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Employer Costs of Alcohol-Involved Injuries

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Background *This study estimates the annual cost of alcohol-related injuries to employers in 1998–2000.*

Methods *Incidence was estimated with occupational injury data, motor vehicle crash data and health care data for 1998–2000. Employer costs were estimated from federal estimates of injury costs by source of payment using data on the percentage of varied payment streams (e.g., health insurance, sick leave) paid by employers.*

Results *The annual employer cost of alcohol-related injuries to employees and their dependents exceed $28.6 billion. Out of this, $13.2 billion comes from job-related, alcohol-involved injuries. The annual employer cost of motor vehicle crashes in which at least one driver was alcohol-impaired is over $9.2 billion. Out of this, only $3.4 billion comes from job-related alcohol involvement.*

Conclusion *Safety programs can reduce the fringe benefit bill without reducing the benefits offered to employees.* Am. J. Ind. Med. 50:136–142, 2007. © *2006 Wiley-Liss, Inc.*

KEY WORDS: occupational injury; alcohol; cost; benefit-eligible dependents; fringe benefits

INTRODUCTION

Employers pay for injuries that occur to their employees on- and off-the-job and to their dependents. They also pay for harm caused to non-employees involved in commercial highway crashes (crashes involving a vehicle on employer business). A good portion of these costs to employers come from alcohol-related injuries. Smith et al. [1999a] found that alcohol is an important factor in many fatal non-traffic injuries and that its importance varies by cause of injury. Alcohol was a major contributing factor in 32% of all homicide cases; 31% of unintentional injury deaths; and 23% of suicide deaths. An estimated 32% of fatal road crashes involved an intoxicated driver or pedestrian.

Several studies have estimated workplace injury costs [Fahs et al., 1989; Markowitz et al., 1989; Neumark et al., 1991; Marquis, 1992; Miller and Galbraith, 1995; Leigh et al., 1997, 2004]. However, none of them estimated the burden that alcohol-involved injuries place on employers. We believe our study is the first to estimate employer costs of alcohol-involved injuries both in the workplace and beyond the company door. We report costs for both motor vehicle and non-motor vehicle-related injuries.

METHODS

In our analysis, we considered the following costs:

Health Fringe Benefit Costs: These are the costs of fringe benefits paid because of illness and injury of employees and their dependents. They cover contributions to Workers' Compensation medical and disability insurance, health insurance, sick leave, Social Security disability insurance, life insurance, and private disability insurance, as well as insurance administration and overhead.

Non-Fringe Costs: These costs include the disruption costs employers face when employees suffer injuries preventing them or their co-workers from working at full

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capacity. Recruiting and training workers to replace fatally injured or permanently disabled employees raises the bill employers pay for injuries. In the case of on-the-job motor vehicle crashes, these costs also include motor vehicle property damage and liability insurance, crash-related legal expenses, and the costs of unreimbursed vehicle damage and replacement. In addition, employers pay taxes to help fund police, fire, and ambulance services.

Wage Premiums: Employers pay wage premiums to workers for accepting risky jobs. Individual workers and their families bear the pain, suffering, and quality-of-life losses associated with workplace injury. Wage premiums for risk-taking can be viewed as payments in advance for possible future losses caused by injury. However, these payments are not necessarily paid to all workers in high-risk jobs and not at a uniform rate across industries. Indeed, Leigh [1995] failed to find statistically significant wage-risk premiums, but subsequent analyses suggest this was due to temporary aberrations in the labor market that since have corrected themselves. More recently, a series of meta-analyses [among them, Miller, 2000; Viscusi and Aldy, 2003] have more firmly established the existence of wage-risk premiums and more tightly bounded their credible range.

Estimation Methods for Different Categories of Alcohol-Involved Injuries

We estimated employer costs separately for each of the following injury categories.

MV-related, on- and off-the-job injuries

Employer costs of alcohol-involved MV crashes on- and off-the-job were estimated from a combined file from 1999 Fatal Analysis Reporting System [National Highway Traffic Safety Administration, 1999, 2000a], [National Highway Traffic Safety Administration, 1999], and 1999 General Estimates System [National Highway Traffic Safety Administration, 2000b]. FARS is a census of all fatal crashes in the United States. It indicates whether crash victims were on the job at the time of crash. CDS contains a nationally representative sample of tow-away crashes for vehicles less than 10,000 pounds. It does not indicate whether crash victims were on the job at the time of crash. GES, which contains a nationally representative sample of all crashes in the US, was used to estimate the incidence of non-fatal crashes not captured by CDS. It also does not indicate whether crash victims were on the job at the time of crash. The GES file was adjusted for under-reporting of alcohol involvement by police through the method described in Blincoe et al. [2002].

