

# Injuries at work are fewer among older employees

*Previous studies offer conflicting results in determining the age groups more prone to accidents on the job; but new data show young workers are hurt more, although often not as seriously*

NORMAN ROOT

There are several contradictory interpretations of the relationship between age and injuries at work.<sup>1</sup> Some investigators have found no significant differences in incidence of injury among the various age groups. Others have found a higher accident rate for both younger and older groups of workers compared with those in the middle age groups. Two other researchers arrived at an opposite conclusion—workers in the intermediate groups, those age 28–47, had the highest accident rates. Still others concluded that accident frequency declined steadily with age for workers older than 25.<sup>2</sup>

These differing interpretations of the relationship between work injury and age have been augmented by equally contradictory reasoning. Older workers have lower accident rates because they are experienced, mature, and are mindful of workplace hazards; conversely, older workers have higher accident rates because of growing carelessness in the workplace—familiarity breeds contempt—and declining reflexes, hearing, and vision. On the other side, younger workers have higher accident rates because they are reckless, green to workplace hazards, and have the dangerous jobs; by contrast, younger workers have lower accident rates because of superior reflexes and less exposure to the more dangerous jobs requiring greater experience.

Inability to collect uniform data about exposure and

incidents on any homogeneous groups of workers, either by industry or occupation, had been considered the most important reason for the divergence of these views.

## Sources and summary of findings

Based on data collected in the Bureau of Labor Statistics Supplementary Data System (SDS), this article analyzes information from more than a million workers compensation records from agencies in 30 States that participated in the SDS program during 1977. It examines the age distribution of injured workers relative to their exposure by industry and occupation, and looks at injury characteristics and costs associated with the age of the injured worker.

Two categories of cases are used in the system: closed and current. A closed case is one in which, by the end of the reference year, all compensation and medical payments due for the injury were awarded or received by the worker, regardless of the year in which the accident occurred or was reported. In a current case the injury either occurred or was reported during the reference year, depending upon the State. Most States submitted current case data; a few, only closed case data; and three States, Idaho, Montana, and Wisconsin, submitted both kinds.

The data indicate that occupational injuries occur at a lower rate to older workers than to younger ones. It appears that the frequency of occupational injuries de-

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clines steadily up to age 64 and then drops even more sharply for workers age 65 and over. The data indicate the positive effect of experience in avoiding injuries and should encourage training for new workers, to reduce the occurrence of injuries in the workplace.

However, older workers do get hurt, and although in most instances their injuries generally reflect workplace hazards common to all, there are some notable differences that apparently reflect physical declines consistent with increasing years. For example, declining bodily coordination among older workers likely contributed to increasing numbers of injuries from falls on working surfaces. Moreover, a traumatic injury to an older worker would more likely result in a fractured bone than it would if the same blow were experienced by a younger worker and would result in greater severity of injury and higher cost.<sup>3</sup>

### New methodology and data

The work injury ratios used in this article are based on the percentages of work injuries and employment within each universe: an industry or occupation. A ratio of 1.0 indicates that the percentages of injuries and employment are equal. Ratios greater than 1.0 indicate that the percentage of injuries is greater than that of employment, and ratios less than 1.0 indicate the opposite.

Relative comparisons are necessary, as opposed to numerical estimates or rates, because of limitations in age-specific industry and occupational employment data, and because of differences in State workers' compensation data. Employment data are from the 1977 Current Population Survey and may be overstated in that they include workers not covered under some State workers' compensation systems.<sup>4</sup> The injury data may be understated in that a comparable universe of cases is not reported in each State whose data are in this article. The 26 States providing current case data accounted for 40 percent of national wage and salary employment during 1977 and are geographically and industrially fairly representative of the Nation.<sup>5</sup>

Despite the limitations, the data permit the first comprehensive examination of age as it relates to injuries at work.

Among employees age 16 and over in 1977, the largest proportion of work-related injuries, 30.3 percent, occurred to workers age 25–34, the same group with the largest percentage of the total number of workers, 26.4 percent. Workers age 16–24 accounted for nearly the same share of injuries, 29.7 percent, but only 23.7 percent of total employment. Of this group, workers age 20–24, comprised 6 of 10 employed and 7 of 10 injured. For age 35 and over, the proportions of injuries for each age group were less than the proportions of employment.

