

Request for Assistance in Preventing Deaths and Injuries of Adolescent Workers

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WARNING!

Each year, approximately 70 adolescents die from injuries at work. Hundreds more are hospitalized, and tens of thousands require treatment in hospital emergency rooms.

The National Institute for Occupational Safety and Health (NIOSH) requests assistance in preventing deaths and injuries among adolescents at work. In 1993, 68 adolescents under age 18 died from work-related injuries, and an estimated 64,000 required treatment in hospital emergency rooms. Adolescents have a high risk for work-related injury compared with adults.

This Alert summarizes available information about work-related injuries among adolescents, identifies work that is especially hazardous, and offers recommendations for prevention.

NIOSH requests that the information in this Alert be brought to the attention of employers and parents of adolescents, educators, and adolescents. NIOSH requests special assistance from safety and health officials and professionals, departments and boards of education, parent-teacher associations, school-to-work teams, unions, advocacy groups, health care providers, insurance companies, editors of appropriate trade journals, and editors of publications written specifically for parents and adolescents.

Risk of Work-Related Injuries Among Adolescents

Deaths

The U.S. Bureau of Labor Statistics identified 136 work-related deaths of adolescents under age 18 in 1992 and 1993 (68 deaths each year) [Derstine 1994; Toscano and Windau 1994]. Agricultural businesses and retail trade accounted for the most deaths (Table 1). Many of the deaths of adolescents under age 16 occurred in family-owned businesses.

Adolescent and adult workers have similar risks of fatal occupational injuries. NIOSH has determined that in 1980-89, the risk of injury death for workers aged 16 and 17 was 5.1 per 100,000 full-time equivalent workers compared with 6.0 for adult workers aged 18 and older [Castillo et al. 1994]. This similarity in risk is cause for concern because adolescents are employed less frequently in especially hazardous jobs. The rate of fatal injuries among adolescents should therefore be much lower than for adults.

Table 1. Fatal work-related injury deaths of U.S. adolescents by industry and age, 1992-93.

Fatal work-related injury deaths of U.S. adolescents by industry and age, 1992-93.

Age of Worker and Industry	Number of Deaths
Workers under age 14:	
Agriculture, forestry and fishing	21 (16 in family businesses)
Other	6
Total	27
Workers aged 14 and 15:	
Agriculture, forestry and fishing	12 (7 in family businesses)
Retail trade	6
Services	3
Other	8
Total	29
Workers aged 16 and 17:	
Retail Trade	25 (3 in family businesses)
Agriculture, Forestry and Fishing	20 (5 in family businesses)
Construction	11
Services	10
Wholesale Trade	5
Manufacturing	4

Other	5
Total	80

Source: Derstine [1994].

Nonfatal Injuries

NIOSH estimates that 64,000 adolescents required treatment in hospital emergency rooms for work-related injuries in 1992 [Layne et al. 1994]. However, research indicates that only one-third of work-related injuries are seen in emergency rooms [CDC 1983]. NIOSH therefore estimates that nearly 200,000 adolescents suffer work-related injuries each year. A substantial number of injured adolescents require hospitalization. From July through December 1992, an estimated 950 adolescents were hospitalized for their injuries [Layne et al. 1994].

Compared with adult workers, adolescents have a high risk of work-related injuries requiring treatment in hospital emergency rooms. Nearly 6 of every 100 full-time equivalent adolescent workers obtain treatment in hospital emergency rooms each year [Layne et al. 1994]. Data from a 1982 study that collected data for workers of all ages suggest that workers under age 18 have higher injury rates than adult workers [CDC 1983].

Sixty-eight percent of occupationally injured 14- to 16-year-olds experienced limitations in their normal activities (including work, school, and play) for at least 1 day, and 25% experienced limitation in their normal activities for more than a week [Knight et al. 1995]. More than half of these adolescents reported that they had not received any training in how to prevent the injury they sustained. A supervisor was present at the time of the injury in only about 20% of the cases.

Work Associated with Large Numbers of Deaths and Serious Injuries

Federal child labor laws prohibit some work associated with large numbers of deaths and serious injuries such as driving a motor vehicle and operating a forklift. Other hazardous activities, such as working alone in retail businesses and cooking, are typically permitted.

Working In or Around Motor Vehicles

Motor-vehicle-related deaths accounted for nearly one-fourth of the work-related injury deaths of 16- and 17-year-olds during the period 1980-89 [Castillo et al. 1994]. These deaths include those of workers who were drivers and passengers in motor vehicles, pedestrians, and bicyclists involved in crashes with motor vehicles.

