



**Workplace**  
Safety and Health

# ***NIOSH*** ***ALERT***

Preventing Deaths, Injuries, and  
Illnesses of Young Workers

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health

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## **Preventing Deaths, Injuries, and Illnesses of Young Workers**

### **WARNING!**

Many young workers die or are hospitalized each year from injuries at work. Many also suffer adverse health effects from hazardous exposures in the workplace.

### **Young workers**

Young workers should take the following steps to protect themselves:

#### ■ **Know about and follow safe work practices:**

- Recognize the potential for injury at work.
- Follow safe work practices.
- Seek information about safe work practices from employers, school counselors, parents, State labor departments, and the U.S. Department of Labor (DOL). Visit [www.youthrules.dol.gov](http://www.youthrules.dol.gov) or call 1-866-4-USWAGE.

#### ■ **Ask about training:** Participate in training programs offered by your employer or request training if none is offered.

#### ■ **Ask about hazards:** Don't be afraid to ask questions if you are not sure about the task you are asked to do. Discuss your concerns with your supervisor or employer first.

#### ■ **Know your rights:** Be aware that you have the right to work in a safe and healthful work environment free of recognized hazards. Visit [www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html).

- You have the right to refuse unsafe work tasks and conditions.

- You have the right to file complaints with the DOL when you feel your rights have been violated or your safety has been jeopardized.
- You are entitled to workers' compensation for a work-related injury or illness.

#### ■ **Know the laws:** Before you start work, learn what jobs young workers are prohibited from doing. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Visit [www.youthrules.dol.gov](http://www.youthrules.dol.gov), or call 1-866-4-USWAGE.



## Employers

Employers should take the following steps to protect young workers:

### ■ Recognize the hazards:

- Reduce the potential for injury or illness in young workers by assessing and eliminating hazards in the workplace.
- Make sure equipment used by young workers is safe and legal. Visit [www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm](http://www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm) or call 1-866-4-USADOL.

### ■ Supervise young workers:

- Make sure that young workers are appropriately supervised.
- Make sure that supervisors and adult coworkers are aware of tasks young workers may or may not perform.
- Label equipment that young workers cannot use, or color-code uniforms of young workers so that others will know they cannot perform certain jobs.

### ■ Provide training:

- Provide training to ensure that young workers recognize hazards and are competent in safe work practices.
- Have young workers demonstrate that they can perform assigned tasks safely and correctly.
- Ask young workers for feedback about the training.

### ■ Know and comply with the laws: Know and comply with child labor laws and occupational safety and health regulations that apply to your business. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Post these regulations for workers to read. For information about Federal child labor laws, visit [www.dol.gov/dol/topic/youthlabor/index.htm](http://www.dol.gov/dol/topic/youthlabor/index.htm) or call 1-866-4-USADOL. For State laws, visit [www.ilsa.net](http://www.ilsa.net) or [www.youthrules.dol.gov/states.htm](http://www.youthrules.dol.gov/states.htm), or call 1-866-4-USWAGE. Information about OSHA



regulations that apply to all workers is available at [www.osha.gov](http://www.osha.gov).

### ■ Develop an injury and illness prevention program: Involve supervisors and experienced workers in developing a comprehensive safety program that includes an injury and illness prevention program and a process for identifying and solving safety and health problems. OSHA consultation programs are available in every State to help employers identify hazards and improve their safety and health management programs. Visit [www.osha.gov/oshprogs/consult.html](http://www.osha.gov/oshprogs/consult.html).

## Educators

Educators should take the following steps to protect young workers:

- **Talk to students about work:** Talk to students about safety and health hazards in the workplace and students' rights and responsibilities as workers.
- **Ensure the safety of school-based work experience programs:** Ensure that vocational education programs, school-to-work, or Workforce Investment Act partnerships offer students work that is allowed by law and is in safe and healthful environments free of recognized hazards. All such programs should include safety and health training.



- **Include worker safety and health in the school curriculum:** Incorporate occupational safety and health topics into high school and junior high curricula (e.g., safety and health regulations, how to recognize hazards, how to communicate safety concerns, where to go for help). Information is available from NIOSH at [www.cdc.gov/niosh/pdfs/99-141.pdf](http://www.cdc.gov/niosh/pdfs/99-141.pdf) [NIOSH 1999] or 1-800-35-NIOSH.
- **Know the laws:** If you are responsible for signing work permits or certificates, know the child labor laws. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Visit [www.dol.gov/dol/topic/youthlabor/ResourceforEducators.htm](http://www.dol.gov/dol/topic/youthlabor/ResourceforEducators.htm) (or call 1-866-4-USADOL), [www.youthrules.dol.gov](http://www.youthrules.dol.gov) (or call 1-866-4-USWAGE), or visit [www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html).

## Parents

Parents should take the following steps to protect young workers:

- **Take an active role in your child's employment:**
  - Know the name of your child's employer and your child's work address and phone number.
  - Ask your child about the types of work involved, work tasks, and equipment he or she uses at work.
  - Ask your child about training and supervision provided by the employer.
  - Be alert for signs of fatigue or stress as your child tries to balance demands of work, school, home, and extracurricular activities.
- **Know the laws:** Be familiar with child labor laws. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Don't assume that your child's employer knows about these laws. Visit [www.dol.gov/dol/topic/youthlabor/ParentsofYoung.htm](http://www.dol.gov/dol/topic/youthlabor/ParentsofYoung.htm) (or call 1-866-4-USADOL), [www.youthrules.dol.gov](http://www.youthrules.dol.gov) (or call 1-866-4-USWAGE), or [www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html).



- **Be aware of young workers' rights:** Report unsafe working conditions or employment in violation of child labor laws to DOL. Young workers are eligible for workers' compensation benefits if injured on the job.
- **Share information with other parents:** Studies have shown that most young workers and parents are not aware of the laws and rights of young workers.

For additional information, see ***NIOSH Alert: Preventing Deaths, Injuries, and Illnesses of Young Workers*** [DHHS (NIOSH) Publication No. 2003-128]. Single copies of the Alert are available free from

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**Department of Health and Human Services**  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health



## **Preventing Deaths, Injuries, and Illnesses of Young Workers**

### **WARNING!**

Many young workers die or are hospitalized each year from injuries at work. Many also suffer adverse health effects from hazardous exposures in the workplace.