Based on age-specific ratios of work injury to employment, work-injury rates apparently would be highest for workers age 20–24 and lowest for those age 65 and over. (See table 1.)

The pattern is similar for all industry divisions except finance; insurance; and real estate; and for services where the percentages of injuries are less than those of employment among workers age 25–34, but higher for workers age 55–64. These are the only industries in which the injury ratios are above 1.0 for this older age group. (See table 2.)

The overall age and injury employment pattern, although similar for the occupational groups, has a few notable differences. For the age group 16–24, the injury to employment ratios did not exceed 1.0 among transport operatives, probably because of age and experience requirements. The ratios for 16–24 year-olds also did not exceed 1.0 among nonfarm laborers, farm laborers and foremen, and service workers. This probably indicates that many of these jobs, particularly for young workers, are frequently casual, part time, or in small establishments, factors that are the basis for exemption from workers' compensation coverage in many States.

### Age and length of service

The age of an injured worker is strongly correlated with length of service. More than 40 percent of injuries to workers under age 35 occurred among those in the first year of employment.<sup>6</sup>

Other researchers have noted the same relationship in studies of specific industries, occupations, or work activities. For example, one study found that in accidents arising from manual handling in the construction industry, “. . . in 60 percent of the cases the incidents occurred during the first year of employment.”<sup>7</sup>

Workers under age 35 accounted for 60 percent of the injuries and 50 percent of employment, and likely accounted for the largest numbers of new entrants on the job in any one year. Thus, high injury rates for this

**Table 1. Work-injury ratios by age<sup>1</sup>**

Age	Percent employment distribution <sup>2</sup>	Percent work injury distribution	Work injury ratio <sup>3</sup>
16-17 .....	3.2	1.9	.59 <sup>4</sup>
18-19 .....	5.3	6.8	1.28
20-24 .....	15.2	21.0	1.38
16-24 .....	23.7	29.7	1.25
25-34 .....	26.4	30.3	1.15
35-44 .....	18.7	16.7	.89
45-54 .....	17.6	13.6	.77
55-64 .....	11.4	8.8	.77
65+ .....	2.2	0.9	.41 <sup>4</sup>

<sup>1</sup> Based on current cases in 26 States. Includes illnesses.

<sup>2</sup> Industry employment source CPS data, 1977.

<sup>3</sup> The ratio computation is column 2 divided by column 1.

<sup>4</sup> Because of the relatively small magnitudes associated with one or both components in these ratios, the relative errors for these age groups would be larger than those for the other age groups.

**Table 2. Ratios of work injury to employment percentages, by industry and age, 1977**

Industry	Total all years	Total 16-24 years	16-17 years	18-19 years	20-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65+ years
All nonfarm industries	1.0	1.25	.59	1.28	1.38	1.15	.89	.77	.77	.41
Mining	1.0	1.53	.50	1.65	1.53	1.14	.94	.57	.56	.45
Construction	1.0	1.14	.39	1.03	1.27	1.24	.88	.77	.73	.40
Manufacturing	1.0	1.61	.50	1.79	1.66	1.15	.81	.68	.63	.42
Transportation	1.0	1.15	.38	1.13	1.21	1.20	.99	.84	.67	.40
Wholesale trade	1.0	1.58	.93	1.79	1.59	1.14	.82	.67	.65	.33
Retail trade	1.0	1.03	.67	1.03	1.23	1.26	.96	.81	.83	.37
Finance, et al	1.0	1.18	1.33	1.20	1.14	.93	.85	.99	1.14	.86
Services	1.0	1.17	.88	1.27	1.19	.97	.89	.96	1.13	.52
Public administration	1.0	1.38	1.25	1.39	1.39	1.32	.97	.67	.67	.43

Source of employment data — BLS, CPS Base table 29B, December 1977.

group would not be unexpected. However, despite the smaller likelihood of an older worker being a new employee and smaller percentages of first year injuries for such workers, the proportion of first year injuries is higher than for any other year of service even for the older workers; each succeeding year of service accounts for a lower percentage of injuries.

