

Grant AFC719-20: Assessing Noise Exposures, Hearing, and Risk of Injuries Among Miners

Organization and Principal Investigator: University of Michigan (Richard Neitzel)

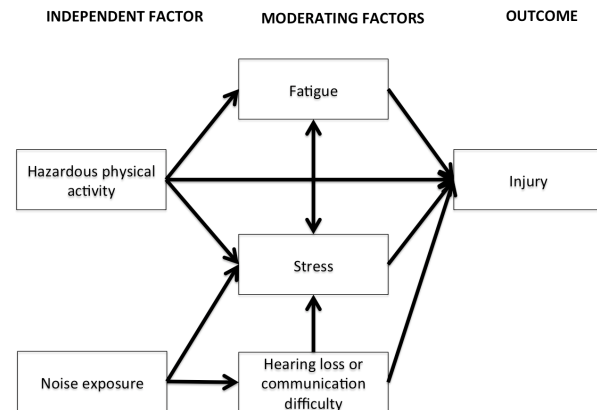
Focus Area: Injury and Disease Exposure and Risk Factors

Priority Area: Hearing loss

Problem Statement and Research Approach: Occupational injuries represent a tremendous health and economic burden to mine workers and their employers in the US and globally. However, despite this situation, a number of potential injury risk factors have not been adequately explored, including the risk of injury due to noise exposure, hearing loss (HL), and use of hearing protection devices (HPDs). Noise is ubiquitous in mining, and noise-induced HL is one of the most common occupational diseases among miners. Noise and HL may increase injury risk by decreasing situational awareness or ability to hear warning signals. HPD use essentially creates HL in normal-hearing workers and may exacerbate HL in hearing-impaired workers. The objective of our study is to evaluate the relationship between injuries and noise, HL, and HPD use among miners.

Approximately 76% of miners are potentially exposed to hazardous noise. Average exposures >85 A-weighted decibels (dBA) cause temporary and permanent noise induced hearing loss as well as non-auditory health effects such as sleep disturbance, hypertension, and heart disease. Given widespread exposures to noise among miners, and the negative consequences of HL and other noise-related health effects, additional research on occupational noise is warranted, and interventions that may result from such research could yield extensive health benefits to workers.

Noise can increase stress cause distraction or impede situational awareness, degrade performance, increase fatigue (, and reduce ability to hear critical sounds. Noise may also disrupt vestibular function, increasing risk of falls. Noise has been identified as an injury risk in several industries. However, only one study appears to have been conducted on US mines; this study suggested higher injury rates among US coal miners with greater exposure to noise (Volk et al. 2016).



Conceptual model of the relationships between noise exposure, hearing impairment from NIHL or use of hearing protectors, and injury

Specific Aims: The study has two specific aims:

- Specific Aim 1: To retrospectively evaluate the risk of recordable injuries associated with noise in a cohort of noise-exposed workers at a single large mining facility over a 10-year period.
- Specific Aim 2: To prospectively evaluate the risk of nonfatal injuries as well as near misses associated with noise, NIHL, and robust and validated measures of HPD use.