The National Institute for Occupational Safety and Health (NIOSH) requests assistance in preventing deaths, injuries, and illnesses among young workers. An average of 67 workers under age 18 died from work-related injuries each year during 1992–2000. In 1998, an estimated 77,000 required treatment in hospital emergency rooms.

This Alert summarizes available information about work-related injuries among young workers, 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 young workers as well as their employers, educators, and parents. Others are requested to help distribute this information: safety and health officials and professionals, departments and boards of education, parent-teacher associations, those involved in implementing school-to-work or Workforce Investment Act partnerships, unions, advocacy groups, youth organizations, health care providers, insurance companies, and

editors of trade journals or publications written for parents and young workers.

### **BACKGROUND**

Research surveys of students and parents suggest that 70% to 80% of teens have worked for pay at some time during their high school years [Light 1995; Steinberg and Cauffman 1995]. Between 1996 and 1998, a monthly average of 2.9 million workers aged 15 to 17 worked during school months, and 4.0 million worked during summer months [BLS 2000]. Workers aged 15 to 17 spend the most work hours in food preparation and service jobs, stock handler or laborer jobs, administrative support jobs, and farming, forestry, or fishing jobs [NIOSH 2002a].

Developmental factors in young workers and the nature of their employment may increase their risk of injury or illness on the job:

- Young workers commonly perform tasks outside their usual work assignments for which they may not have received training

[Bowling et al. 1998; Massachusetts Department of Public Health 1998].

- Young workers may lack the experience and physical and emotional maturity needed for certain tasks.
- Young workers may be unfamiliar with work requirements and safe operating procedures for certain tasks.
- Young workers may not know their legal rights and may not know which work tasks are prohibited by child labor laws [Castillo et al. 1999; NRC/IOM 1998].
- Young workers are experiencing rapid growth of organ and musculoskeletal systems, which may make them more likely to be harmed by exposure to hazardous substances or to develop cumulative trauma disorders [Bruckner and Weil 1999; NIOSH 1997a; NRC/IOM 1998].
- Young workers may be exposed to suspected asthma-causing agents and substances that disrupt the function or maturation of the endocrine and central nervous systems [Golub 2000; Banks and Wang 2000].

## Fatalities

According to data from the U.S. Bureau of Labor Statistics (BLS), 603 workers under age 18 suffered fatal occupational injuries between 1992 and 2000, an average of 67 per year. Of these, 362 were aged 16 or 17, 119 were aged 14 or 15, and 122 were under age 14 [NIOSH 2003]. More than 30% of all fatal injuries to young workers occurred in family businesses. Figure 1 shows the percentage of work-related deaths among young workers by industry. The events in which young workers were killed were similar to those for workers of all ages (Figure 2).

## Nonfatal Injuries

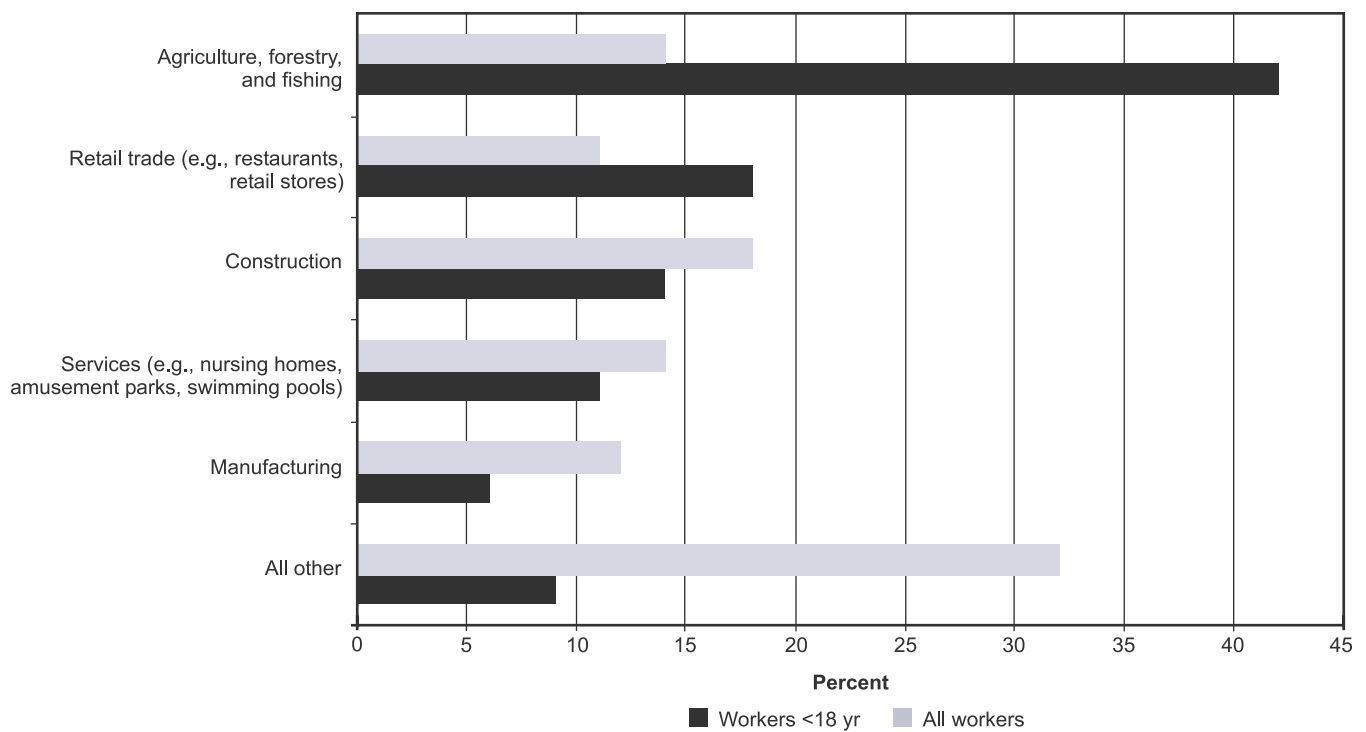
The two primary sources of information about nonfatal injuries to young workers are the

National Electronic Injury Surveillance System (NEISS), based on hospital emergency department data, and the Survey of Occupational Injuries and Illnesses (SOII), an annual survey of employers conducted by the BLS. Using NEISS, NIOSH estimated that 77,000 young workers under age 18 required treatment in hospital emergency departments for work-related injuries during 1998 [Jackson 2001]. However, information from national surveys indicates that only one-third of work-related injuries are seen in emergency departments [CDC 1983]; therefore it is likely that nearly 230,000 teens suffered work-related injuries that year.

