Economic Costs: Another Alternative for Measuring Workplace Fatalities

Elyce Biddle*
Dan Hartley**

Introduction

Occupational injury, illness, and fatality continue to be prominent public health concerns. Preserving and protecting the American worker encompasses economic, moral, and legal parameters. The safety and health community needs quantitative information to facilitate their efforts in recognizing, evaluating, and controlling hazards in the workplace, which ultimately lead to the prevention of occupational fatalities. The Occupational Safety and Health Administration (OSHA)

**Elyce Biddle, Chief, Methods and Analysis Team, Division of Safety Research, NIOSH, Morgantown, WV. Email: elyce.biddle@cdc.hhs.gov*

****Dan Hartley, Epidemiologist, Division of Safety Research, NIOSH, Morgantown, WV. Email: dhartley@cdc.gov*

needs data to efficiently optimize resource allocation and to conduct its programs effectively. Other decision makers could use information to evaluate where regulatory and legal efforts in the area of health and safety are having an impact, and identify areas with problems that need attention. The research community seeks to know the impact of prevention activities on particular categories of injury and their causes (Pollack & Keimig, 1987).

All these needs — those of the safety professional, OSHA, decision makers, and the research community — require measures of the magnitude and impact of occupational incidents. Over the years a number of measures have been developed and used to analyze occupational fatal injuries. The two more prevalent figures, the frequency of occurrence and the rate of fatal injury, have been used for this purpose. A third measure — years of potential life lost — was introduced in the late 1940s as an alternative measure to quantify premature mortality.

The magnitude and impact of workplace fatalities was described in detail by Meyer and Pegula (2004) in "Years of Potential Life Lost: An Alternative for Measuring Workplace Fatalities." The authors provide a comparison of the value of frequency counts, rates of occurrence, and years of potential life lost in measuring workplace fatalities. However, there remains one more measure that can be used for targeting prevention efforts — the societal cost of a workplace fatality. This economic measure determines the impact on U.S. Gross Domestic Product by combining years of potential work life lost (YPWLL) and the number of fatalities with the value of lost production attributable to the fatality. This paper presents a description of this economic measure and a comparison of frequency, YPWLL, and societal cost measures (Centers for Disease Control and Prevention, 1986).

Methods

Cost of fatalities

This study uses occupational fatality data from the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) for the period 1992, the first year of comprehensive collection, through 2001. The CFOI system compiles data from 50 states and the District of Columbia using multiple sources, such as death certificates, medical examiner records, workers' compensation claims, and reports to OSHA for decedents of any age as long as the death was a work-related fatal injury. Work relationship must be substantiated by two or more independent source documents or a source document and a follow-up questionnaire.

This study provides cost estimates and years of potential work life lost for workplace fatalities in the private and non-military public sectors for those decedents greater than 16 years of age included in the National Institute of Occupational Safety and Health (NIOSH) CFOI research file. This research file excludes fatalities occurring in New York City for the 1992-2001 period and those fatalities resulting from the terrorist acts of September 11, 2001.[1]

The cost of a workplace fatality to society was estimated using the cost-of-illness approach, which combines direct and indirect costs to yield an overall cost of an occupational fatal injury. For this study, only medical expenses were used to estimate the direct cost associated with the fatality. The indirect cost was derived by calculating the present value of future earnings summed from the year of death until the decedent would have reached age 67, accounting for the probability of survival were it not for the premature death. All estimates were adjusted to 2003 dollars.

[1] Because of unique confidentiality protocols, New York City would not permit BLS to include their data in the NIOSH special research file.

Mathematically this is represented as follows:

$$PV_{Fatality} = \sum_{n=y}^{67} P_{y,q,s}(n)\,[Y_{s,j}(n) + Y_s^h(n)] * (1+g)^{n-y}/(1+r)^{n-y}$$

where:

$PV_{Fatality}$	= present discounted value of loss due to occupational fatal injury per person
$P_{y,q,s}(n)$	= probability that a person of age *y*, race *q*, and sex *s*, will survive to age *y+1* (years of potential work life lost)
y	= age of the individual at death
q	= race of the individual
s	= sex of the individual
n	= age if the individual had survived
$Y_{s,j}(n)$	= median annual earnings of an employed person of sex *s*, occupation *j*, and age *n* (includes benefits and life-cycle wage growth adjustment)
$Y_s^h(n)$	= mean annual imputed value of home production of a person of sex *s* and age *n*
g	= wage growth rate attributable to overall productivity
r	= real discount rate (3%)