The following jobs are examples of work that may be associated with motor-vehicle-related deaths and injuries:

- Delivery of passengers or goods (such as furniture, appliances, parcels, messages, newspapers, pizzas, groceries, and pharmaceuticals)
- Services that require routine travel to provide home-based service such as cable television installation and repair, appliance repair, and landscaping services
- Residential trash pickup
- Road maintenance (such as operation of sweepers)
- Work at road construction sites (including flagpersons)
- Work at gas stations, truck stops and auto repair shops

Operating Tractors and Other Heavy Equipment

Machine-related deaths were the second leading cause of work-related injury death for 16- and 17-year-olds for the years 1980-89 [Castillo et al. 1994]. Tractors alone accounted for 44% of the machine-related deaths.

The following lists examples of heavy equipment associated with deaths:

- Tractors used in farm settings and nonfarm settings such as construction
- Forklifts
- Excavating machinery such as backhoes, bulldozers, steam and power shovels, and trenchers
- Loaders such as bucket loaders, end loaders, and front-end loaders

- Road grading and surfacing machinery such as asphalt and mortar spreaders, graders, levelers, planers, scrapers, road line marking machinery, steam rollers, and road pavers

Working Near Electrical Hazards

Electrocution was the third leading cause of work-related injury death among 16- and 17-year-olds for the years 1980-89 [Castillo et al. 1994].

Electrocution accounted for a greater proportion of work-related injury deaths in adolescents than in adults (12% versus 7%). Contact with an energized power line caused more than 50% of the electrocutions.

The following types of work pose an increased risk for electrocution:

- Using poles, pipes, and ladders near overhead power lines during construction work, painting, and pool cleaning
- Working on roofs to perform jobs such as roofing, roof maintenance, cleaning of rain gutters, installation and repair of heating and cooling equipment, installation and repair of television antennas, and cleaning of chimneys and smoke stacks
- Operating or contacting boomed vehicles, such as bucket trucks, telescopic forklifts, and telescopic cranes
- Using grain augers and moving grain elevators and irrigation pipes near power lines
- Tree trimming
- Wiring of electrical circuits and other work involving exposure to electrical circuitry, including work performed by electricians' helpers

Working at Jobs with a High Risk for Homicide

In 1993, assaults and violent acts accounted for about one-fourth of all work-related injury deaths of adolescents [Toscano and Windau 1994]. Most work-related homicides are associated with robbery (75% in 1993).

The following types of jobs involve increased risk for work-related homicide:

- Working alone or in small numbers in businesses where money is exchanged with the public and the risk for robbery-related homicide is high—for example, in convenience stores, gas stations, restaurants, hotels, and motels
- Working alone in contact with large numbers of people where there may be opportunities for uninterrupted assaults for example, working in motel housekeeping, delivery of passengers or goods, and door-to-door sales.

Working with Fall Hazards

Falls were the fifth leading cause of work-related injury death for 16- and 17-year-olds during the years 1980-89 [Castillo et al. 1994]; they accounted for 8% of these deaths in 1993 [Toscano and Windau 1994]. Forty percent of fatal falls were from or out of a building or other structure [Castillo et al. 1994]. Fatal falls were documented for distances ranging from 10 feet to 14 floors.

The following types of jobs are associated with work-related falls:

- Using ladders and scaffolds to work at heights—such as, in building construction, building maintenance (brick cleaning and window washing), painting, and harvesting fruit from trees
- Working on structures or near openings in building construction
- Working on roofs
- Tree trimming

Cooking and Working Around Cooking Appliances

Severe burns are a risk for adolescents involved in cooking. An estimated 5,200 adolescents sought emergency-room treatment for work-related burns associated with cooking or working in a place where food was prepared during the 18-month period from July 1992 through December 1993 [NIOSH 1994].

The following types of work involve burn hazards associated with cooking:

- Cooking in restaurants and other commercial settings
- Servicing cooking equipment—adding, filtering, and removing hot grease from fryers, and cleaning grills and fryers and their associated vents
- Working near cooking appliances where workers may slip into or against equipment

Hazardous Manual Lifting

From July 1992 through December 1993, overexertion accounted for approximately 4,500 work-related injuries of adolescents treated in hospital emergency rooms; about 2,500 of these injuries were attributed to lifting [NIOSH 1994]. These estimates are conservative, since sprains and strains that result from repeated stress on the body (as opposed to a single injurious event) are often not treated in emergency rooms but by private physicians or clinics. Sprains and strains associated with lifting are frequently severe [Parker et al. 1994]. Although an individual's ability to safely lift objects varies, work for adolescents should not generally require them to lift objects weighing greater than 15 pounds more than once per minute or to lift objects weighing greater than 30 pounds; tasks involving continuous lifting should never last more than 2 hours [NIOSH 1994].

