(64,444 structural fires of which 7,938 were classified as serious fires). Hood wearing produced significant decreases in neck burns (by 54%), ear burns (by 60%) and head burn totals (by 46%). Based on our combined laboratory and field results, we recommend the use of modern thermal protective hoods.

**Session: G5.0**
**Title: Simulation Exercises**
Category: Safety Communications and Training
Organized by Henry P. Cole, University of Kentucky
Moderator(s): Ted Scharf and Mike Colligan

***G5.2 Simulation Exercises to Prevent Occupational Exposure to Blood and Other Body Fluids***—Gershon RM, Karkashian, Christine D, Cole HP, Flanagan PA

Simulation Exercises to Prevent Occupational Exposure to Blood and Other Body Fluids An interventional study, designed to identify and develop innovative strategies to reduce health care workers' risk from bloodborne pathogens, was recently conducted. One of the strategies that was developed and evaluated was the use of simulation exercises to improve health care workers' adherence to recommended safe work practices. Participatory action research teams (PAR), composed of front line workers, managers and researchers, worked together to develop five scenarios that were based on actual exposure incidents. The exercises were tailored for different health care worker sub-groups, such as nurses, doctors and operating room staff. The exercises present factual risk assessment data, (such as the risk of infection with human immunodeficiency virus following a needlestick) as well as examples of barriers to compliance with safe work practices that health care workers might face in their everyday jobs. The exercises also present ways in which these barriers might be overcome.

The exercises were evaluated qualitatively through several pilot studies involving health care worker populations. A quantitative assessment tool that could be used in a pre/post test format has also been developed.

Because of the nature of the risk, and the relationship between the risk and the adoption of self-protective behaviors, simulation exercises may be a highly effective approach to limiting risk of exposure among health care workers. This approach might also be an effective method for targeting risk taking behavior with respect to a number of health care associated hazards, such as respiratory pathogens (e.g., not wearing respiratory masks), musculoskeletal injuries, (e.g., unsafe lifting), etc.

***G5.3 Using a Narrative Simulation Exercise for Training Motorists to Avoid Collisions With Farm Machinery on Public Roads***—Lehtola CJ, Cole HP, Bean TL, Piercy LR, Struttman T, Westneat S

The third leading cause of tractor-related fatalities is collisions with motor vehicles on public roadways. These deaths include tractor operators as well as motor vehicle occupants. Many motorists do not recognize the limitations of the tractor operator such as sight, hearing, and not being able to travel at high speeds. Motorists also may not be familiar with the meaning of the Slow Moving Vehicle emblem or the activation of turn signals vs. flashing hazard lights.

A simulation exercise was developed for the purpose of training "John Q. Public" motorist about the hazards posed by farm machinery on public roads. The exercise titled: "No Way To Meet A Neighbor" is an interactive story that presents an interesting but tragic scenario about a tractor and motor vehicle collision on a public road. The story is based on real incidents. The exercise is designed to help both farm and non-farm youth and adults become more aware of :

The risk of tractor and motor-vehicle collisions Strategies for avoiding collisions.

The use of ROPS and seatbelts prevent injury and death to tractor operators during even very severe tractor - motor vehicle collisions.

The exercise was developed in a workshop held at the University of Florida that included injury prevention specialists as well as university students involved in an agricultural safety class.

The exercise has been field tested in different locations in the country, including Florida, Ohio, and Kentucky. It has also been tested with a variety of age groups from pre-driving youth to adults. Answer sheets and questionnaires were returned for N=350. The data is being analyzed at the time of this abstract submission. Initial results indicate that for the adult sample the exercise appears to be both interesting and effective as a teaching activity.

***G5.4 The Use and Impact of Narrative Simulations in the US Coal Industry***—Vaught CV

This presentation will summarize the results of a recent study to assess how mine health and safety trainers used simulation exercises that were distributed (over a two year period) by the Mine Safety and Health Administration (National Mine Health and Safety Academy). The exercises are designed to teach judgment and decision making skills in three broad content areas: first aid, technical practices, and a mixture of the two. A previous study revealed that more than 400,000

response sheets were distributed prior to December 1994. The present study focused on who ordered the exercises (1995-1996), how the materials were used, and their impact on training. The sample size is 52 organizations. Safety and health trainers from these organizations reported that 31,785 workers were trained with the simulation exercises.