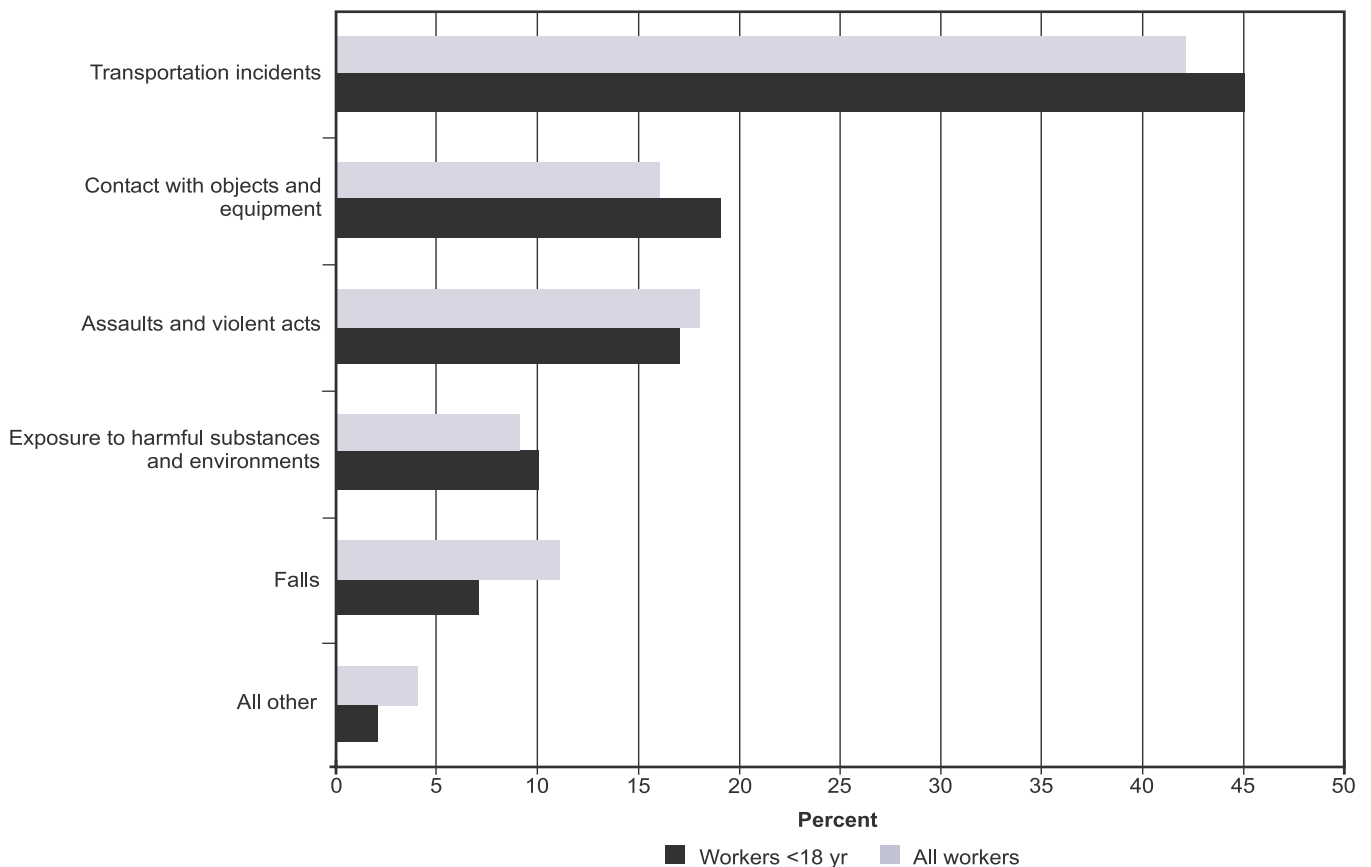
According to emergency department data, workers aged 15 to 17 had a substantially higher rate of work-related injuries or illnesses in 1998 than did all workers aged 15 or older: 4.9 per 100 versus 2.9 per 100 full-time equivalent (FTE) workers [CDC 2001].

SOII data show that compared with adult workers, injuries to young workers result in slightly fewer days away from work. However, injury severity for young workers may be underestimated because days away from work are counted only if the injured worker was scheduled to work on those days. Since young workers tend to work part-time or for shorter durations, injuries among young workers may on average be more severe than the days-away-from-work data suggest [BLS 2000]. Furthermore, the impact of work-related injuries for young workers extends beyond their work lives. A study of young workers treated in emergency departments for work-related injuries found that 52% missed scheduled work, 45% needed a prescription medication, 38% felt they were permanently injured in some way, and 33% were restricted in their normal home activities [Mardis 2001].





**Figure 1.** Percentage of work-related deaths by industry: workers under age 18 compared with all workers, United States, 1992–2000. Source: Census of Fatal Occupational Injuries Special Research Files, BLS, analysis by NIOSH [2003]. Data in this figure do not include work-related deaths in New York City.



**Figure 2.** Percentage of work-related deaths by event: workers under age 18 compared with all workers, United States, 1992–2000. Source: Census of Fatal Occupational Injuries Special Research Files, BLS, analysis by NIOSH [2003]. Data in this figure do not include work-related deaths in New York City.