The following types of work may involve hazardous manual lifting:

- Working in warehouses
- Delivering furniture and appliances
- Retrieving, carrying, or stocking shelves with relatively heavy items
- Working in health care settings where patients are lifted and moved
- Installing or removing carpet or tile
- Baling hay

Other Hazardous Work

Many particularly hazardous jobs are prohibited by Federal child labor laws. These are summarized in the Appendix [DOL 1990a,b]. Other particularly hazardous work that is not typically prohibited by Federal child labor laws

includes work in petroleum and gas extraction, commercial fishing, many jobs that require use of respirators, work in sewage treatment plants or sewers, work on industrial conveyors, many uses of compressed air or pneumatic tools such as nail guns, farm work using all-terrain vehicles, and work around many types of machines with power take-offs or similarly rotating drivelines [NIOSH 1994].

Additional Health Concerns for Adolescent Workers

In addition to injuries, hazardous materials and working conditions are also a concern for adolescent workers. Less is known about them than the effects of injuries (which have an immediate impact and can be counted and classified as to cause). Exposures of adolescent workers to hazardous materials and working conditions may result in an immediate illness; however, illness might not be detected for months or years after exposure. Adolescent workers may be exposed to pesticides in farm work and lawn care, benzene at gasoline stations, lead in auto body repair, asbestos and silica in construction and maintenance work, and high levels of noise in manufacturing, construction, and agriculture [Committee on Environmental Health 1995; Pollack et al. 1990; NIOSH 1994]. Concerns have also been raised that fatigue from balancing work and school may contribute to injuries among adolescent workers [Miller 1995].

Existing Regulations

Occupational safety and health regulations apply to adolescent and adult workers. Federal and State child labor laws provide additional protection for workers under age 18. When Federal and State regulations differ on the same issue, the more protective law applies.

OSHA

The Occupational Safety and Health Administration (OSHA) within the Department of Labor is the Federal agency with primary responsibility for setting and enforcing standards to promote safe and healthful working conditions for all workers. OSHA standards may require specific conditions in

the workplace or the use of specific practices, methods, or processes to promote safe work. Employers are responsible for becoming familiar with standards applicable to their establishments and for ensuring a safe working environment.

Violations of occupational safety and health regulations have been associated with deaths of adolescents. Of the 104 deaths of adolescents under age 18 investigated by OSHA between 1984 and 1987, citations for safety violations were issued in 70% of the deaths [Suruda and Halperin 1991].

Federal Child Labor Laws

The primary law governing the employment of workers under age 18 is the Fair Labor Standards Act, which is enforced by the Wage and Hour Division of the Employment Standards Administration within the Department of Labor. Child labor provisions of this act are designed to protect the educational opportunities of minors and prohibit their employment in jobs and under conditions that could harm their health or well-being.

Federal child labor laws restrict hours and types of work for 14- and 15-year-olds and set minimum ages for work declared hazardous under the law. Hazardous farm work (see Appendix) is prohibited for adolescents under age 16 [DOL 1990a], but children working on family farms are exempt from Federal child labor laws. Hazardous work in nonfarm businesses including family businesses (see Appendix) is prohibited for adolescents under age 18 [DOL 1990b].

Violations of Federal child labor laws are common and have been associated with serious injury and death. An estimated 1,475 youths incurred serious injuries as a result of illegal employment between 1983 and 1990 [GAO 1991]. Research on work-related deaths of adolescents has found that 38% to 86% of the deaths are associated with prohibited activities [Castillo et al. 1994; Dunn and Runyan 1993; Suruda and Halperin 1991; GAO 1990].

State Child Labor Laws

States also have child labor laws. They may be stricter than Federal child labor laws.

Conclusions

Although work can have many benefits for the development of adolescents and may be financially necessary, the potential for serious injury and death must be recognized and addressed. Large numbers of adolescents are killed and seriously injured at work each year. Employers and parents of adolescents, school counselors and teachers, and adolescent workers may be unaware of the risks and circumstances of work-related injuries to adolescents. Information in this Alert can help those involved make informed decisions about safe work for adolescents and prepare adolescent workers to recognize hazards on the job.

Recommendations

Employers

NIOSH recommends that employers take the following steps to protect adolescent workers:

- Know and comply with child labor laws and occupational safety and health regulations that apply to your business. Post these regulations for workers to read.
- Assess and eliminate the potential for injury or illness associated with tasks required of adolescents.
- Provide training to ensure that adolescents recognize hazards and are competent in safe work practices.
- Routinely verify that the adolescents continue to recognize hazards and employ safe work practices.
- Evaluate equipment that adolescents are required to operate to ensure that it is both legal and safe for use by adolescents.
- Ensure that adolescents are appropriately supervised to prevent injuries and hazardous exposures.