**Severity and costs**

The distribution of closed cases across age groups was similar to that for all cases submitted to the workers' compensation agencies.<sup>8</sup> Work injury to employment ratios were greater than 1.0 for workers age 18 to 34, and below 1.0 for all other ages as seen in the following tabulation:

	Age group					
	16-24	25-34	35-44	45-54	55-64	65+
All closed cases	1.19	1.05	.94	.90	.88	.50
Fatalities	.77	.90	1.06	.86	1.45	2.95
Permanent disabilities	.81	.90	1.09	1.15	1.24	.81
Temporary disabilities	1.27	1.03	.89	.86	.85	.45
Other	1.17	1.14	.96	.85	.75	.36

The distribution of cases, however, varied by severity. The more severe cases, fatalities and permanent disabilities, accounted for larger proportions of the cases among older workers than among younger ones. Con-

versely, temporary disabilities were more prevalent among younger workers. Fatality ratios were higher than 1.0 for the 35-44, 55-64, and 65 and over age groups, and below 1.0 for the others. Permanent disability ratios were highest for workers age 35-64. However, temporary disability and other ratios were higher among younger workers.

Average indemnity compensation and medical payment costs associated with occupational injuries increased with age. Indemnity compensation for workers age 16-17 averaged \$593 compared with \$1,637 for workers age 65 and over. Average medical payments ranged from \$318 to \$609 for these respective age groups. The increase in average costs according to age explains why the total costs are greater for each age group in the 25-54 range than for age 16-24, even though the latter group accounts for a larger number of cases than any of the next three age groups. Total costs for injured workers age 55 and over are lower because of the significantly fewer cases among these age groups.

The average cost patterns by extent of disability differ from the total cost patterns. Costs by severity generally peak in age group 45-54, and then decline somewhat in the next two age groups. Generally, indemnity compensation is awarded on the basis of the number and age of dependents, wage level of the injured worker, and extent of disability. Teenagers and older workers are less likely to have minor dependents, and so average

**Table 3. Natures of injuries to workers, by age, in percent, 26 States, 1977**

Age group	Total	Amputation, enucleation	Burn, (heat, chemical)	Contusion, crushing, bruise	Cut, laceration, puncture	Fracture	Hernia, rupture	Inflammation	Sprains, strains	Multiple injuries	Heart attack	All other
Total	100.0	0.8	3.6	14.3	17.3	7.8	1.3	1.1	34.4	1.4	0.3	17.8
16-17	100.0	1.0	11.0	13.1	37.9	6.0	.4	.3	15.7	.9	...	13.7
18-19	100.0	1.2	6.0	15.0	27.7	6.6	.8	.7	24.3	1.1	.0	16.6
20-24	100.0	.8	4.1	14.7	21.0	6.6	1.1	.9	31.7	1.1	.0	18.0
25-34	100.0	.6	3.2	13.8	15.9	7.0	1.0	1.1	37.4	1.4	.1	18.6
35-44	100.0	.7	2.9	13.6	13.4	7.8	1.3	1.3	38.9	1.5	.3	18.4
45-54	100.0	.8	2.9	14.7	13.4	9.4	1.8	1.4	36.1	1.7	.8	17.0
55-64	100.0	.8	2.6	15.3	14.1	11.3	2.9	1.1	32.2	1.8	1.3	16.6
65+	100.0	1.4	2.8	14.5	15.7	15.6	2.6	.5	23.8	2.9	1.9	18.4