Zaloshnja et al. [2004], costs per victim were merged into the combined file by body part injured, fracture involvement, and threat to life severity. The costs then were distributed into more detailed cost categories (e.g., workers' compensation medical and disability costs, health insurance, disability insurance, and life insurance costs, social security costs, auto insurance costs, unreimbursed property damage, etc.) with the distribution in Miller [1997]. Other costs per case and wage risk premiums are from Miller [1997]. These costs were inflated to 2000 dollars using inflators (medical spending per capita, employment cost index, and consumer price index—all items) calculated from the 2002 Economic Report of the President [Council of Economic Advisors, 2002].

The costed file was used to estimate employer costs of alcohol-involved injuries on-the-job and off-the-job. All liability payments to third parties involved in crashes with vehicles on employer business were assigned to occupants of such vehicles. Given that the information on the commercial nature of the vehicle is not available for all vehicles in CDS and GES and the information on whether crash victims were on the job at the time of crash is lacking for all vehicles, a logistic regression model constructed from 1991 to 1999 FARS was used to estimate the probability of a crash injury being work-related in cases when it could not be directly determined. The dependent variables used in the logistic regression model included alcohol involvement, restraint use, seating position, gender, and age group (0–15, 16–20, 21–45, 46–64, and over 64). The regression coefficients appear in Zaloshnja and Miller [2006, see appendix].

Fatal, non-MV, on-the-job injuries

The average annual incidence of fatal, occupational, non-MV injuries was estimated from 1999 to 2001 Census of Fatal Occupational Injuries [Bureau of Labor Statistics, 2000, 2001a, 2002]. Weber and Cox [2001] reports that 9.3% of all fatally injured employees were under the influence of alcohol. From 1999 to 2001 FARS, we estimated that 9.1% of MV occupational fatalities were alcohol involved. From these two percentages, we extrapolated that 9.4% of Non-MV occupational fatalities were alcohol involved [(All fatals $\times$ 9.3% $-$ MV fatals $\times$ 9.1%)/non-MV fatals].

Greenfeld and Henneberg [2001, Table 12] report that workplace homicides in which the perpetrator was under the influence of alcohol and the victim doesnot represent 23% of all occupational homicides. This percentage was multiplied by the annual number of occupational homicides estimated from 1999 to 2001 Census of Fatal Occupational Injuries [Bureau of Labor Statistics, 2000, 2001a, 2002].

Costs per fatality were updated from Miller [1997]. These costs were inflated to 2000 dollars using inflators (medical spending per capita, employment cost index, and consumer price index—all items) calculated from the 2002 Economic Report of the President [Council of Economic Advisors, 2002].

Fatal, non-MV, off-the-job injuries

Estimates on alcohol involvement in fatal non-MV injuries from Smith et al. [1999a], the above percentage (9.4%), and fatal injury counts from 2000 National Vital Statistics System [National Center for Health Statistics, 2002] were used to estimate the incidence of fatal, alcohol-involved, non-occupational, non-MV injuries. The updated costs per fatality from Miller [1997] were used to estimate total costs.

Non-fatal, non-MV, on-the-job injuries

The estimation of employer costs of non-fatal, alcohol-involved, occupational, non-MV injuries was started by inflating occupational medical, wage loss, and disruption costs per case reported by Leigh et al. [2004] and detailed in an unpublished table [Miller et al., 2002], using medical cost and wage indices for years 1993 and 2000. Using the year 2000, incidence of non-fatal occupational injuries that caused work loss or required medical treatment, found on the BLS website [Bureau of Labor Statistics, 2001b], we estimated the total cost.

Except for wage losses, these costs are fully borne by employers. Miller [1997] estimated that only 83% of wage losses are covered by employers. It estimated this percentage from the percentage of workers with WC coverage and with sick leave, wage replacement rates from WC, and the employer share of Social Security Disability Income for temporary and permanent disability work losses, and the wages lost to temporary and permanent disability. To avoid double counting, we subtracted the employer costs of non-fatal, occupational, MV injuries found in a companion paper [Zaloshnja and Miller, 2006]. Finally, we multiplied the remaining cost by 4% alcohol-involved [Cherpitel, 1993] to calculate the employer costs of non-fatal, occupational, non-MV injuries that were alcohol-involved.

Greenfeld and Henneberg [2001; Table 12] report that non-fatal occupational assaults in which the perpetrator was under the influence of alcohol and the victim was not represent 30% of all non-fatal occupational assaults. This percentage was multiplied by the total number of non-fatal occupational assaults resulting in days away from work, estimated from Bureau of Labor Statistics' Annual Survey of Occupational Injuries and Illnesses [Bureau of Labor Statistics, 1999]. The same unit costs as above were applied for this category of injuries.