Worker and case characteristics used for these cost estimates included: sex, race, and age of the worker; employer industry; worker occupation; event or exposure; and year of death. CFOI coded industry and occupation at the time of death using the 1987 Standard Industrial Classification system for industry (Executive Office of the President, 1987) and the 1990 Bureau of the Census Occupational Classification System (BOC, 1992) for occupation.

The wage component of the cost model consists of four parts: base wage, benefits, economy-wide productivity growth, and life-cycle wage growth. Using the decedent's age, race, sex, and occupation at the time of death, the base wage value was derived from the Current Population

Survey, a monthly household survey of the non-institutional population 16 years of age collected by the Bureau of the Census for the Bureau of Labor Statistics (U.S. Department of Labor, 2003). The value of employee benefits was added to the base wage using data from the U.S. Chamber of Commerce (1981-2002) annual survey of employee benefits administered to a sample of employers based on the distribution of U.S. employment. The Employment Cost Index was employed to estimate the amount that wages rose in concert with the growth of the U.S. economy as a whole (U.S. Department of Labor BLS, 2002). To account for the final component of wage growth, estimates of the life-cycle growth, or the salary growth due to experience of the individual worker, were included. This rate was based on mean wages, presented in constant dollars by sex, race, and age group for each year, from the historical income tables of the BLS Current Population Survey. The rate of change for mean wages was determined for each sex and race within a specific age group.

Non-market losses, or losses of household production, were derived from time-diary data captured in the National Human Activity Pattern Survey study commissioned by the Environmental Protection Agency (Expectancy Data, 2000). All productivity losses were adjusted by the probability that the individual would have remained in the labor market were it not for the premature death that resulted from an occupational event or exposure. The probability estimates used in this study were developed by the National Center for Health Statistics, Division of Vital Statistics. This agency used data from the 1990 Census of Population and number of deaths occurring in the United States to U.S. residents for three years, 1989-91 (U.S. Department of Health and Human Services, 1997). These current life tables were based on a complete count of resident deaths in the United States during those years. Separate probabilities were calculated for each sex within the white population, the population other than white, and the black population. The initial survival table presented the number of persons in the sample surviving to exact age x. The percent of persons who, having attained age x, will survive to age $x+t$, was calculated by dividing $x+t$ by x and multiplying by 100.

The single nominal value for medical costs was obtained from the Detailed Claims Information (1992-1995) database from the National Council on Compensation Insurance. This database provides estimates of the costs of injury and fatality to workers based on a nationally representative sample. More detailed information regarding this method has been published previously (Biddle, 2004).

Years of potential work life lost

Years of potential life lost (YPLL) is an alternative mortality measure to determine the relative importance of various causes of death. By definition, YPLL is "the number of years of potential life lost by each death occurring before a predetermined end point" (Centers for Disease Control and Prevention, 1986). In this study, the probability of survival used to calculate YPLL reflect the age, race, and sex of the decedent and were modified to reflect an end point of an assumed retirement age of 67. Finally, the measure was renamed "years of potential work life lost" (YPWLL) to reflect this difference.

The YPWLL measure is represented by the first portion of the cost calculation as follows:

$$\text{YPWLL} = \sum_{n=y}^{67} P_{y,q,s}(n)$$

where:

YPWLL	= years of potential work life lost
$P_{y,q,s}(n)$	= probability that a person of age *y*, race *q*, and sex *s* will survive to age *y+1*
y	= age of the individual at death
q	= race of individual
s	= sex of the individual
n	= age if the individual had survived

Results

For the 10-year period 1992-2001, the total YPWLLs associated with the 59,017 occupational fatalities was 1,424,416 with an average of 24.1. The highest average YPWLL of 25.1 occurred in 1992 and the lowest of 23.5 occurred in 1999 and 2001. The highest frequency of fatalities occurred in 1994 with 6,303 and the lowest number of fatal injuries was 5,664 in 2001. The overall burden of these occupational fatalities was $48.7 billion with a mean cost per fatality of $825,297. The total cost ranged from a high of $5.2 billion in 1994 to a low of $4.7 billion in 1999. While the highest mean cost of $880,805 occurred in 2001, the lowest mean cost of $801,638 occurred in 1996.