**Table 4. Source of injury to workers, by age, in percent, 26 States, 1977**

Age group	Total	Bodily motion	Boxes, barrels, containers	Furniture, fixtures	Hand tools, not powered	Hand tools, powered	Machines	Metal items	Vehicles	Wood items	Working surfaces	Other person	All other
Total	100.0	6.8	10.5	3.0	5.6	1.7	6.6	13.1	7.3	4.1	13.6	3.1	24.6
16-17	100.0	2.6	10.4	3.4	12.8	1.2	9.4	8.5	5.3	2.6	10.0	1.8	32.0
18-19	100.0	3.6	10.2	2.6	8.0	2.3	10.3	14.1	6.2	4.8	9.5	2.0	26.4
20-24	100.0	5.3	10.8	2.7	6.9	2.0	7.4	14.7	6.6	5.0	10.5	2.5	25.4
25-34	100.0	7.3	10.6	2.7	5.4	1.7	6.0	13.8	7.8	4.2	12.6	3.3	24.8
35-44	100.0	8.3	10.6	3.0	4.6	1.4	5.8	12.7	7.9	3.7	14.3	3.5	24.2
45-54	100.0	8.3	10.4	3.4	4.2	1.3	5.8	11.5	7.7	3.5	17.2	3.5	23.2
55-64	100.0	7.4	9.9	4.0	4.0	1.3	6.1	10.9	6.8	3.5	20.2	3.2	22.5
65+	100.0	5.0	7.3	3.7	3.3	1.6	6.4	7.9	7.5	3.1	27.8	3.7	22.6

awards, particularly for fatalities and permanent disabilities, are lower for them than for age groups in the 20-54 year range.

### Work-injury characteristics

Although the kinds of injuries generally occur in similar proportions to workers in all age groups, there are some notable differences that apparently reflect: inexperience, such as unfamiliarity with tools and equipment; advancing years, such as decreasing coordination and resiliency to trauma; or occupational restraints, such as being too "green" for the highly technical jobs, or being too old for the "heavy" ones.

*Nature of injury.* The most frequently occurring injuries to all workers were: sprains and strains, cuts and lacerations, contusions and bruises, fractures, and burns.<sup>9</sup> (See table 3.) These five categories accounted for more than 75 percent of all injuries. The major difference among age groups was that fractures, hernias, and heart attacks were markedly more frequent for older workers than for workers as a whole. For example, fractures among workers age 55 and over accounted for 11 to 16 percent of all their injuries, but fractures to all workers accounted for 8 percent of all injuries; The proportions of hernias for workers age 45 and over ranged from 2 to 3 percent, but for all workers they represented only 1 percent. Conversely, cuts and laceration, and burns occurred consistently less frequently with increasing age, perhaps reflecting experience as a factor in avoiding them.

*Part of body affected.* Back injuries accounted for 1 of 5 injuries to all workers. Workers age 65 and over and teenagers suffered back problems less frequently than all other workers. The respective percentages of backs as a proportion of all body parts injured were about 12 for both teenagers and workers age 65 and over, and 24 for workers age 35-44. These data probably primarily reflect the previously mentioned restraint that teenagers and older workers are less likely to have jobs requiring heavy lifting. However, injuries to eyes and fingers were more prevalent among younger workers than older ones.

There appeared to be a consistent trend that with increasing age, injuries to legs and body systems became more frequent. Legs as proportions of body parts involved in work injuries ranged from 8 percent among teenage workers to 11 percent for workers age 65 and over. For body systems, the proportions of injuries ranged from 1 percent for teenage workers to 4 percent for those age 65 and over.

*Source of injury.* As a proportion of all sources of injury, working surfaces accounted for the largest percentage among workers age 35 and over, and steadily increased in frequency, from the 10 percent levels experienced by teenage workers to 28 percent for older workers. (See table 4.) Conversely, injuries associated with nonpower hand tools were significantly higher for younger workers. The frequency declined from 13 percent among 16-17 year-olds to 3 percent for workers age 65 and older.

