

CTDs relative to a state which does not is 2.79 (95% CI: 1.33, 5.92); for forearm/elbow conditions the odds ratio is 4.42 (1.20, 19.29); for shoulder/upper arm conditions the odds ratio is 4.34 (1.43, 14.73); and for conditions involving the hands/wrist, forearm/elbow, and shoulder/upper arm combined the odds ratio is 3.90 (2.31, 6.65).

Conclusion. The consistency of findings suggests that a significant difference in reporting may exist, possibly related to state workers' compensation policy regarding compensation for CTDs.

Session 30: Occupational Violence

Workplace Violence: Research for Prevention—Jenkins EL

An average 20 workers are murdered and another 18,000 become the victims of nonfatal assaults in the workplace each week in the U.S. While all workers are potentially at risk for such attacks, surveillance data indicate that the largest number of workplace homicides occur in retail trade (38%) and service (17%) sectors. The largest number of nonfatal workplace assaults occur in the service sector (64%), particularly in nursing homes (27%) and hospitals (11%). The highest rates of workplace homicide occur in retail trade (1.60 per 100,000 workers) and public administration (1.30). Homicide is the leading cause of occupational injury death for women in the workplace and the second leading cause of death overall. For homicides, men are at three times higher risk than women, but for nonfatal assaults women are at slightly higher risk than men. Risk factors for workplace violence include dealing with the public, the exchange of money, and the delivery of services or goods. Prevention strategies include environmental designs (e.g., visibility and lighting, cash-handling devices, and bullet-resistant barriers), administrative controls (e.g., staffing plans and violence prevention policies) and behavioral strategies (e.g., training in non-violent response to robbery). There are, however, very little scientific data as to the effectiveness of these strategies in various settings, either alone or in combination. Research on workplace violence (surveillance and risk factor research) is made more difficult by the lack of complete victim, perpetrator, risk factor, and exposure information. The description of the nature and magnitude of this problem has, to date, relied on information collected for other purposes (e.g., death certificates, workers' compensation files) or as part of a larger criminal justice information system (e.g., victimization surveys). Future research on workplace violence will have to address the limitations of existing data and focus heavily on evaluating the efficacy of prevention strategies in various settings.

Evaluation of Risk Factors for Workplace Violence in Liquor Stores—Hartman C, Peek-Asa C, Kraus JK, Erickson J, Howard J

Introduction. Liquor stores have the second highest workplace homicide rates in the U.S., second only to taxicab drivers. The number of nonfatal injuries to liquor store employees is unknown, but likely exceeds the number of fatal events. Workplace violent injuries in liquor stores are due predominantly to robbery and shoplifting, but little is known about the risk factors that make liquor stores especially vulnerable. This study examines the robbery history and risk factors for workplace violence found in a small sample of Southern California liquor stores.

Methods. Robbery and assault histories for liquor stores in Santa Monica, California were collected from January 1992 through July

1996 from the Santa Monica Police Department (SMPD). Owners from 20 liquor stores in Santa Monica were eligible to participate in the study; 12 (60 percent) agreed. Environmental surveys to determine risk factors for robbery and workplace violence injury were conducted in each of the participating liquor stores.

Results. Robberies and assaults are very common among liquor stores in Santa Monica. On average, liquor stores were robbed one time in the four-and-one-half-year time period covered by SMPD records, with a range of 0 to 5 robberies. During the same period, three assault-type offenses were averaged, with a range of 0 to 8 assaults. Robberies accounted for 13 percent of all crimes reported to police by liquor stores; assaults accounted for 60 percent. The survey of risk factors identified many potential areas to introduce prevention strategies, including cash handling, store-front window visibility, indoor and outdoor lighting and training in crime control.

Conclusion. This survey found a number of risk factors for robbery and workplace violence for which interventions could be both inexpensive and easily implemented. This research is a pilot-study for a large-scale intervention of workplace violence.

Risk Factors for Robbery and Employee Injury in Convenience Stores—Hendricks S, Landsittel D, Amandus H, Malcan J

Homicide is the second leading cause of workplace fatalities. Additionally, the annual number of workplace assaults have been estimated to be one million or more. The majority of these workplace assaults and homicides are robbery related. Convenience stores have been shown to be especially vulnerable to robbery and employee injury. The results of two studies examining the risk factors associated with robbery and employee injury in convenience stores are reported here. The first study consisted of collecting information from police reports of convenience stores in the metropolitan areas of seven states. The purpose of these data was to examine risk factors (use of a weapon by the robber; number of customers in the store at the time of a robbery; gender of a lone employee; the number of employees on duty; the amount of money stolen; time of day of the robbery; the stores past experience with robberies) which are associated with the risk of an injury given a robbery occurs. Results from this study as well as the limitations of using police reports are discussed. The second effort was a case-control study of convenience store robbery in the three largest metropolitan areas in the Commonwealth of Virginia where a case store was a store with a robbery reported to the police and a control store was a store within a 2-mile radius of the case store which was open at the time of the robbery. The purpose of these data was to examine the association of store environmental designs (use of a cash limit and drop safe; location of the cash register; escape routes and hiding places; lighting inside and outside the store; view into the store from outside, within the store, and out from the store; use of security cameras, videos, and security mirrors; presence and location of gas pumps and pay phones), geographical factors (proximity to major highways and traffic routes and amount of traffic; surrounding criminal activity; surrounding land use; socio-demographic characteristics of the surrounding community), and store operational characteristics (number of employees on duty; training of employees in robbery prevention; weapons available to the employees) to the risk of a store being robbed. Results from these data are presented. Difficulties and limitations of assessing factors

associated with the overall risk of injury to employees from these two separate components are discussed.