TABLE A

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Year, 1992-2001 (2003 Dollars)

Year of Death	No. of Fatalities	Total YPWLL (Fatalities)	Average YPWLL	Total Cost $ (Millions)	Mean Cost $ (Thous.)
All	59,017	1,424	24.1	48,705	825
1992	5,833	146	25.1	4,782	820
1993	5,986	147	24.6	4,905	819
1994	6,303	155	24.6	5,169	820
1995	5,959	145	24.4	4,891	821
1996	5,899	142	24.1	4,729	802
1997	6,013	144	24.0	4,852	807
1998	5,840	138	23.7	4,751	814
1999	5,827	137	23.5	4,701	807
2000	5,693	135	23.7	4,937	867
2001	5,664	133	23.5	4,989	881

Note: Because of rounding, columns may not sum to the all years totals.

The largest number of fatalities within an age group was 14,821, recorded in the 35-44 years-old age group. The 25-34 years-old age group and the 45-54 years-old age group had 12,665 and 12,410 fatalities, respectively. The highest total YPWLL was associated with the 25-34 years-old age group, while the highest average YPWLL calculated was for the 16-19 years-old age group. The highest total cost ($15.7 billion) and the highest mean cost ($1.06 million) were calculated for the 35-44 years-old age group.

Workers categorized as "White" accounted for 49,230 (83 percent) of the occupational fatalities during the study period. The total YPWLL for those workers was almost 1.2 million years, which was eight times greater than the total for those categorized as "Black" and 11 times greater than the total for the "Other" race category. However, the average YPWLL for the "White" category of 23.9 was lower than that calculated for "Black" (24.7) or the "Other" category (26.6). The total cost for the "White" category of $40.8 billion was nine times greater than that of the "Black" category and 13 times greater than that of the "Other" category. The mean cost for white workers was less than 1 percent higher than that of the "Other" category and 4 percent higher than that of the "Black" category.

Males accounted for 92 percent of the occupational fatalities during this study period. The total YPWLLs calculated for males (1,304,723) was 11 times greater than that calculated for females (119,693). The average YPWLL calculated for males of 24.0 was less than the average YPWLL calculated for females of 25.6. The total cost for males of $44.8 billion was over 11 times greater than the total cost of $3.9 million calculated for females. Conversely, the mean cost for males of $824,536 was lower than the mean cost for females of $834,135.

Among occupational divisions, the operators, fabricators, and laborers division experienced the most occupational fatalities with 20,206, or more than one-third of the total number of fatalities, during the study period. The occupation division with the least number of fatalities (4,844) was the service division.

These divisions also experienced the highest (520,090) and lowest (130,441) number of total YPWLLs, respectively. The highest average YPWLL of 26.9 was associated with the service occupational division, while the lowest average YPWLL of 19.3 was calculated for the farming, forestry, and fishing division.

TABLE B

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Selected Worker Characteristics, 1992-2001 (2003 Dollars)

Age Group	No. of Fatalities	Total YPWLL (Thous.)	Average YPWLL	Total Cost $ (Millions)	Mean Cost $ (Thous.)
Overall	59,017	1,424	24.1	48,705	825
Age Group					
16-19	1,481	72	48.6	1,042	703
20-24	4,345	193	44.5	3,801	875
25-34	12,665	468	37.0	13,261	1,047
35-44	14,821	404	27.2	15,728	1,061
45-54	12,410	217	17.5	10,782	869
55-64	8,099	64	7.9	3,717	459
65+	5,111	5	1.0	370	72
Race					
White	49,230	1,175	23.9	40,798	829
Black	5,926	147	24.7	4,721	797
Other	3,861	103	26.6	3,186	826
Sex					
Male	54,342	1,305	24.0	44,805	825
Female	4,675	120	25.6	3,900	834

Note: Because of rounding, columns may not sum to the overall totals.

