

Research Summary: Fatal Injuries and Young Workers

Youths' risk of suffering a fatal work injury is lower than that for adults. Nevertheless, working in hazardous environments such as farms, retail establishments, and construction sites claimed the lives of 403 youths from 1992 through 1997.

MICHAEL H. CIMINI

During 1992-97, 403 youths, age 17 years and younger, suffered fatal work injuries. BLS research shows that these fatalities occurred primarily in agriculture, retail trade, and construction.¹ About half of the fatalities involved various types of vehicles and equipment; about one-third occurred in family businesses.

Youths' risk of fatal work injuries

About 3 million youths under the age of 18 work each year. On average, about 67 youths die each year from work-related injuries—roughly 1 percent of all fatalities. Because youths work for short periods, for the most part in part-time jobs, exposure hours were used to evaluate fatality risk. (These fatality rates were calculated using actual hours worked and then converted to full-time equivalency—2,000 hours worked per employee each year.)² As shown in table 1, 16 and 17 year olds—who comprise the majority of employed youths—have rates below those for all workers, and 15 year olds have about the same rate.³

Event

The work fatality profile for youths, to some extent, mirrors that of older workers: Vehicle-related incidents and homicides were the leading causes of death for both sets of workers. There were slight differences, however, in the proportion of fatalities for highway incidents, off-road vehicle incidents, contacts with objects, and falls. (See table 2.) The pattern for these two groups was fairly similar for assaults

TABLE 1. Worker fatalities by age, 1992-97

Worker's age	Total	Annual average	Average rate per 100,000 workers ¹
All ages	37,875	6,313	5.0
Under 15	109	18	(²)
15	46	8	5.1
16	91	15	3.4
17	157	26	3.7

¹ Excludes the military and workers under 15 years of age and is based on number of hours worked.

² Rate was not calculated because employment data and hours worked are not available.

and violent acts, fires and explosions, and exposures to harmful substances and environments.

Industry

Of the 403 youths fatally injured on the job in 1992-97, approximately two-fifths were working in agriculture and one-fifth were working in retail trade. The construction, services, and manufacturing industries also sustained high levels of youth deaths. (See table 3.)

Agriculture. Agriculture is one of the most dangerous industries for all workers. The industry's rate of fatal work injuries consistently ranks just below that of mining, which has the highest rate. Therefore, it is not surprising that the industry poses great hazards to youths.

Youths working on farms accounted for 40 percent (162) of the fatalities to workers under 18 during the study period. Slightly over one-half of these fatalities occurred to youths on their own families' farms. Of the 162 youth fatalities in

Michael H. Cimini is an economist in the Division of Compensation Data Analysis and Planning, Bureau of Labor Statistics.
Telephone: (202) 606-6275
E-mail: Cimini_M@bls.gov

TABLE 2. Fatalities to young workers and all workers by event and exposure, 1992-97

Event or exposure	Workers under 18		All workers	
	Number	Percent	Annual average number	Percent
Total	403	100	6,313	100
Transportation incidents	163	40	2,589	41
Highway incidents	70	17	1,304	21
Nonhighway incidents	47	12	396	6
Worker struck by vehicle	25	6	368	6
Water vehicle	9	2	106	2
Railway	8	2	80	1
Assaults and violent acts	82	20	1,247	20
Homicide	72	18	1,003	16
Suicide	3	1	213	3
Animal attack	7	2	29	1
Contact with objects and equipment	82	20	1,004	16
Struck by object	36	9	570	9
Caught in objects or equipment	25	6	295	5
Running equipment	17	4	154	2
Collapsing materials .	17	4	121	2
Falls	23	6	657	10
Exposure to harmful substances and environments	44	11	588	9
Electric current	25	6	312	5
Exposure to caustic, noxious, allergenic substances	9	2	122	2
Oxygen deficiencies .	10	2	102	2
Fires and explosions	8	2	194	3

agriculture, all but 10 occurred to males. About three-fourths of the 109 fatalities involving youths under 15 occurred in farming.