Washington State's Late Night Retail Worker Crime Protection Regulation: Relationships with Employer Practices—Nelson N, Mendoza CT, Silverstein BA, Kaufman JD

Washington's Late Night Retail Worker Crime Protection regulation, which became effective in February of 1990 and is enforced by the state OSHA program, was intended to prevent injuries by deterring violent crimes in retail establishments. We investigated whether the regulation was associated with businesses' violence prevention activities. 1,516 employers at high risk of robbery, including gas stations, groceries, convenience stores, hotels, restau-

rants, and taverns, were surveyed in 1995 to determine whether they had violence prevention training programs for their employees (a requirement for businesses covered by the standard). Overall, awareness of the regulation was low (4.4%). Employers covered by the regulation were more likely to have training programs (OR=1.4), as were those aware of a regulation (OR=3.4). State OSHA plan contact (in the form of a compliance inspection or consultation visit) was also associated with having a training program (OR=1.9). There was some suggestion that chain businesses were more likely to have programs (more specifically, those chains that had experienced a robbery). Despite low awareness of the standard, results suggested that regulatory efforts to protect high-risk employees were associated with employers' robbery and crime prevention activities.

Day Three--Friday, October 17, 1997

Session 31: Injuries and Fatalities in Retail Trade

Workplace Deaths in the Retail Industry, US 1992-1995—Peek-Asa C

Introduction. In many urban areas of the United States retail is among the fastest growing economic sectors and employs a growing percentage of the overall workforce. Although retail has not traditionally been identified as a high-hazard industry, it is among industries with the highest number of workplace deaths. The Bureau of Labor Statistics reported that 17% of all workplace deaths in 1994 were among retail workers. This presentation will examine workplace deaths in the retail industry in order to identify specific types of workplace hazards.

Methods. Workplace deaths reported to the Bureau of Labor Statistics's Census of Fatal Occupational Injuries from 1992 through 1995 were examined. The retail industry was identified using Standard Industrial Codes 5210 through 5999; types of retail establishments were further divided by SIC. Characteristics of deaths including age, gender, occupation, activity, and type of injury were compared between retail and other industries.

Results. The three leading causes of workplace death in the retail industry were violence (69.8%), motor vehicle crashes (18.9%) and falls (3.1%). Workers killed in the retail industry were 9.0 times more likely to die because of a violent event than workers in other industries (95% CI = 8.38 - 9.66). Although violence-related deaths decreased slightly over the study period they remain the leading cause of retail deaths. Among different types of retail establishments deaths attributable to violence ranged from 22.4% (building supply) to 98.9% (liquor stores). Females, younger workers, occupations dealing with money and the public were at highest risk of a violence-related death. Risk factors, types of injuries, and activities during injury will be examined in the presentation.

Discussion. Workers in the retail industry are at lower risk of most types of workplace deaths but have a markedly increased risk of death by violent means. As workplace violence becomes a larger proportion of workplace deaths and the industries at greatest risk of workplace violence increase in number and size, prevention

measures will need to be identified and evaluated. Prevention measures must be flexible to fit a variety of workplace settings.

Fatal Occupational Crushing and Amputation Injuries in Scrap Balers and Compactor—Moore PH, Smith EO

Purpose. Scrap balers and compactors reduce large amounts of solid waste to small units by means of powered rams or compacting panels. These machines are used by manufacturing companies to handle large amounts of scrap and waste materials such as paper, cotton and metals, by retail and service establishments to compress paper and cardboard boxes, and by government agencies for refuse collection, disposal and recycling. Stationary compactors and balers are commonly used in recycling centers, manufacturing facilities, and retail stores, while mobile compactors are used in refuse collection. The goal of the presentation is to describe the circumstances and risk factors associated with crushing and amputation injuries due to baling and compacting equipment, and to provide recommendations which employers and workers can use to prevent future injuries.

Research Data. Data sources were the National Traumatic Occupational Fatalities (NTOF) surveillance system, the Census of Fatal Occupational Injuries (CFOI), and the Fatality Assessment and Control Evaluation (FACE) project. NTOF is based upon death certificates, CFOI identifies fatalities through multiple sources, and FACE combines surveillance of occupational fatalities with site investigation of selected fatality types.

Hypothesis. Crushing and amputation injuries sustained due to baling and compacting equipment are preventable. Determination of circumstances and identification of risk factors can lead to the development of prevention strategies.

Method. Fatalities were identified through key word searching of all three databases and were further classified by machine type (stationary or mobile). Field investigations conducted by the New Jersey FACE program evaluated the circumstances of three of these fatalities. Risk factors identified were addressed by the development of recommendations for injury prevention.

Results. The NTOF identified 58 fatalities involving compacting