As was the case with the total fatalities and total YPWLLs, the highest total cost of $15.8 billion was calculated for the operators, fabricators, and laborers occupational division, while the lowest total cost of $4.0 billion was associated with the service division. The managerial and professional specialty division had the highest mean cost of $1.1 million and the farming, forestry, and fishing division had the lowest mean cost of $487,532.

TABLE C

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Occupation Division, 1992-2001 (2003 Dollars)

Occupation Division	No. of Fatalities	Total YPWLL (Thous.)	Average YPWLL	Total Cost $ (Millions)	Mean Cost $ (Thous.)
Overall	59,017	1,424	24.1	48,705	825
Managerial & professional specialty	6,626	141	21.4	7,488	1,130
Technical, sales, & admin. support	7,288	174	23.9	6,765	928
Service	4,844	130	26.9	3,984	823
Farming, forestry, & fishing	8,805	170	19.3	4,293	488
Precision production, craft, & repair	10,793	278	25.8	10,083	934
Operators, fabricators, & laborers	20,206	520	25.7	15,810	782

Note: Categories not meeting publication criteria are not shown; therefore, the columns do not sum to overall totals.

Among industry divisions, the construction division had the highest frequency of occupational fatalities with 10,961 recorded fatalities during the 1992-2001 time period. With 1,017 occupational fatalities reported for the study period, the finance, insurance, and real estate industry division experienced the fewest number. The construction industry division also had the highest number of total YPWLLs with 295,135. Mining had the highest average YPWLL of 27.0, while construction had the next highest with an average YPWLL of 26.9.

TABLE D

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Industry Division, 1992-2001 (2003 Dollars)

Industry Division	No. of Fatalities	Total YPWLL (Thous.)	Average YPWLL	Total Cost $ (Millions)	Mean Cost $ (Thous.)
Overall	59,017	1,424	24.1	48,705	825
Agriculture, forestry, & fishing	7,943	149	18.8	4,088	515
Mining	1,598	43	27.0	1,649	1,032
Construction	10,961	295	26.9	9,406	858
Manufacturing	7,145	176	24.6	5,902	826
Transportation & public utilities	9,667	228	23.6	8,879	918
Wholesale trade	2,433	58	23.9	1,988	817
Retail trade	6,217	157	25.3	4,711	758
Finance, insurance, & real estate	1,017	21	20.2	882	868
Services	8,233	200	24.4	7,318	889
Public admin.	3,311	85	25.7	3,521	1,063

Note: Categories not meeting publication criteria are not shown; therefore, the columns do not sum to overall totals.

The total cost of occupational fatalities by industry division ranged from a high of $9.4 billion in construction to a low of $882 million in finance, insurance, and real estate. Public administration and mining industry divisions had the two highest mean costs of an occupational fatality, both over $1 million each.

The number of fatalities by event division ranged from a high of 24,772 in the transportation accident division to a low of 172 in the bodily reaction and exertion division. The transportation accident division had the highest total YPWLLs of 579,000, while the bodily reaction and exertion division had the lowest with 3,000. The event division of exposure to harmful substances and environments had the highest average YPWLL of 28.6, while the event division of bodily reaction and exertion had the lowest average YPWLL of 19.9.

TABLE E

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Event or Exposure Division, 1992-2001 (2003 Dollars)

Event or Exposure Division	No. of Fatalities	Total YPWLL (Thous.)	Avg. YPWLL	Total Cost $ (Mill.)	Mean Cost $ (Thous.)
Overall	59,017	1,424	24.1	48,705	825
Contact with objects & equipment	9,722	233	24	7,309	752
Falls	6,668	149	22.3	5,009	751
Bodily reaction & exertion	172	3	19.9	134	777
Exposure to harmful substances & environments	5,465	156	28.6	4,917	900
Transportation accidents	24,772	579	23.4	20,957	846
Fires and explosions	1,883	48	25.5	1,676	890
Assaults and violent acts	10,229	254	24.8	8,625	843

Note: Categories not meeting publication criteria are not shown; therefore, the columns do not sum to overall totals.