**Table 5. Types of injuries to workers, by age, in percent, 26 States, 1977**

Age group	Total	Struck against	Struck by	Fall from elevation	Fall on same level	Caught in, under, between	Bodily reaction	Over exertion	Contact with temperature extremes	Motor vehicle accidents	All other
Total	100.0	10.9	20.6	6.2	9.8	7.5	6.9	21.8	2.8	2.1	11.4
16-17	100.0	20.2	25.1	4.0	8.6	9.3	2.6	8.8	9.7	1.1	10.6
18-19	100.0	14.3	25.8	4.6	7.2	11.2	3.7	15.6	4.8	1.3	11.4
20-24	100.0	11.8	23.9	5.5	7.1	9.0	5.4	20.9	3.0	1.6	11.8
25-34	100.0	10.3	20.6	6.2	8.6	6.8	7.4	23.5	2.4	2.4	11.8
35-44	100.0	9.5	18.3	6.5	10.2	6.4	8.4	24.6	2.3	2.4	11.4
45-54	100.0	9.8	17.4	7.1	13.0	6.4	8.4	22.5	2.3	2.3	10.7
55-64	100.0	9.9	17.2	7.4	16.2	6.3	7.7	20.7	2.1	1.9	10.5
65+	100.0	9.4	17.4	9.1	22.8	6.3	5.1	13.9	2.6	2.6	10.9

*Type of accident.* Being struck by and against, and caught in, under, or between things accounted for more than 50 percent of injuries to teenage workers, but the percentage steadily declined for older workers. (See table 5.) Conversely, falls, particularly falls on the same level, became an increasingly serious problem with advancing age. For workers age 65 and over, falls produced nearly one-third of injuries compared with about 13 percent for teenagers.

These age-specific patterns of injury characteristics

were similar across industry and occupational groups.

### More data available

Additional data on extent of disability by indemnity compensation and medical costs, part of body affected by injury, distribution of employment and nature of injury by both age and industry, and ratios of work injury to employment percentages by occupation and age are available from the Bureau upon request. These data will be presented in future reprints of this article. □

#### FOOTNOTES

<sup>1</sup> The terms "injury" and "accident" also refer to illness and exposure. The single terms are used for brevity.

<sup>2</sup> These interpretations are taken from the summary of safety studies in *Human Factors and Safety, Information Sheet 15*, International Occupational Safety and Health Information Center (CIS), International Labour Office, Geneva, Switzerland, May 1967.

<sup>3</sup> See also the following studies: *Remarques Sur Les Statistiques Technologiques D'Accidents De Travailleurs Salaries*, Paris, France, Annee 1966, and Max D. Kossoris, "Relation of Age to Industrial Injuries," *Monthly Labor Review*, October 1940.

<sup>4</sup> Employment data for industry and occupation are taken from the Bureau's Employment and Earnings reports. The industry and occupational employment series are not comparable, but are the most reliable data available by age, on national employment. The occupational employment series also contains significant numbers of workers not covered by State workers' compensation, such as self-employed workers and unpaid family workers. To this extent, relative occupational employment ratios are overstated. The major factors that have a differential effect on the two series are detailed in *Employment and Earnings*, Vol. 25, No. 3 (Bureau of Labor Statistics, March 1978), pp. 139-59.

<sup>5</sup> For a discussion of differences in State coverage and reporting requirements see Norman Root and David McCaffrey, "Providing more

information on work injuries and illnesses," *Monthly Labor Review*, April 1978, pp. 16-21. Data from these 26 jurisdictions were used for the development of ratios and comparisons of injury characteristics: Alaska, California, Colorado, Connecticut, Hawaii, Idaho, Indiana, Iowa, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Montana, Nebraska, New Jersey, New Mexico, Oregon, South Dakota, Tennessee, Utah, Vermont, Virgin Islands, Wisconsin, and Wyoming.

<sup>6</sup> This can be length of time with the employer, the occupation, or the job. More often this relates to time with the employer. See Norman Root and Michael Hofer, "The first work injury data available from new BLS study," *Monthly Labor Review*, January 1979 pp. 76-80.

<sup>7</sup> P. M. Shepard, 1970, quoted by D. A. Stubbs and A. S. Nicholson in "Manual Handling and Back Injuries in the Construction Industry: An Investigation," *Journal of Occupational Accidents*, Vol. 2, No. 3, August 1979, pp. 179-90.

<sup>8</sup> The 1977 cost and extent of disability data used in this analysis are from 5 States providing closed case data in the SDS program: Arkansas, Delaware, Montana, North Carolina, and Wisconsin.

<sup>9</sup> Classification of the factors associated with work injuries is based on the American National Standards Institute (ANSI) Z16.2, 1962 Standard Method of Recording Basic Facts Relating to the Nature and Occurrence of Work Injuries.