

## The Changing Epidemiology of Coal Workers' Pneumoconiosis in Appalachia – Investigating the Role of Silica Exposure.

**A. S. Laney, PhD, MPH<sup>1</sup>, E. L. Petsonk, MD<sup>1</sup> and M. D. Attfield, PhD<sup>1</sup>.** Email: [aol4@cdc.gov](mailto:aol4@cdc.gov)

<sup>1</sup>National Institute for Occupational Safety and Health, Division of Respiratory Disease Studies, Morgantown, WV.

### Background

Epidemiologic reports since 2000 have documented increased severity and rapid progression of pneumoconiosis among underground coal miners in KY, VA, and WV. To investigate if silica exposure might explain the increased disease, we examined chest x-rays (CXRs) for specific abnormalities (r-type small opacities) known to be associated with silicosis lung pathology.

### Methods

Underground coal miners are offered CXRs every 5 years, and abnormalities consistent with pneumoconiosis are recorded by NIOSH B Readers using the International Labour Office (ILO) Classification of Radiographs of Pneumoconioses. CXRs from 1980–2008 of 46,117 participating miners in KY, VA, and WV were studied, focusing on reporting of r-type opacities (small rounded opacities 3–10 mm in diameter). Log binomial regression was used to calculate prevalence ratios adjusted for miner age and profusion category.

### Results

The percentage of CXRs showing any r-type opacities in the region increased from 0.18 in 1980–89 to 0.59 in the 1990–99 period (PR=2.5, 95% CI=1.7–3.7) and increased further from 1990–99 to 1.4 for 2000–08 (PR=1.6, 95% CI=1.2–2.2). The increase from 1980–89 to 2000–08 was 5.2 fold (95% CI=3.7–7.3). The proportion of CXRs showing profusion categories 2 or 3 (reflecting disease severity) in these states increased from 1980–99 to 2000–08 (crude PR=2.3, 95% CI=1.8–2.8).

### Conclusions

r-type opacities increased in the 1990s and 2000s among underground coal miners from KY, VA, and WV, suggesting increasingly excessive exposure to respirable silica. These results and reports from the region of severe and rapidly progressive pneumoconiosis challenge the effectiveness of current approaches to controlling respirable silica in US coal mines.

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