- Involve supervisors and experienced workers in developing an injury and illness prevention program and in identifying and solving safety and health problems.

Parents

Parents should take the following steps to protect adolescent workers:

- Take an active role in the employment decisions of your children.
- Discuss the types of work involved and the training and supervision provided by the employer.

Educators

Educators should take the following steps to protect adolescent workers:

- If you are responsible for signing work permits, know the State and Federal child labor laws.
- Talk to students about safety and health hazards in the workplace and students' rights and responsibilities as workers.
- Ensure that school-based work experience programs (such as vocational education programs and School-to-Work programs) provide students with work experience in safe and healthful environments free of recognized hazards.
- Ensure that school-based work experience programs incorporate information about workers' legal rights and responsibilities and training in hazard recognition and safe work practices.
- Consider incorporating information about workers' rights and responsibilities and occupational safety and health into high school and junior high curricula to prepare students for the world of work.

Adolescents

Adolescent workers should take the following steps to protect themselves:

- Be aware that you have the right to work in a safe and healthful work environment free of recognized hazards and that you have the right to refuse unsafe work tasks and conditions.
- Know that you have the right to file complaints with the U.S. Department of Labor when you feel your rights have been violated or your safety has been jeopardized.
- Remember that adolescent workers are entitled to workers' compensation in the event of work injury or illness.
- Obtain information about your rights and responsibilities as workers from school counselors and State labor departments.
- Participate in any training programs offered by your employer, or request training if none is offered.
- Recognize the potential for injury at work and seek information about safe work practices from employers and State labor departments.
- Follow safe work practices.

Acknowledgments

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We greatly appreciate your assistance in protecting the lives of adolescent workers.

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Appendix

Extremely Hazardous Jobs Prohibited by Federal Child Labor Laws

A. Farm work declared hazardous under Federal child labor laws [DOL 1990a]:

- Operating a tractor of more than 20 power-take-off horsepower, or connecting or disconnecting an implement or any of its parts to or from such a tractor
- Operating or helping to operate any of the following machines:
 - Corn picker
 - Cotton picker
 - Grain combine
 - Hay mower
 - Forage harvester
 - Hay baler
 - Potato digger
 - Mobile pea viner
 - Feed grinder
 - Crop dryer
 - Forage blower
 - Auger conveyor
 - Unloading mechanism of a non gravity-type, self-unloading wagon or trailer
 - Power post-hole digger
 - Power post driver
 - Non Walking-type rotary tiller
 - Trencher or earthmoving equipment
 - Forklift
 - Potato Combine
 - Power-driven circular, band, or chain saw
- Working on a farm in a yard, pen, or stall occupied by one or more of the following:
 - Bull, boar, or stud horse maintained for breeding purposes
 - Sow with suckling pigs
 - Cow with newborn calf (with umbilical cord present)
- Felling, bucking, skidding, loading, or unloading timber with a butt diameter of more than 6 inches

- Working from a ladder or scaffold (painting, repairing, or building structures, pruning trees, picking fruit, etc.) at a height greater than 20 feet
- Driving a bus, truck, or automobile when transporting passengers, or riding on a tractor as a passenger or helper
- Working inside one of the following:
 - A fruit, forage, or grain storage area designed to retain an oxygen-deficient or toxic atmosphere
 - An upright silo within 2 weeks of adding silage or with a top unloading device in operating position
 - A manure pit
 - A horizontal silo while operating a tractor for packing purposes
- Handling or applying agricultural chemicals identified by the word “Danger,” “Poison” with skull and crossbones, or “Warning” on the label
- Handling or using a blasting agent including (but not limited to) dynamite, black powder, sensitized ammonium nitrate, blasting caps, and primer cord
- Transporting, transferring, or applying anhydrous ammonia

B. Nonfarm work declared hazardous under Federal child labor laws [DOL 1990b]:

- Manufacturing and storing explosives
- Motor vehicle driving and working as outside helper
- Coal mining
- Logging and sawmilling
- Operating power-driven woodworking machines
- Work involving exposure to radioactive substances
- Operating power-driven hoisting apparatus
- Operating power-driven metal-forming, punching, and shearing machines
- Mining, other than coal mining
- Power-driven bakery machines
- Slaughtering, meat-packing, processing, or rendering
- Operating power-driven paper products machines

- Manufacturing brick, tile, and kindred products
- Operating power-driven circular saws, band saws, and guillotine shears
- Working in wrecking, demolition, and shipbreaking operations
- Working in roofing operations
- Working in excavation operations