

## Respiratory Morbidity Among Former U.s. Coal Miners

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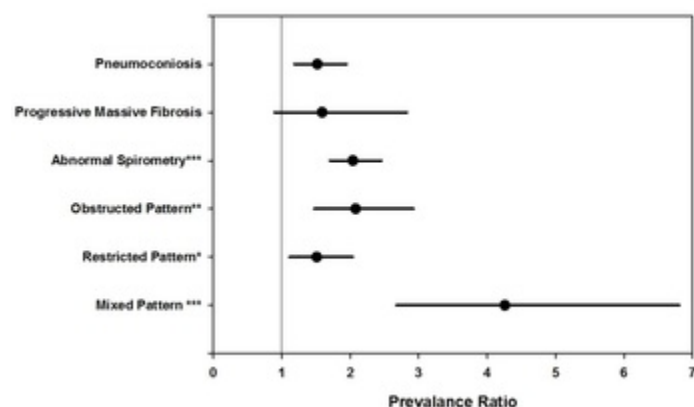
**Rationale:** Inhalation of coal mine dust (CMD) can cause pneumoconiosis, a chronic occupational lung disease, and has been associated with decrements in pulmonary function. For over 40 years the National Institute for Occupational Safety and Health Coal Workers' Health Surveillance Program (CWHSP) has conducted a surveillance system where coal miners are offered free, periodic chest radiographs for the detection of dust-related lung disease. In recent years, pneumoconiosis prevalence and severity have increased among working miners. Historically, former miners were not included in the CWHSP and have not been systematically surveyed for pneumoconiosis, therefore little is known about this population. We investigated the prevalence of pneumoconiosis and abnormal lung function among former bituminous coal miners.

**Methods:** During 2012 and 2013, NIOSH's mobile surveillance unit traveled to coal mining regions where former coal miners were notified through community outreach efforts of the opportunity to obtain a free chest radiograph and spirometry test. Radiographs and spirometry were classified according to International Labour Office standards for pneumoconiosis and American Thoracic Society lung function interpretative strategies, respectively. We calculated prevalence of pneumoconiosis and abnormal lung function and compared prevalences among former miners to a 2009–2013 survey of working coal miners (n=6645), using a modified Poisson regression to estimate prevalence ratios, adjusting for confounders. Only miners reporting 10 or more years of mining were included in the analyses.

**Results:** We evaluated 923 former miners' chest radiographs from 10 states; 64 (6.9%) had pneumoconiosis. Of those, 13 (1.4%) had progressive massive fibrosis, the most severe form of pneumoconiosis. Four hundred and seventy-three former miners performed spirometry— 86% tests were of acceptable and repeatable quality. Of those, 111 (27.3%) had abnormal lung function. Figure 1 demonstrates that significantly higher prevalences were observed among former miners when compared to working miners for pneumoconiosis, abnormal spirometry, and all three patterns of lung function abnormalities when controlling for confounders (see Figure).

**Conclusions:** Compared to long-tenured working miners, pneumoconiosis and abnormal lung function prevalence in former miners were significantly elevated. Pneumoconiosis is a progressive disease that can develop and/or worsen after a miner has left employment. Long-term effects of CMD on lung function after a miner has left mining are not completely known. Fully characterizing the scope of CMD-related respiratory morbidity and progression requires ongoing surveillance of both actively working and former miners. Furthermore, outreach and education efforts focusing on the long-term respiratory hazards of CMD should also target former miners.

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