Over 43 percent of the total costs, or almost $21 billion, were recorded in the transportation accidents division. The exposure to harmful substances or environments division had the highest mean cost of $899,716 while the lowest mean cost of $751,430 was calculated for the falls division.

Discussion

Over the years, the safety and health community has relied on three basic quantitative measures to demonstrate progress and to facilitate resource allocation for targeting research efforts — frequency counts, rates of occurrence, and to a lesser extent, YPLL. Each measure provides a portion of the overall safety and health picture. Frequency counts are absolute measures that provide an assessment of the magnitude of the problem and demonstrate patterns of fatalities. These counts allow practitioners to focus attention on interventions and hazard controls that could affect the greatest number of employees.

The frequency counts serve an additional function by becoming the numerator in the measure of risk, the rate of fatal occupational injury. This measure provides the benefit of allowing users to make risk comparisons between worker groups or types of incidents. As discussed by Meyer and Pegula (2004), these two measures provide valuable information, but do not provide "any indication of the impact of each fatal work injury." This study's version of this measure, years of potential work life lost (YPWLL), assesses this impact in temporal terms — the number of productive work years lost because of an occupational fatality. The final measure presented in this work, economic loss or cost, provides additional information on the impact of a fatal work injury on the U.S. Gross Domestic Product. Much the same as fatality rates, YPWLLs and economic costs are comparable across work groups using years and dollars as the unit, respectively.

Each of these individual measures is strengthened when used in combination with at least one of the other measures. Table A demonstrates the importance of examining all mortality measures to evaluate the success of occupational safety and health activities. There is a general decline in the number of fatalities, suggesting successful efforts during that time frame. The YPWLL statistics present the same implication of progress. The lowest total and average YPWLLs were found in 2001. Although not presented in this work, the rate of work-related fatalities per 100,000 workers has also declined – from 5.2 in 1992 to 4.3 in 2001. However, the mean cost per occupational fatal injury has a different pattern. During 1992-1999, the costs decreased by 2 percent from $819,735 in 1992 to $806,902 in 1999. The mean costs increased over the last two years (9 percent between 1999 and 2001), suggesting the need for further analysis to determine the rationale for these increases. It is probable that worker characteristics of the fatalities, such as those highlighted in Tables B and C, have changed in those two years. Determining which of those characteristics have changed may impact decisions regarding future resource allocations for prevention and control strategies.

Similarly, all measures should be employed when determining targeting strategies for specific worker groups. As shown in Table C, operators, fabricators, and laborers have the highest number of fatalities, total YPWLLs, and total costs; they would be identified as the priority group for seeking new strategies. However, if selecting average YPWLLs as the measure of choice, then service occupations rise to the top. Finally, selecting the mean cost would direct attention to managerial and professional specialty occupations. A similar outcome is found in Table D, where using the number of fatalities, total YPWLLs, or total costs would direct resources to the construction industry division. The mining industry would receive attention if the average YPWLLs were used. Finally, resources should be directed to the public administration industry if mean costs were the measure employed. If based on total number of fatalities, total YPWLLs, and total costs, Table E suggests that transportation accidents should receive primary attention. Using average YPWLLs or mean costs as the measure, exposure to harmful substances and environments should receive the resource allocation.

While the previous evaluations are useful, examining worker and case characteristics at a greater level of detail may provide a more focused targeting strategy. Table F provides information about selected individual occupations within the construction industry: which had the highest number of fatalities, total YPWLLs, and total cost among all industry divisions. The individual occupations represent those five occupations with the highest frequency, average YPWLL, and mean cost within the construction industry.

The results indicate that within the construction industry, the construction laborers occupation (2,767 fatalities) had over three times more work-related fatalities than any other individual occupation. Electrician apprentices had the highest average YPWLL, 38.8 years. Electrical power installers had the highest mean cost, over $1.2 million. All five of the highest mean costs within the construction industry were over $1 million. Occupations found in all three categories should be tagged for additional consideration, such as job safety, job hazard, or job task analysis techniques. In this instance, no single occupation falls into all three categories. However, electricians are among the occupations with the highest frequency and the highest mean cost, while electricians in training (apprentices) are among the occupations with the highest average YPWLL.