Like adults, working youths are exposed to various hazards on the farm—machinery, falls, being struck by objects, and natural phenomena. (See tabulation.)

Event	Number	Percent
Total	162	100
Transportation	87	54
Off highway	40	25
Overturning and falls	35	22
Highway	27	16
Overturning	20	12
Workers struck by vehicle	10	6
Struck by object	15	9
Caught in running equipment	14	9
Grain engulfment	7	4
Animal assault	7	4
Falls	5	3
Drowning	5	3
Struck by lightning	4	2

TABLE 3. Fatalities to youths and all workers by industry, 1992-97

Industry	Workers under 18		All workers		
	Number	Percent	Average annual number	Percent	Rate per 100,000 workers ¹
Total	403	100	6,313	100	5.0
Agriculture, forestry, and fishing	162	40	827	13	23.7
Mining	-	-	167	3	26.2
Construction	53	13	1,015	16	14.3
Manufacturing	21	5	750	12	3.7
Transportation and public utilities	12	3	935	15	13.2
Wholesale trade	14	3	257	4	5.3
Retail trade	87	22	728	12	3.5
Finance, insurance, and real estate	-	-	115	2	1.5
Services	32	8	772	12	2.3
Government	13	3	682	11	3.5
Other or unspecified ...	9	2	66	1	-

¹ Excludes the military and workers under 15 years of age and is based on number of hours worked.

Over one-half (87) of youth deaths in agriculture were transportation related. Tractors were involved in almost one-third (51) of all youth farm fatalities. About one-half of the tractor-related fatalities resulted from the tractor overturning onto the worker, when being driven in a field or on a roadway. Other tractor-related fatalities resulted from the worker being run over while standing in a field, being struck by the bucket of a tractor-mounted loader, or being caught in the tractor's power take-off mechanism. (See tabulation.)

Event	Number	Percent
Total	51	100
Overturning in a field	15	29
Overturning on a roadway	13	25
Fall from a tractor and struck by attached equipment	6	12
Runover by tractor	4	8
Struck by tractor bucket	3	6
Caught in power take-off	3	6
Other	7	14

In 38 of these 51 instances, the fatally injured youth was operating the tractor. In 16 incidents, the youth was under 16 years of age; in 7, they were under 16 and operating the tractor on a public road.

Retail trade and services. About three-fourths of young workers between the ages of 15 and 17 are employed in the retail trade and service sectors. The most common employers of youths in the retail sector are eating and drinking establishments, grocery stores, and department stores. In the service sector, the most common employers are entertainment or recreation businesses, private households, health care providers, and educational institutions.

As the following tabulation shows, assaults and violent acts—almost all of which were homicide—was the leading cause of fatalities for youths working in retail trade; it accounted for two-thirds (59) of the 87 deaths. Of the 56 homicides, 23 (41 percent) were the result of a confirmed robbery; in 21 incidents, the motive was unclear. Three-fourths of youth deaths in retail trade occurred in food stores, such as a convenience store, grocery, or bakery, or in a restaurant. Males incurred 74 percent of these fatalities. Regardless of sex, assaults accounted for the majority of deaths. Eighty-four percent of fatality victims in retail trade were wage and salary workers, 11 percent worked in their family’s business, and 5 percent were self-employed (all were newspaper carriers).⁴

Event or exposure	Number	Percent
Total	87	100
Assaults and violent acts	59	68
Homicides	56	64
Transportation	16	18
Highway crashes	13	15
Struck by object	5	6
Exposure to harmful environment	4	5
Other	3	3

There were 32 deaths involving youths in the service industry. Transportation-related incidents were the leading cause of fatalities. Homicides and exposure to harmful environments (such as electrocutions and drownings) were the next two most common events leading to youth fatalities in this industry.

Construction. Approximately 13 percent (53) of fatalities incurred by youths were in construction. Of the 53 deaths, two-thirds were incurred by 17-year-olds, and about one-half occurred from June through August. In 15 incidents,

the youths were self-employed or working in a family business.