Non-fatal, non-MV, off-the-job injuries

We based our estimation of employer costs of non-fatal, alcohol-involved, non-occupational, non-MV injuries on incidence by cause estimates from 1998 National Health Interview Survey [National Center for Health Statistics, 2000] and National Hospital Discharge Survey [National Center for Health Statistics (NCHS), 1996]. The percentages of alcohol-involved injuries by cause came from Smith et al. [1999b] and are shown in Table I. To avoid double counting, we subtracted occupational injuries from the total number of injuries for ages under 65, assuming that people under 65 were either employees or their dependents.

In this study, we adopted costs per case used in Zaloshnja et al. [2005]. To estimate what portion of health insurance care costs for employees and benefit eligible dependents employers pay, we multiplied medical costs from Zaloshnja et al. [2005] by the percentage of medical spending covered by private insurance (39%: [Bureau of the Census, 2001], Table 120), and by the percentage of private insurance premiums paid by employers (78%: [Branscome and Crimmel, 2002]).

For sick leave and disability insurance estimation purposes, we assumed that non-occupational injury victims aged 18–64 were employed during the period covered by our study. To estimate sick leave costs, we multiplied short-term wage loss by the percentage of it compensated by sick leave (50.1%: [Hensler et al., 1991]). To estimate disability insurance costs, we multiplied the total long-term wage loss for the 18–64 age group by the percentage of employees covered by employer financed disability insurance (44%: [Bureau of Labor Statistics, 2000]). Lost productivity caused by the absence of non-occupational injury victims, and hiring and training costs were adopted directly from Zaloshnja et al. [2005].

Table II summarizes the methods and sources used to estimate employer costs of alcohol-involved injuries.

RESULTS

The annual employer cost of alcohol related injuries to employees and their dependents exceed $28.6 billion, including wage-risk premiums (Table III). Out of this, 30%

TABLE I. Alcohol Involvement in U.S. Injuries by Cause, Age 0–64

Cause	Alcohol involvement
Unintentional	
Pedestrian/pedalcyclist, MV-related	44%
Pedestrian/pedalcyclist, Non-MV-related	44%
Other MV	30%
Poisoning	20%
Burn	17%
Drowning	43%
Falls	25%
Other	25%
Assault	41%
Suicide	23%

TABLE II. Summary of Methods and Sources

Injury category	Incidence	Costs
MV-related, alcohol-involved injuries on and off the job	Estimated from a combined 1999 FARS/CDS/GES file. On-the-job status for cases in CDS and GES was modeled from 1991 to 1999 FARS using a logistic regression	Most unit costs came from Zaloshnja et al. [2004a] and were distributed into more detailed cost categories with the distribution in Miller [1997] Other unit costs came from Miller [1997]
Fatal, non-MV, alcohol-involved injuries on the job	Total incidence (independent of alcohol involvement) was estimated from 1999 to 2001 CFOI Weber and Cox [2001]: 9.3% of all fatally injured employees were under the influence of alcohol From 1999–2001 FARS: 9.1% of MV occupational fatalities were alcohol involved Extrapolating: 9.4% of fatal, non-MV injuries on the job were alcohol-involved	Costs per fatality were updated from Miller [1997]
Fatal, non-MV, alcohol-involved injuries off the job	Fatal injury counts from 2000 NVSS, estimates on alcohol involvement in fatal non-MV injuries from Smith et al. [1999a], and the above percentage (9.4%), were used to estimate the incidence	Costs per fatality were updated from Miller [1997]
Non-fatal, non-MV, alcohol-involved injuries on the job	Two thousand incidence of non-fatal occupational injuries that caused work loss or required medical treatment came from the BLS website	Societal costs per case were updated from Leigh et al. [2004] From Miller and Galbraith [1995] and Miller [1997], it was estimated that 83% of wage losses are borne by employers Subtracted the employer costs of non-fatal, occupational, MV injuries from Zaloshnja and Miller [2006] Multiplied the remaining cost by 4% [Cherpitel, 1993]
Non-fatal, non-MV, alcohol-involved injuries off the job	Total incidence (independent of alcohol involvement) was estimated from 1998 NHIS and 1996 NHDS The percentages of alcohol-involved injuries by cause came from Smith et al. [1999b] Subtracted occupational injuries from the total number of injuries for ages under 65	Costs per case from Zaloshnja et al. [2004] The percentage of medical spending covered by private insurance: 39% [Statistical Abstract of the U.S., 2001, table 120] The percentage of private insurance premiums paid by employers: 78% [Branscome and Crimmel, 2002]

TABLE III. Annual U.S. Employer Costs of Alcohol-Involved Injuries, 1998–2000 (in Millions of 2,000 Dollars)

Costs	On-the-job	Off-the-job	All
Medical costs	910	7,680	8,590
Wage replacement	4,716	3,857	8,573
Life insurance	13	590	603
Disruption costs	335	3,247	3,582
Legal liabilities	1,010	—	1,010
Property damage	378	—	378
Taxes to fund emergency services	9	28	36
Subtotal	7,369	15,402	22,772
Wage premiums	5,878	—	5,878
Total	13,247	15,402	28,650

goes towards paying for the health care provided to the injured employees or their dependents and 30% is the cost of wage replacement (i.e., sick leave, disability insurance). Another 13% is comprised of costs related to the disruption employers face when employees suffer injuries preventing them or their co-workers from working at full capacity, and to the recruiting and training of workers who replace fatally injured or permanently disabled employees. Though not perceived by employers as tangible costs, wage premiums represent a good portion of employer cost of alcohol-related injuries to employees (21%).

