Results: From march 1998 to july 2001, 1820 workplaces were assessed by occupational health teams. Silica was used in [redacted]orkplaces at the start of the program. Use of [redacted]ed to 30.9% by august 2001. Estimated over-[redacted] declined from 14.6% in december 1999 to [redacted] 3274 workers were enrolled in the screening [redacted]0 pulmonaty X-rays taken. Results are available for 2661 workers. So far, parenchymal abnormalities compatible with early silicosis were discovered in 1.2% of workers. The total number of confirmed cases of silicosis was 19 as of july 2001. No new cases of accelerated or acute silicosis occurred since program inception.

Conclusions: We described the short term effects of a comprehensive intervention aimed at eliminating acute and accelerated silicosis in sandblasting. After five years of follow-up, no new cases compatible with acute and accelerated silicosis have occurred. Encouraging results in terms of use of substitutes for sandblasting and of higher knowledge of the health effects of silica by workers and industry were also noted. In spite of these results, it remains to be demonstrated whether or not these effects will continue in the future.

66 Reducing exposure to respirable quartz at for drill operators at surface coal mines

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Purpose: The purpose of this investigation is to evaluate the efficacy of a rule-change by the U.S. Mine Safety and Health Administration designed to reduce exposure to respirable silica dust for surface mine drill operators. The rule change (30 CFR 72.620; April 19, 1994) requires surface mine operators to use dust control devices on drills and authorizes MSHA inspectors to determine compliance based on visual inspection of dust and of controls.

Data/Methods: Results of more than 4,000 dust samples taken during unannounced inspections by MSHA inspectors have been obtained for the period from 1990 to 2000, both before and after the rule went into effect for all surface coal mines in the U.S. Data included the mine and date of samples, the concentration of respirable dust (c_D) and the percent quartz in the dust sample (p_Q). The concentration of respirable quartz dust (c_Q) was calculated as $c_D \times p_Q$. We determine whether concentrations of respirable quartz dust were reduced to acceptable levels after the rule went into effect.

Results: The industry-wide GM before the rule went into effect was 134.0 $\mu g/m^3$ and afterwards, 37.9 $\mu g/m^3$. There was no trend in the GM before the rule went into effect that would account for this difference. The average difference in concentration of respirable quartz for mines active both before and after the rule went into effect, was 97.2 $\mu g/m^3$. The average difference in percent quartz at these mines was not significantly different from zero (given the large numbers, tests of statistical significance are superfluous).

Discussion: Before this rule went into effect, there was substantial exposure to respirable quartz dust for drill operators at surface mines but afterwards, it was significantly less. For mines active both before and after, there was a significant decline in dust exposure that was entirely due to reduction in total respirable dust and not with change in the percent of quartz in dust samples. Nevertheless, there are many mines where exposure exceeds both the legal and the recommended exposure limits.

67 Health effects of respirable crystalline silica: unanswered questions

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The association between occupational exposure to respirable crystalline silica and silicosis has long been known. However, many questions remain about the pathogenesis, development, and risk of silicosis and other silica-related diseases.
The United States National Institute for Occupational Safety and Health (NIOSH) conducted a review of the health effects of occupational exposure to respirable crystalline silica. This review of a large body of literature found that crystalline silica is related to silicosis, lung cancer, pulmonary tuberculosis, and airways diseases and may be related to the development of autoimmune disorders, chronic renal disease, and other adverse health effects. Many uncertainties exist regarding (1) mechanisms and influence of particle characteristics on disease, (2) pathogenicity and toxicity of less well-studied forms of crystalline silica, silica substitutes, and dust mixtures, (3) movement of particles from the lung to other organs; and (4) exposure-response relationships in experimental animals and worker cohorts. Opportunities exist for further toxicologic, epidemiologic, and other research that will supplement dust control measures and eliminate these preventable occupational diseases.

68 Lung cancer among silica-exposed workers: is chance the only explanation for contradictory findings?

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In 1997, IARC upgraded crystalline silica to a Group 1 human carcinogen However, this decision has been criticised based on violations of the principles of causality including the lack of consistency in experimental results across species, lack of replication of findings under different circumstances of exposure, and the lack of a clear dose-response curve. Recent epidemiological literature on the silica-silicosis-lung cancer link replicates the inconsistent findings that have been characterising 50 years of scientific debate in the occupational arena. Exposure circumstances capable of modifying the silica-lung cancer association include chronic bronchitis, composition of the dust mixing, particularly concerning co-occurrence of other known or probable lung carcinogens, total respirable dust, concentration of silica in respirable dust, type of crystalline silica, and particle surface characteristics. The hypothesis of a sil-

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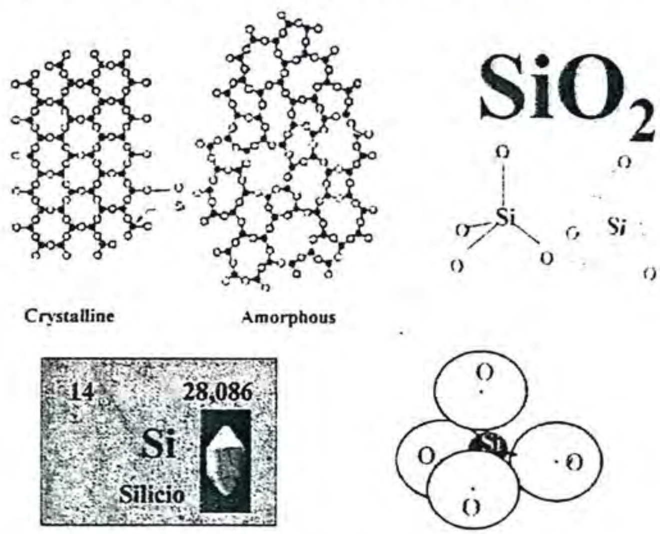

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