rates in Xuanwei have attracted the attention of scientists for decades. Dr. Qing Lan, an epidemiologist at the [National Cancer Institute](#) in Rockville, Md., is completing two studies involving hundreds of women and families there. While her team is confident that coal burning is causing the high rates of cancer, they are not certain it is due to silica.

She and Dr. Nathaniel Rothman, another epidemiologist at the institute, expect to finish collecting data this year and begin the tedious, multiyear process of analyzing it in hopes of isolating just what it is about the coal in Xuanwei that causes the high rates of cancer.

"You can never say any study is the last study," Dr. Rothman said. "But we hope this really nails it."

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