## WORK THAT POSES SPECIAL RISKS FOR YOUNG WORKERS

### Agricultural Work

Agriculture is the most dangerous industry for young workers, accounting for 42% of all work-related fatalities of young workers between 1992 and 2000. Unlike other industries, half the young victims in agriculture were under age 15 [NIOSH 2003]. For young agricultural workers aged 15–17, the risk of fatal injury is four times the risk for young workers in other workplaces [BLS 2000]. Young workers employed in agriculture may be directly hired workers, employees of labor contractors, or farm residents working in the family business. Agricultural work exposes young workers to safety hazards such as machinery, confined spaces, work at elevations, and work around livestock. Young workers may also be exposed to agricultural chemicals (e.g., pesticides, fertilizers), noise, respiratory irritants, and toxic gases (see Appendix A) [NRC/IOM 1998; Kirkhorn and Garry 2000].

Workers may legally perform any agricultural task after they reach age 16, whereas they are prohibited from some jobs in other industries until they reach age 18. Furthermore, child labor laws do not cover workers under age 16 who work on their parents' or guardians' farms. Between 1992 and 2000, 76% of the fatal injuries to agricultural workers under age 16 involved work in a family business [NIOSH 2003].

### Work in Retail Trades

The second highest number of workplace fatalities among workers younger than age 18 occurred in the retail trades (e.g., restaurants and retail stores). Between 1992 and 2000, 63% of these deaths were due to assaults and violent acts, most of which were homicides. Homicide associated with robbery is the probable cause for one fourth to one half

of all young worker fatalities in retail trades [Windau et al. 1999]. Handling cash, working alone or in small numbers, and working in the late evening and early morning hours may contribute to workplace homicides [NIOSH 1996a].

In 1998, more than half of all work-related nonfatal injuries to young workers occurred in retail trades, more than 60% of which were eating and drinking establishments. Cuts in retail trades were the most common type of injury treated in emergency departments, followed by burns in eating and drinking establishments and bruises, scrapes, and scratches in other retail settings [Mardis and Pratt 2003]. Common hazards in restaurants include using knives to prepare food, handling hot grease from fryers, working near hot surfaces, and slipping on wet or greasy floors [NRC/IOM 1998].

In addition, certain types of machinery prohibited for use by young workers under current child labor laws are commonly found in retail establishments—including food slicers, paper balers, forklifts, dough and batter mixers, and bread cutting machines. Young workers may choose to operate unfamiliar machinery to prove responsibility, independence, or maturity [Massachusetts Department of Public Health 1998], or they may be instructed to do so by an employer who is unaware of child labor laws or chooses to disregard them.

Exposure to harmful chemicals may also occur in restaurants. Chemicals commonly used for cleaning may cause chlorine or ammonia gas release when mixed improperly. Depending on the amount of gas inhaled, irritation of the eyes and respiratory tract, dizziness, cough, and chest pain may occur. Severe exposure may lead to pulmonary edema (the accumulation of fluid in lung tissues), serious lung injury, or pneumonia [CDC 1991]. Chlorine gas inhalation has also been shown to cause longer-term, asthma-like symptoms (see Appendix A) [Leroyer et al. 1998].

## Transportation: Motor Vehicles and Mobile Machinery

Persons aged 16 to 20 in the general population have higher fatality and injury rates due to motor vehicle crashes than any other age group [NHTSA 2001]. In the workplace, 45% of all fatal injuries to workers under age 18 between 1992 and 2000 resulted from transportation incidents [NIOSH 2003]. Transportation incidents, as defined by the BLS, include incidents occurring on or off the highway involving motor vehicles as well as industrial vehicles (such as tractors and forklifts) in which at least one vehicle was in operation [Windau et al. 1999]. Child labor laws prohibit workers under age 18 from operating many types of motor vehicles or mobile machinery. Operating a motor vehicle at work is prohibited for workers aged 16 and allowed only under limited circumstances for those aged 17 (see Appendix B). Despite current restrictions, transportation-related fatalities and injuries among young workers continue to occur. Ensuring safe operation of vehicles on the job by young workers poses special challenges for employers. In addition to being new to the workplace, young employees are new to driving, which compounds the risk of injury.

## Construction

The complex and ever-changing construction work environment presents multiple safety hazards. Overall, more U.S. workers are killed working in construction than in any other industry. Construction workers risk injury from a wide range of events, including falls, electrocution, collapsing structures, machinery-related incidents, falling objects, and motor vehicle crashes. Child labor laws prohibit workers aged 14 and 15 from working in construction, except when performing office work away from the construction site. Other laws that apply to all workers under age 18 prohibit several tasks associated with construction [DOL 2001], yet they do not address all hazards on the job site.

In addition to the risk of injury, construction work may expose workers to many substances with adverse health effects. The effects may not appear until years after the first exposure. Among the substances that have been linked to occupational illnesses among construction workers are asbestos, cement, synthetic vitreous fibers, silica, and wood dust; dusts and fumes from sources such as cadmium, lead, copper, zinc, and asphalt; and solvents and other chemicals such as toluene, polyurethanes, epoxy resins, and methylene chloride. Illnesses from such exposures include lead poisoning, asbestosis and other lung disorders related to inhalation of fibers, cancers, asthma, chronic obstructive pulmonary disease, bronchitis, skin rash or inflammation, silicosis, adverse effects on fetuses, and other chronic toxic effects (see Appendix A) [Osorio and Melius 1995; NIOSH 1991; NIOSH 1992; NIOSH 2001d; Ringen et al. 1995; Rühl and Kluger 1995; Sullivan et al. 1995].

## SAFETY REGULATIONS THAT PROTECT YOUNG WORKERS

### OSHA

The Occupational Safety and Health Administration (OSHA) within the U.S. Department of Labor (DOL) is the Federal agency with primary responsibility for setting and enforcing standards to promote safe and healthful working conditions for all workers. Employers are responsible for becoming familiar with standards applicable to their establishments and for ensuring a safe working environment. The OSHA Web site provides information about regulations and standards and provides tools specific to many work settings for complying with these standards: [www.osha.gov/fso/ca.html](http://www.osha.gov/fso/ca.html) and [www.osha.gov/SLTC/index.html](http://www.osha.gov/SLTC/index.html). OSHA also offers assistance directly to employers through consultation programs available in every

State. Consultation programs help employers identify hazards and improve their safety and health management programs. For more information, visit [www.osha.gov/oshprogs/consult.html](http://www.osha.gov/oshprogs/consult.html).