The same type of evaluation can be conducted using other case characteristics. For example, the events or exposures with the highest values for the three measures are presented in Table G. The results from among this subset of events or exposures show that shootings had the highest frequency (6,364), contact with overhead power lines had the highest average YPWLLs (31.4 years), and aircraft accident, not elsewhere classified had the highest average cost (approximately $1.4 million per fatality). Evaluating this group of events or exposures presents challenges for those making resource allocation or targeting decisions. No single event or exposure is found in all three groups. To provide additional insight, the evaluator could enlarge the lists of events or exposures to include the top 10 or 25 in each group.

TABLE F

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Selected Occupations within the Construction Industry, 1992-2001 (2003 Dollars)

Construction Industry Occupations	No. of Fatalities	Total YPWLL (Thous.)	Avg. YPWLL	Total Cost $ (Mill.)	Mean Cost $ (Thous.)
Highest Frequency					
Construction laborers	2,767	83	29.9	1,987	718
Carpenters	823	22	26.2	675	820
Construction supervisors*	655	15	22.5	608	929
Electricians	615	17	27.9	637	1,036
Managers, administrators*	585	11	19.1	674	1,153
Highest Average YPWLL					
Electrician apprentices	50	2	38.8	48	958
Helpers, construction trades	119	4	35.4	76	639
Electric power installers	147	5	32.7	185	1,257
Sheet metal workers	58	2	30.6	60	1,030
Drywall installers	79	2	30.0	65	822
Highest Mean Cost					
Electrical power installers	147	5	32.7	185	1,257
Managers, administrators*	585	11	19.1	674	1,153
Structural metal workers	414	12	29.1	435	1,050
Electricians	615	17	27.9	637	1,036
Sheet metal workers	58	2	30.6	60	1,030

*not elsewhere classified

TABLE G

Number, Years of Potential Work Life Lost and Costs of Occupational Traumatic Fatal Injury by Selected Event or Exposure Categories, 1992-2001 (2003 Dollars)

Events or Exposures	No. of Fatalities	Total YPWLL (Thous.)	Avg. YPWLL	Total Cost $ (Mill.)	Mean Cost $ (Thous.)
Highest Frequency					
Shooting	6,364	167	26.2	5,418	851
Struck by falling object	3,515	82	23.3	2,575	733
Jack-knifed or overturned, no collision	2,656	66	24.8	2,232	840
Collision accident, moving in opposite directions, oncoming	2,383	58	24.1	2,118	889
Vehicle struck stationary object, equipment on side of road	2,366	59	25	2,086	882
Highest Average YPWLL					
Contact with overhead power lines	1,306	41	31.4	1,209	926
Struck by lightning	145	4	30.5	121	833
Sudden start or stop*	64	2	30.3	53	821
Contact with electric current of machine, tool, appliance, or light fixture	482	14	29.9	442	916
Excavation or trenching cave-in	416	12	29.5	356	856
Highest Mean Cost					
Aircraft accident*	1,179	29	24.6	1,601	1,358
Aircraft accident, unspecified	586	14	24.5	788	1,344
Aircraft accident–During takeoff or landing	575	14	23.9	763	1,327
Collision between railway vehicles	69	1	21.1	77	1,113
Other cave-in	116	3	25.6	120	1,032

*not elsewhere classified

Conclusion

While this type of analysis yields good results, the process can be time consuming and subject to error. Developing a combination metric that encompasses all magnitude and impact measures of fatal occupational injuries would be a welcome addition to the tools of the safety professional.

References

American National Standards Institution. (1996). *ANSI Z16.2-1995 American National Standard for Information Management for Occupational Safety and Health.* Itasca, IL: National Safety Council.

Biddle, E. (2004, July). Economic cost of fatal occupational injuries in the United States, 1980-1997. *Contemporary Economic Policy*, 22(3), 370-381.

Census of Fatal Occupational Injuries (CFOI). (1992-2001). Electronic Database. Washington, DC: Bureau of Labor Statistics [Producer and Distributor].

Centers for Disease Control and Prevention. (1986). Premature mortality in the United States: Public health issues in the use of years of potential life lost. *MMWR*, 35(2S), 1s-11s.

Detailed Claims Information. (1992-1995). Electronic Database. Boca Raton, FL: National Council on Compensation Insurance [Producer and Distributor].