The presentation will condense and report on several aspects of the study. These include: exercise administration and evaluation strategies, perceived value of the simulations as training tools, and trainer suggestions for new materials. Overall, trainer responses to the survey suggested that the simulations helped to improve the effectiveness of their instruction and promoted a problem-solving approach to their training. The structure of their training also allowed them to make use of trainees' knowledge and experience. A large majority of the health and safety trainers responding to the survey offered to help in the construction and field-testing of new exercises.

The presentation will conclude with a few observations concerning continuation and expansion of the simulation exercises as one method for occupational health and safety training within the mining community. There were many collaborators in the construction and testing of the mine safety and health simulation exercises, and many are interested in extending those early collaborations.

***G5.5 Using Case-based Interactive Narrative Simulation Exercises to Prevent Occupational Injuries***—Cole HP

A series of interactive narrative simulation exercises was developed to empower workers and managers to recognize and remove risk factors for occupational injuries. The simulations are stories derived from actual injury and disaster cases. As workers select from among decisions alternatives at critical points in the exercises, they interact with the plots, characters, goals, and predicaments encountered in the story scenario as well as with each another as they collaborate in the decision making process. Research suggests four criteria for designing these types of problem-solving exercises. First, the narratives and decision alternatives must be accurate with respect to surveillance data that define injury events in terms of agents, hosts, risk factors, environments, exposure to specific injury agents, as well as the frequency and severity of these injury events. Second, the exercise narratives must by authentic with respect to the lives, culture, plights, context and language of the populations for whom the materials are designed. Third, the exercises are powerful teaching devices but also can serve as valid tools for assessing knowledge, attitudes, and behavior in situations like those depicted in the narratives. Fourth, the format of the exercises (paper and pencil, physical models, role play, computer, etc.) is not as important as the intent and coherence of the exercise narrative. Field tests of more than 100 simulation exercises in a wide variety of occupations provided information about the problem-solving skills in which workers excel, the areas in which they need more education, the identification and correction of dangerous misconceptions, and areas in which the ability to work safely is compromised by poor work practices, poor equipment design, and the absence of adequate tools and resources. Worker performance data from the exercises can help management improve instruction, work organization, ergonomics, and engineering controls to reduced injury frequency and severity.

**POSTER SOCIAL**

***PS.01 The Economic Impact of Occupational Fatalities, A Retrospective Study (1995-1998)***—Beaulieu AM, Leighton RW, Lim KC, Richards RF

Background: Since 1991 the Maine Department of Labor (MDOL) in collaboration with the Federal Bureau of Labor Statistics began documenting occupational fatalities under the Census of Fatal Occupational Injuries (CFOI) program. The CFOI program record occupational fatalities under guidelines that identify the nature, part, source and event that led to that fatality.

Purpose of Study: The primary objective of the study is to determine the magnitude of the economic impact of fatal workplace injuries from 1995 through 1998 in Maine and how many of these fatalities were preventable.

Methodology: Using data from the CFOI and the Maine Workers' Compensation Board (WCB), the economic impact of 86 fatalities was assessed using indicators such as years of potential life lost, loss of future earnings, Workers' Compensation payments and OSHA penalties.

Results: The 86 fatalities accounted for 1,919 years of potential life lost study. The total sum of lost wages based on the retirement age of 65 not adjusting for inflation is estimated to be over $1.3 million. Of the 86 cases, 29 (33.7%) cases had WCB death benefit payment, which totaled $1.49 million and incurred $170,857.00 in medical cost. Funeral cost accounted for $198,071.00.

OSHA investigated 23 cases and levied fines totaling $554,625.00. An analysis of 50 case reports by BLS Safety consultants indicated that 90.0% of these fatalities were preventable.

Discussion: Work-related fatalities present a significant economic impact to employers. Direct cost includes death benefit payments and medical expenses. Indirect cost includes lost of productivity due to disruptions at work, poor morale and OSHA fines. Long term impact includes the years of potential life lost and potential earnings. In addition, work-related fatalities have a significant impact on the quality of life of the families of the deceased workers.


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# ABSTRACTS

## National Occupational Injury Research Symposium

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