## Federal Child Labor Laws

A workplace may be fully compliant with OSHA regulations and yet may place young workers at risk of injury or illness if applicable Federal and State child labor laws are not followed. One study estimated that more than three-fourths of employers of young workers were unfamiliar with child labor laws. Lack of awareness of occupational safety and health laws by young workers, adults, and employers has been identified as a major obstacle to preventing injury and illness in young workers [NRC/IOM 1998].

The primary Federal law governing the employment of workers under age 18 is the Fair Labor Standards Act (FLSA) of 1938, which is enforced by the Wage and Hour Division of the Employment Standards Administration within DOL. Child labor provisions of the FLSA are designed to protect the educational opportunities of minors and prohibit their employment in jobs that pose safety or health risks.

The FLSA does not cover all young workers. The FLSA applies to an entire business enterprise if the enterprise has annual gross revenues of \$500,000 or more. Some States extend coverage of child labor laws to all businesses, regardless of revenues. Even if an entire enterprise is not covered, the FLSA applies to individual workers engaged in producing, transporting, loading, or receiving goods for interstate commerce. Interstate commerce also includes workers who handle documents related to interstate commerce, such as credit card transactions. For more information, visit [www.dol.gov/esa/regs/compliance/whd/whdfs27.htm](http://www.dol.gov/esa/regs/compliance/whd/whdfs27.htm).

Child Labor Regulation No. 3 restricts hours and specifies allowable employment activities for workers aged 14 and 15 (see Appendix B). Two other groups of regulations define work prohibited for young workers in terms of Hazardous Orders—occupations declared hazardous for young workers by the Secretary of Labor. The first of these defines hazardous farm work prohibited for workers under age 16 (see Appendix C) [DOL 1990]. However, no Federal child labor laws cover children working on their parents' or guardians' farms. Another group of regulations applicable to nonagricultural businesses, including family businesses (see Appendix B), defines jobs prohibited for adolescents under age 18 [DOL 2001]. DOL reviews Federal child labor laws on an ongoing basis to ensure that they provide adequate protection to young workers. For more information, visit [www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm](http://www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm) or call 1-866-4-USADOL.

## State Child Labor Laws

States may also have their own child labor laws that are stricter than Federal laws. For example, Maine and Massachusetts prohibit all workplace driving by workers under age 18 [Maine DOL 2003; Massachusetts Department of Public Health 2002], whereas Federal law allows "occasional and incidental driving" by workers aged 17, although in limited circumstances [DOL 2001]. If a State child labor law is less protective than Federal law, or if no applicable State law exists, Federal child labor laws apply (if the business meets the requirements for coverage under Federal laws) [NRC/IOM 1998]. For more information, visit [www.youthrules.dol.gov/states.htm](http://www.youthrules.dol.gov/states.htm) or [www.ilsa.net](http://www.ilsa.net) or call 1-866-4-USWAGE.

## CASE REPORTS

The following case reports give examples of the risks young workers may face while at work:



## **Case 1—Amputation in meat grinder**

In 2000, a 17-year-old bagger employed at his family's retail grocery store suffered amputation of his right arm when it became caught in an operating meat grinder. A customer had asked him for ground beef. Because none was available at the meat counter, he decided to operate the grinder himself. Some of the meat became stuck in the grinder bowl. He removed the feed pan and reached into the bowl with his right hand, pushing the meat down into the "worm," a rotating machine part shaped like a corkscrew. When meat fed from the bowl, the worm caught his hand and fed it into the grinder's barrel, amputating his hand and part of his lower right arm [NIOSH 2001a].

## **Case 2—Suffocation in corn bin**

In 1999, a 15-year-old worker suffocated in a corn bin while working on his family's farm. He entered a 20,000-bushel corn bin through a door at the top to scoop corn away from a lower door of the bin. The corn in the bin sloped from the sides to the center. The center portion of the bin was empty, and the corn at the sides was about 7 feet high. A coworker opened the bin door, didn't see the young worker, and assumed he had exited from the bin. About 30 minutes after the young worker entered the bin, two coworkers entered to check on him. They found him suffocated under approximately 4 feet of corn [Nebraska DOL 2000].

## **Case 3—Shooting during robbery attempt**

In 2000, a 16-year-old restaurant cashier died when she was shot in the head during an armed robbery attempt. At 1:15 p.m., a man approached the cashier and her mother, a co-owner of the restaurant, at the cash register. He pointed a gun at the cashier, demanded money from the register, and fired

the gun, striking her in the face. She was transported to the hospital and pronounced dead [Wisconsin Division of Health 2000].

## **Case 4—Burns at a fast food restaurant**

In 1997, a 17-year-old worker in a fast-food restaurant suffered second- and third-degree burns on her shoulder, back, chest, and arm when hot grease splattered from an uncovered, portable grease-filtering machine. A coworker was using the machine 10 feet away to filter hot grease from a fryer used to cook French fries. As a result of the burns, the victim has undergone skin grafts and suffered permanent nerve damage [National Consumers League 2001].

## **Case 5—Fatal crushing incident in cardboard baler**

In 2000, a 16-year-old produce-market worker died from crushing injuries after being caught in the vertical-downstroke baling machine he was operating. He was working alone in the basement when he was caught by the hydraulic ram of the baling machine. Another worker discovered him slumped over at the waist and leaning into the loading chamber of the machine. He may have leaned over into the compression chamber to adjust a tie wire or a box when he was caught by the ram as it moved downward [NIOSH 2000a].

## **Case 6—Chlorine gas inhalation**

A 16-year-old male restaurant worker was preparing to clean the floor by mixing cleaning solutions. During the mixing, noxious fumes were emitted and he began to feel ill and light-headed. He developed chest pains and was taken to an emergency department, where he was treated for chlorine gas inhalation [NIOSH 2002b]. (Year of injury withheld.)