Executive Office of the President. (1987). *Standard Industrial Classification Manual, 1987.* Washington, DC: Office of Management and Budget.

Expectancy Data. (2000). *The Dollar Value of a Day: 1998 Dollar Valuation.*

Meyer, S., & Pegula, S. (2004). Years of potential life lost: An alternative for measuring workplace fatalities. *IAIABC Journal*, 41(2), 180-206.

Pollack, E.S., & Keimig, D.G. (Eds.) (1987). *Counting injuries and illnesses in the workplace: Proposals for a better system.* Washington, DC: National Academy Press.

Rice, D., MacKenzie, E.J., & Associates. (1989). *Cost of injury in the United States: A report to Congress.* San Francisco, CA: Institute for Health and Aging, University of California and Injury Prevention Center, The Johns Hopkins University.

U.S. Chamber of Commerce. (1981-2002). *Employee Benefits.* Washington, DC.

U.S. Department of Commerce. (1992). *1990 Census of Population: Alphabetical Index of Industries and Occupations.* Washington, DC: Bureau of the Census.

U.S. Department of Labor. (1980-2002). *Employment and earnings: Household data annual averages.* Washington DC: Bureau of Labor Statistics, 28-40 (Issue No. 1 of each).

U.S. Department of Labor. (2002). Office of Employment and Unemployment Statistics. *Current Population Survey.* Years 1967-2002. Retrieved November 20, 2003, from http://stats.bls.gov:80/

U.S. Department of Labor. (2003). Bureau of Labor Statistics, Office of Compensation and Working Conditions. *Employment cost index.* Retrieved July 7, 2003 from http://stats.bls.gov:80/news.release/eci/toc.htm

U.S. Department of Labor. (2003). Bureau of Labor Statistics, Office of Compensation and Working Conditions. *Occupational outlook quarterly.* Retrieved February 27, 2003, from http://www.bls.gov/opub/ooq/2001/winter/art04.pdf

IAIABC Journal

Spring, 2005 Vol. 42, No. 1

Contents

From the DEW Line

Editor's Report 9

Features

An Introduction to Longshore & Harbor Workers' Compensation and the Defense Base Act 15
Michael Niss

CHSWC White Paper on Cost/Benefit of Implementing Electronic Deposit for Unemployment and Disability Benefits in the State of California 31
Christine Baker, Irina Nemirovsky, D. Lachlan Taylor

Medication Use in Workers' Compensation 47
Elizabeth J. Kuschner, Tron A. Emptage

Colorado Drug Utilization Guidelines: Medical Treatment Guidelines for Chronic Pain Disorders 71
Edward Whitney

Cross-Border Coverage and Claims for Workers' Compensation 85
Gregory Krohm, Brandon Miller

Cross-Border Workers' Compensation and Social Security Policy in North America: An Analysis of the NAFTA Trucking Dispute through the Eyes of a Workers' Compensation Practitioner 121
Tequila J. Brooks

Safety

California's Worker Occupational Safety and Health Training and Education Program: A Model for Other States 149

 (continued on back cover)

(continued from front cover)

Technology

Secrets of a Successful Marriage: How Minnesota Combined Imaging Technology with ADR Strategies to Effectively Prevent and Resolve Workers' Compensation Disputes 157
Keith Keesling

Research

Economic Costs: Another Alternative for Measuring Workplace Fatalities 173
Elyce Biddle, Dan Hartley

Medical

What Employers Can Expect for California Comp in 2005 193
Chris Wheaton, W. Tom Fogarty

News and Current Interest

Energy Workers Act Revisited: 2004 Amendments to the Energy Employees Occupational Illness Compensation Program Act of 2000 211
Margret Carde

WCPR Summaries 229

Opinion

New Times, New National Commission 233
Laura Collins

Workers' Compensation 2020: Parts 2 and 3 247
Terry Bogyo

 0-9759356-1-5

IAIABC Journal

Spring, 2005
Vol. 42, No. 1

Robert Aurbach, Editor

IAIABC

International Association of Industrial
Accident Boards and Commissions

ISBN 0-9759356-1-5

Printed in the United States of America