

**Grant AFC719-35:** Evaluation of Silicosis, Asthma and COPD among Sand and Gravel and Stone Surface Miners

**Organization and Principal Investigator:** Michigan State University (Kenneth Rosenman)

**Focus Area:** Injury and Disease Exposure and Risk Factors

**Priority Area:** Examination of the Relationships between Mine Environment Exposures and the Development or Exacerbation of Asthma and COPD.

**Problem Statement and Research Approach:** Approximately 43% of miners in the United States are either sand and gravel or stone miners. In 2015, there were 6,292 active sand and gravel mines (34,781 miners), and 4,303 stone mines (67,070 miners) in the United States.

The risk of silicosis in stone quarry sheds is well documented. Even though surface sand and gravel and stone miners are the largest group of miners in the United States, there have been limited studies on their health or the types of exposures that may contribute to adverse respiratory health outcomes. The risk of silicosis in stone quarry sheds is well documented and there have been some reports from state surveillance systems on the occurrence of silicosis among sand and gravel miners.

Individuals exposed to silica during mining operations are at risk not only for silicosis but also for COPD. In addition, miners are also potentially at risk of developing work-related asthma (WRA) from exposure to diesel fumes and other workplace allergens and irritants.

We will contact miners in two ways: 1) Through their employers, and 2) Directly during the MSHA required refresher training sessions. The potential number of miners to be contacted are the approximately 3,000 surface miners. Miners will be classified as having: 1) Silicosis, no silicosis or unable to determine because no chest radiograph was reviewed; 2) Asthma, no asthma, or unable to determine; 3) COPD, no COPD, or unable to determine; 4) Definite work-related asthma, possible work-related asthma, no work-related asthma, or unable to determine, or 5) no lung disease.

**Specific Aims:** The project aims to:

- Conduct a cross-sectional study of the prevalence of asthma, work-related asthma, COPD and silicosis among miners in Michigan with an emphasis on surface miners.
- Determine the number and rates of individuals with silicosis, asthma, work-related asthma, and COPD, and daily and weekly respiratory symptoms related to work.
- Find the relationship between levels of silica with average predicted FVC, FEV1 and FEV1/FVC ratio and percent abnormal over time.