### **Case 7—Crushing death by forklift**

In 2000, a 17-year-old laborer working at a salvage lumber business was fatally injured when the forklift he was operating overturned. A coworker was riding on the right side of the forklift, holding on to the overhead guard. As the young worker turned the forklift sharply to the left, it tipped and overturned to the right. His coworker jumped out, landing with her ankle pinned to the ground by the machine. She sustained minor injuries. The operator, who was thrown or jumped from the operator's seat, landed with his head caught between the overhead guard and the ground. He was pronounced dead at the scene [NIOSH 2001b].

### **Case 8—Fatal collision while responding to fire call**

In 2000, a 17-year-old volunteer junior fire fighter died after his privately owned vehicle collided with a farm tractor. He drove into the opposite lane of a two-lane road as he negotiated a curve. He was not wearing a seat belt. His vehicle struck the tractor, which was traveling in the oncoming lane. The tractor was fitted with a front-end loader that impacted the cab area of his vehicle. He was airlifted to the hospital, where he was pronounced dead 2 hours later [NIOSH 2001c].

### **Case 9—Fatal injury from trench collapse**

In 1999, a 17-year-old laborer died and a coworker was injured when an unprotected wall of the trench they were working in collapsed. The day before the incident, the trench shield used to shore up the trench had been removed to ease removal of broken sewer pipes. Although the shield had not been replaced, the young worker and a coworker were sent into the trench the next day to check the grade of the sewer line. As the two workers were placing a pole to check the grade, a section of the trench wall caved in,

burying the 17-year-old worker to mid-chest level and his coworker to his knees. The two workers could not be removed until protective systems were installed to ensure the rescuers' safety. The coworker was later admitted to the hospital and recovered from his injuries. The 17-year-old laborer underwent emergency surgery but died about 5 hours after the incident [NIOSH 2000b].

### **Case 10—Crushing death beneath street sweeper**

In 1996, a 13-year-old construction laborer was crushed beneath an unattended rolling street sweeper while working at an asphalt plant owned by his father. The unattended vehicle had rolled approximately 140 feet, striking the young victim. No one else on the site saw the incident occur. [Massachusetts Department of Public Health 1996].

### **Case 11—Inhalation of insecticide-containing fertilizer**

A 16-year-old male stock handler was restocking garden shop shelves with bags of insecticide-containing fertilizer when he inhaled dust from a leaking bag. He began to choke, cough, and feel light-headed. The following morning when his symptoms had not resolved he was taken to an emergency department where he was treated for insecticide and fertilizer inhalation [NIOSH 2002b]. (Year of injury withheld.)

## **CONCLUSIONS**

Employment of young workers can have many benefits for businesses and for young workers. However, the potential for serious injury and death must be recognized and addressed by everyone involved. Employers, educators, parents, and young workers may not be aware of safety and health laws designed to protect young workers on the job.

Safety and health regulations alone cannot control or eliminate all the factors that may contribute to risk of injury for young workers. On the basis of case reports presented in this Alert and other incidents, NIOSH concludes that one or more of the following circumstances are commonly present when young workers are injured or killed at work:

- Young workers may not be trained to perform assigned tasks safely.
- Young workers may be assigned to perform incidental tasks for which they have no training or experience, or they may take it upon themselves to perform these tasks.
- Young workers may not be adequately supervised.
- Young workers lack the experience and maturity needed to recognize and deal with injury hazards. More specifically, they may not yet have a sufficient understanding of work processes to recognize hazardous situations.
- Young workers may not have the training or experience to handle emergencies or injuries.
- Young workers, their employers, and parents may disregard or be unaware of child labor laws that specify the jobs and the hours that young workers may not work.

## RECOMMENDATIONS

### Young Workers

Young workers should take the following steps to protect themselves:

- **Know about and follow safe work practices:**
  - Recognize the potential for injury at work.
  - Follow safe work practices.

### Young Workers

- Seek information about safe work practices from employers, school counselors, parents, State labor departments, and DOL. Visit [www.youthrules.dol.gov](http://www.youthrules.dol.gov), or call 1-866-4-USWAGE.

- **Ask about training:** Participate in training programs offered by your employer, or request training if none is offered.
- **Ask about hazards:** Don't be afraid to ask questions if you are not sure about the task you are asked to do. Discuss your concerns with your supervisor or employer first.
- **Know your rights:** Be aware that you have the right to work in a safe and healthful work environment free of recognized hazards. Visit [www.osha.gov/sltc/teenworkers/index.html](http://www.osha.gov/sltc/teenworkers/index.html).
  - You have the right to refuse unsafe work tasks and conditions.
  - You have the right to file complaints with DOL when you feel your rights have been violated or your safety has been jeopardized.
  - You are entitled to workers' compensation for a work-related injury or illness.
- **Know the laws:** Before you start work, learn what jobs young workers are prohibited from doing. State child labor laws may be more restrictive than Federal laws, and they vary considerably from State to State. Visit [www.youthrules.dol.gov](http://www.youthrules.dol.gov) or call 1-866-4-USWAGE.

### Employers

Employers should take the following steps to protect young workers:

- **Recognize the hazards:**
  - Reduce the potential for injury or illness in young workers by assessing

and eliminating hazards in the workplace.

- Make sure equipment used by young workers is safe and legal. Visit [www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm](http://www.dol.gov/dol/topic/youthlabor/hazardousjobs.htm) or call 1-866-4-USADOL.

#### ■ **Supervise young workers:**

- Make sure that young workers are appropriately supervised.
- Make sure that supervisors and adult coworkers are aware of tasks young workers may or may not perform.
- Label equipment that young workers cannot use, or color-code uniforms of young workers so that others will know they cannot perform certain jobs.

#### ■ **Provide training:**

- Provide training in hazard recognition and safe work practices.
- Have young workers demonstrate that they can perform assigned tasks safely and correctly.
- Ask young workers for feedback about the training.