The majority of the youths in construction worked as laborers, particularly for special trades contractors performing jobs such as roofing and concrete work. Because these youths performed a variety of tasks including digging foundations and ditches, moving and stacking lumber, and erecting or dismantling scaffolding, their fatalities were dispersed by event and exposure. Falls and electrocutions were the leading causes of youth fatalities in this industry. (See tabulation.) Three-fourths of the fatal falls were from or through roofs and skylights. One-half of the electrocutions resulted from contact with overhead power lines.

Event or exposure	Youths		All workers	
	Number	Percent	Number	Percent
Total	53	100	6,087	100
Falls	12	23	1,921	32
Electrocutions	11	21	830	14
Struck by object	9	17	579	10
Highway incidents	6	11	715	11
Excavations and trenching	5	9	201	3
Struck by vehicle	4	8	456	8
Other	6	11	1,385	23

Other industries. Manufacturing accounted for 5 percent (21) of youth fatalities, one-third of which were incurred by newspaper carriers involved in a vehicle-related incident or homicide.⁵ One-fourth occurred in logging and sawmill operations, where the youths were struck by falling trees or by vehicles. Transportation and public utilities, wholesale trade, and government each accounted for 3 percent of the fatal work injuries incurred by youths. Slightly more than one-half of these fatalities were vehicle-related.

¹ See Janice Windau, Eric Sygnatur, and Guy Toscano, “Injuries Incurred by Young Workers,” *Monthly Labor Review*, June 1999.

Data on fatal work injuries are from the Bureau of Labor Statistics’ Census of Fatal Occupational Injuries (CFOI), which covers all fatal work injuries. This program has collected occupational fatality data nationwide since 1992; it uses diverse data sources to identify, verify, and profile fatal work injuries. Information about each workplace fatality (industry and other worker characteristics, equipment involved, and circumstances of the event) is obtained by cross-referencing source documents such as death certificates, workers’ compensation records, and reports to Federal and State agencies. This method assures counts are as complete and accurate as possible.

² The fatal work injury rates included in the study were calculated using annual average employment and hours worked that were collected in the Current Population Survey (CPS). The rates are considered experimental measures. They provide the number of fatal work injuries per 100,000 workers for 1992-97, and were calculated as follows:

$$\frac{[(N_{92} + N_{93} + N_{94} + N_{95} + N_{96} + N_{97}) / (W_{92} + W_{93} + W_{94} + W_{95} + W_{96} + W_{97})] \times 100,000}{\text{where:}}$$

N = number of civilian worker fatalities, age 15 and older, 1992-97, and

W = annual average number of employed civilians, age 15 and older, 1992-97

For calculating rates using hours worked, the total hours worked was converted to full-time equivalent workers using a 2,000-hour work year. Thus, the rate of fatalities per 100,000 full-time equivalent workers = (fatalities/hours) x 200,000,000.

The CFOI program does not collect employment or hours of exposure data; therefore, annual average estimates from the CPS for 1992-97 are used in the denominator. The CPS employment and hours data used to calculate rates are estimates based on a sample of persons employed rather than a complete count. Thus, the CPS estimates and fatality rates have sampling errors; that is, they may differ from figures that would have been obtained if it had been possible to take a census of employed persons. See “Explanatory Notes and Estimates of Error” in the BLS monthly periodical, *Employment and Earnings* for an explanation of CPS sampling and estimation methodology, and standard error computations. The relative standard errors of the CPS estimates can be used to approximate confidence ranges for the fatality rates.

³ In some tables and tabulations, the sum of individual items may not equal the total because some categories of data may not be displayed.

⁴ Newspaper carriers are sometimes considered independent contractors.

⁵ Newspaper carriers are mentioned both here and in the section on retail trade because they are usually employed either in newspaper printing and publishing, in the manufacturing sector, or in direct selling establishments in the retail trade industry. There were 11 fatalities among newspaper carriers under age 18 during the study period.