of the frequency and severity of injuries. The second analyzes injury characteristics using MSHA defined data fields and author defined injury classifications. Key findings are discussed in the third section. In summary, 370 serious injuries were identified, 26 of these were fatalities. Although haulage truck dump-site activities resulted in a small proportion of surface mining injuries, these injuries were much more likely to result in death or significant lost time than most other surface mining injuries. The findings of this report support that haulage truck dump-site activities are worthy of continued study by those interested in improving the health and safety of workers at surface mines.

***C4.3 Evaluating Safety Interventions in the U.S. Mining Industry***—Coleman PJ, Kerkering JC

Traumatic injury prevention in the workplace is an ongoing challenge, particularly in high-risk industries such as mining. When a safety program is changed, or a new emphasis added, how can it be evaluated? What works and what doesn't? We outline one approach to this problem here.

In mining companies as in other industries, accidents often occur as events that can be modeled by a Poisson process. When safety program improvements are made, the expected reduction in accidents can also be modeled as a change in the process parameter. From a practical standpoint, if a reduction in accidents is observed over some time period, the hypothesis of a significant change in the underlying parameter can be tested using tail sums of binomials. Alternatively, confidence intervals for two observed accident counts in non-overlapping intervals can be compared. For typical mining companies wishing to assess whether changes in safety procedures have had a significant impact on injury rates, these comparisons are easily done but the power of such tests depends on the numbers of accidents being compared, or on the length of observation periods.

We used Mine Safety and Health Administration (MSHA) reported injury and illness databases to determine average values of reported accident counts for mining companies. Employment data for mines was also analyzed to obtain baseline values and variability over time. To facilitate the use of statistical tests to compare the effects of a safety intervention, tables were constructed based on the comparison of two Poisson rates. These provide confidence intervals for observed event counts from pre- and post-intervention periods. Methods were also developed to account for changes in employment or hours worked during the observation periods. We discuss ways in which these techniques can be used by employers, unions, and researchers to improve safety and health.

***C4.4 Alternate Measures of Risk for Communicating Study Results: Comparisons of Injury and Chronic Disease Mortality in the NIOSH Colorado Uranium Miners Cohort***—Park R, Stayner L, Bailer J, Gilbert S, Halperin W

Traditional measures of relative risk such as SMRs, Rate Ratios, and attributable risks or fractions, are often not meaningful or intuitive for many audiences. Using simple lifetable (SMR) and more powerful Poisson regression methods, we produced estimates of SMRs, attributable risk fraction, attributable years of potential life lost, and excess lifetime risk for both chronic disease outcomes (lung cancer, nonmalignant respiratory disease) and fatal injuries. These results provide stark summaries of the magnitude of work-related mortality among uranium miners. For example, for every year employed, miners on average lost almost 4 months of life expectancy just due to risk of subsequent work-related lung cancer. Although work-related chronic disease deaths dominated (due to radon, silica and probably other exposures), more years of life were lost on average, per individual injury death (37 yrs), than for a lung cancer death (20 yrs). In deriving meaningful statements on injury risk, it is especially important to describe consequences in terms of years of life lost due to hazards on the job as well as other epidemiological measures of risk.

**Session: C5.0**
**Title: Intervention and Risk Factor Research**
Category: Intervention Evaluation
Moderator(s): Linda Goldenhar

***C5.1 Evidence on the Effectiveness of Measures Recommended to Prevent Workplace Homicide***—Loomis D, Wolf S, Runyan CW, Marshall S, Butts JD

Government agencies have recommended that employers adopt measures to reduce the risk of homicide on the job. Their recommendations include both environmental design modifications and administrative actions. To investigate the value of recommended preventive measures, we analyzed data from a case-control study of homicide in North Carolina workplaces in 1994-98. Workplaces were the units of analysis: case workplaces were those where a worker's death resulted from homicide during the study period (n=105); control workplaces were an incidence-density sample of the study base, matched by industry sector (n=210). Data on safety measures and other workplace characteristics were collected by telephone interview. Conditional logistic regression was used to estimate the exposure odds ratio (OR) as an indicator of association. Among 13 environmental interventions examined, only the presence of a barrier between workers and the public (OR 0.5, 95% CI 0.2-1.2) was associated with a noteworthy reduction in risk. Keeping entrances closed during working hours (OR 0.5, 95% CI 0.2-1.1), special arrangements with a law enforcement agency (OR 0.4, 95% CI 0.2-0.8), pre-employment psychological screening (OR 0.5,


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# ABSTRACTS

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