- **Know and comply with the laws:** Know and comply with child labor laws and occupational safety and health regulations that apply to your business. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Post these regulations for workers to read. For information about Federal child labor laws, visit [www.dol.gov/dol/topic/youthlabor/index.htm](http://www.dol.gov/dol/topic/youthlabor/index.htm) or call 1-866-4-USADOL. Links to State labor offices are available at [www.ilsa.net](http://www.ilsa.net) or [www.youthrules.dol.gov/states.htm](http://www.youthrules.dol.gov/states.htm) (1-866-4-USWAGE). Information about OSHA regulations that apply to workers of all ages is available at [www.osha.gov](http://www.osha.gov).

- **Develop an injury and illness prevention program:** Involve supervisors and experienced workers in developing a comprehensive safety program that includes an injury and illness prevention program and a process for identifying and solving safety and health problems. OSHA consultation programs are available in every State to help employers identify hazards and improve their safety and health management programs. Visit [www.osha.gov/oshprogs/consult.html](http://www.osha.gov/oshprogs/consult.html).

## Educators

Educators should take the following steps to protect young workers:

- **Talk to students about work:** Talk to students about safety and health hazards in the workplace and students' rights and responsibilities as workers.
- **Ensure the safety of school-based work experience programs:** Ensure that vocational education programs, school-to-work, or Workforce Investment Act partnerships offer students work that is allowed by law and is in safe and healthful environments free of recognized hazards. All such programs should include safety and health training.
- **Include worker safety and health in the school curriculum:** Incorporate occupational safety and health topics into high school and junior high curricula (e.g., safety and health regulations, how to recognize hazards, how to communicate safety concerns, where to go for help). Information is available from NIOSH at [www.cdc.gov/niosh/pdfs/99-141.pdf](http://www.cdc.gov/niosh/pdfs/99-141.pdf) [NIOSH 1999] or 1-800-35-NIOSH.
- **Know the laws:** If you are responsible for signing work permits or certificates, know the child labor laws. State laws may be more restrictive than Federal laws, and they vary considerably from State to State.



Visit [www.dol.gov/dol/topic/youthlabor/ResourcesforEducators.htm](http://www.dol.gov/dol/topic/youthlabor/ResourcesforEducators.htm) (or call 1-866-4-USADOL), [www.youthrules.dol.gov](http://www.youthrules.dol.gov) (or call 1-866-4-USWAGE), or visit [www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html).

## Parents

Parents should take the following steps to protect young workers:

### ■ Take an active role in your child's employment:

- Know the name of your child's employer and your child's work address and phone number.
- Ask your child about the types of work involved, work tasks, and equipment he or she uses at work.
- Ask your child about training and supervision provided by the employer.
- Be alert for signs of fatigue or stress as your child tries to balance demands of work, school, home, and extracurricular activities.

### ■ Know the laws: Be familiar with child labor laws. State laws may be more restrictive than Federal laws, and they vary considerably from State to State. Don't assume that your child's employer knows about these laws. Visit [www.dol.gov/dol/topic/youthlabor/ParentsofYoung.htm](http://www.dol.gov/dol/topic/youthlabor/ParentsofYoung.htm) (or call 1-866-4-USADOL), [www.youthrules.dol.gov](http://www.youthrules.dol.gov) (or call 1-866-4-USWAGE), or [www.osha.gov/SLTC/teenworkers/index.html](http://www.osha.gov/SLTC/teenworkers/index.html).

### ■ Be aware of young workers' rights: Report unsafe working conditions or employment in violation of child labor laws to DOL. Young workers are eligible for workers' compensation benefits if injured on the job.

### ■ Share information with other parents: Studies have shown that most young

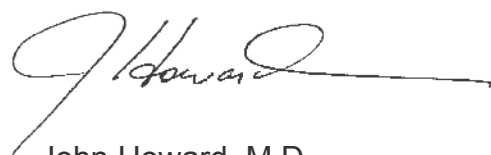
workers and parents are not aware of the laws and rights of young workers.

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Director  
Division of Safety Research  
National Institute for Occupational Safety and Health  
1095 Willowdale Road  
Morgantown, WV 26505-2888  
Telephone (304) 285-5894; or call  
1-800-35-NIOSH (1-800-356-4674).

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



John Howard, M.D.  
Director, National Institute for  
Occupational Safety and Health  
Centers for Disease Control  
and Prevention

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## Appendix A

### Occupational exposures and adverse health effects in work settings where young workers are commonly employed

Work setting	Occupational exposures	Adverse health effects
Farm, lawn care services, nurseries	Agricultural chemicals (pesticides, fertilizers, and others) [NCCAIP 1996; NRC/IOM 1998]*	Diseases of the nervous system, hormone disruption, fertility problems, cancer
Retail trades, building maintenance, health care	Cleaning solutions and disinfectants [Massachusetts Department of Public Health 1998]	Eye or skin irritation, skin rash or inflammation, respiratory problems, asthma-like symptoms
Health care	Bloodborne pathogens (HIV, hepatitis viruses) [Lipscomb and Borwegen 2000]	Acquired immune-deficiency syndrome (AIDS), infectious liver diseases
Gas stations	Benzene (from fuels) [Maranelli et al. 2000; Hartle 1993]	Leukemia
Auto repair, painting, construction	Lead [EPA 2001; IARC 1987; NRC/IOM 1998; Levin and Goldberg 2000; Lewis 1990]	Developmental and neurological impairment, mental retardation, anemia, sterility, possibly cancer, others
Construction and maintenance	Asbestos [IARC 1987; Oliver 1994; Wagner 1997]	Lung cancer, lung disease (asbestosis)
Construction, maintenance, agriculture	Silica [Wagner 1997; NIOSH 2002c; IARC 1997]	Lung disease (silicosis), cancer
Manufacturing, construction, agriculture	Noise [NRC/IOM 1998]	Hearing impairment
Services, manufacturing, agriculture	Sensitizers and irritants (such as animal proteins, cleaning agents, enzymes, flour, natural rubber latex, and certain reactive chemicals) [NRC/IOM 1998; Massachusetts Department of Public Health 1998]	Asthma, allergies, skin rash, or inflammation
Agriculture (planting, cultivating, harvesting), stock or inventory handling, typing or keyboarding	Repetitive trauma [NIOSH 1997b]	Cumulative trauma disorders of hands, elbows, or shoulders (e.g., carpal tunnel syndrome)
Construction, auto body shops	Isocyanates [Banks and Wang 2000; NIOSH 1996b; Redlich et al. 2001]	Respiratory irritation, asthma, skin rash or inflammation, allergic inflammatory disease of the lung
Health care, veterinary health care	Radiation [Fritschi 2000; Emery and Cooper 1998; Samet 1997]	Cancer (skin cancer, thyroid cancer, leukemia, possibly others)

\*See reference list on page 12.