If only clearly tangible costs are considered (i.e., excluding wage premiums), Table III reveals that 2/3 of total employer costs is caused by off-the-job injuries. The biggest portion of these costs (50%) goes toward paying for the

health care provided to employees and their dependents injured off-the-job.

The annual employer cost of motor vehicle crashes in which at least one driver was alcohol-impaired is over $9 billion, including wage-risk premiums (Table IV). Out of this, only $3.1 billion comes from job-related alcohol involvement and 30% of it go toward paying for legal liabilities employers face when their employees cause crashes while driving on employer business. Another 37% covers wage premiums.

The annual employer cost of alcohol-involved, workplace violence-related injuries is over $8.5 billion, including wage-risk premiums (Table V). Out of this, more than 52% covers wage replacement costs. Another 40% covers wage premiums.

TABLE V. Annual U.S. Employer Costs of Alcohol-Involved, Workplace Violence, 1998–2000 (in Millions of 2,000 Dollars)

Costs	On-the-job
Medical costs	438
Wage replacement	4,482
Life insurance	3
Disruption costs	194
Legal liabilities	0
Property Damage	0
Taxes to fund emergency services	0
Subtotal	5,117
Wage premiums	3,449
Total	8,566

DISCUSSION

This study has five main limitations. First, the estimates of non-fatal injury alcohol involvement we use are less certain and current than we would have preferred (they are based on a study from 1994). Second, wage premiums are not necessarily paid to all workers in high-risk jobs and not at a uniform rate across industries, as assumed. For example, Viscusi and Hersch [2001] suggest smokers get a smaller premium than non-smokers; the same might be true for alcohol drinkers. Third, it relies on published estimates of employer costs of injury and is subject to the limitations in those cost estimates. Fourth, predicting the work-related status of non-fatal motor vehicle injuries was based on a logistic regression model with a relatively low predictive power. If the model overestimates the probability of work relatedness by 10%, our overall employer cost estimate would be 1.4% greater in reality. Fifth, we may have overestimated the effects of alcohol on injuries because there could be both self-selection for drinking and/or dangerous jobs. It could also be that dangerous jobs drive people to drink [Leigh, 1996]. Alcohol abuse and job hazards. Totally eliminating alcohol-involved injuries could reduce employer costs by $28.6 billion annually or, if wage premiums are excluded, by $22.8 billion. Off-the job alcohol-related injuries account for between half and two-thirds of alcohol-involved injury cost, depending on whether wage premiums are included in the total. Eliminating alcohol impaired driving could save employers $9.2 billion annually. Impaired driving accounts for almost one-third of employer costs of alcohol-involved injury, with crashes outside of works hours the largest factor.

In comparison, depression costs employers $44 billion annually, with the average employee losing 5.6 productive hr per week [Stewart, 2004]. Employer costs of alcohol-involved injuries are however a fraction of smoking-related costs. On average, direct medical expenses and lost productivity resulting from premature death for people with smoking-related diseases cost employers a staggering $157 billion annually or $3,856 per smoker per year. [Center for Disease Control, 2002].

Cost offset studies have shown that the costs of substance abuse treatment for employees are more than offset by subsequent medical cost savings alone [Holder and Blose, 1992]. Treatment spending reduces substance abuse that saps worker productivity and causes injury and illness. EAPs also have proven effectiveness in this regard [Blum and Roman, 1995; Collins, 1998].

This study shows that protecting employees from alcohol-involved injury can be a profitable investment of time and resources. Additional benefits are also likely to be gained if these initiatives result in lower levels of problem drinking, which would positively impact family and social relationships.

TABLE IV. Annual U.S. Employer Costs of Alcohol-Involved MV Injuries, 1998–2000 (in Millions of 2,000 Dollars)

Costs	On-the-job	Off-the-job	All
Medical costs	443	3,095	3,538
Wage replacement	158	1,712	1,870
Life insurance	2	169	171
Disruption costs	134	862	996
Legal liabilities	1,010	0	1,010
Property damage	378	0	378
Taxes to fund emergency services	9	28	36
Subtotal	2,133	5,866	7,999
Wage premiums	1,232	—	1,232
Total	3,365	5,866	9,231

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