## Appendix B

### Child Labor Provisions of the Fair Labor Standards Act (FLSA) for Nonagricultural Occupations (adapted from DOL Fact Sheet No. 043) [DOL 2002a]

#### Minimum Federal age standards for nonagricultural employment

The FLSA and the child labor regulations issued at 29 CFR 570 establish both hours and occupational standards for young workers. Children of any age are generally permitted to work for businesses entirely owned by their parents, except that those under age 16 may not be employed in mining or manufacturing, and no one under age 18 may be employed in any occupation the Secretary of Labor has declared to be hazardous.

- **Age 18:** Once a young worker reaches age 18, he or she is no longer subject to the Federal child labor provisions.
- **Ages 16–17:** Sixteen is the basic minimum age for employment. Workers aged 16 and 17 may be employed for unlimited hours in any occupation other than those declared hazardous by the Secretary of Labor.
- **Ages 14–15:** Young persons aged 14 and 15 may be employed outside school hours in a variety of non-manufacturing and non-hazardous jobs for limited periods of time and under specified conditions.
- **Under age 14:** Children under age 14 may not be employed in nonagricultural occupations covered by the FLSA. Permissible employment for such children is limited to work that is exempt from the FLSA (such as delivering newspapers to the consumer and acting). Children may also perform work not covered by the FLSA—such as completing minor chores around private homes or casual babysitting.

#### Permitted occupations for workers aged 14 and 15 in nonagricultural employment

Child Labor Regulation No. 3 limits the industries and occupations in which workers aged 14 and 15 may be employed.

- Fourteen- and 15-year-olds may work in most office jobs and retail and food service establishments, but they may not work in processing, mining, or in any workroom or workplace where goods are manufactured or processed.
- Fourteen- and 15-year olds are also prohibited from working at tasks covered by Hazardous Orders or in occupations involving transportation, construction, warehousing, communications, and public utilities.
- Fourteen- and 15-year-olds may not operate most power-driven machinery, including lawn mowers, lawn trimmers, and weed cutters. They may operate most office machines and certain equipment found in food service establishments such as dishwashers, toasters, dumbwaiters, popcorn poppers, milkshake blenders, and coffee grinders.
- They may be employed in occupations such as bagging groceries, office work, stocking shelves, cashiering, and light cooking performed in the full sight of customers. Fourteen- and 15-year-olds may not bake as part of their employment.



## Hours standards for workers aged 14 and 15 in nonagricultural employment

Child Labor Regulation No. 3 also limits the hours and the times of day that 14- and 15-year-olds may work to the following:

- Outside school hours\*
- No more than 3 hours on a school day
- No more than 8 hours on a nonschool day
- No more than 18 hours during a week when school is in session
- No more than 40 hours during a week when school is not in session
- Between 7 a.m. and 7 p.m.—except between June 1 and Labor Day, when the evening hour is extended to 9 p.m.

## Hazardous occupations orders for nonagricultural work (HOs)

The FLSA establishes age 18 as the minimum for those nonagricultural occupations that the Secretary of Labor finds and declares to be particularly hazardous for minors aged 16 and 17, or detrimental to their health or well-being. In addition, Child Labor Regulation No. 3 bans 14- and 15-year-olds from performing any work proscribed by the HOs.

**HO 1.** Manufacturing or storing explosives: bans minors working where explosives are manufactured or stored, but permits work in retail stores selling ammunition, gun shops, trap and skeet ranges, and police stations.

**HO 2.** Driving a motor vehicle or work as an outside helper on motor vehicles: bans operating motor vehicles on public roads and working as outside helpers on motor vehicles (except 17-year-olds may drive cars or small trucks during daylight hours for limited times and under strictly limited circumstances).

**HO 3.** Coal mining: bans most jobs in coal mining.

**HO 4.** Logging and sawmilling: bans most jobs in logging and timbering (including cutting firewood) and in sawmills.

**HO 5.<sup>†,‡</sup>** Power-driven woodworking machines: bans the operation of most power-driven woodworking machines, including chain saws, nailing machines, and sanders.

**HO 6.** Exposure to radioactive substances and ionizing radiation: bans exposure to radioactive materials.

**HO 7.** Power-driven hoisting apparatus: bans the operation of most power-driven hoisting apparatus such as forklifts, nonautomatic elevators, skid-steer loaders, cranes, and high lift trucks, but does not apply to chair lifts at ski resorts nor to electric and pneumatic lifts used to raise cars in garages and gasoline service stations.

**HO 8.<sup>†,‡</sup>** Power-driven metal-forming, punching and shearing machines: bans the operation of certain power-driven metal-working machines but permits the use of most machine tools.

**HO 9.** Mining, other than coal: bans most jobs in mining at metal mines, quarries, aggregate mines, and other mining sites including underground work in mines, work in or about open cut mines, open quarries, and sand and gravel operations.

**HO 10.<sup>†,‡</sup>** Power-driven meat processing machines, slaughtering, and meat packing plants: bans the operation of power-driven meat processing machines, such as meat slicers, saws and meat choppers, wherever used (including restaurants and delicatessens). This ban includes the use of this machinery on items other than meat, such as cheese and vegetables. HO 10 also bans most jobs in slaughtering and meat packing establishments.

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See footnotes at end of Appendix B (page 20).

**HO 11.<sup>‡</sup>** Power-driven bakery machines: bans the operation of power-driven bakery machines such as vertical dough and batter mixers (including most countertop models), dough rollers and dough sheeters. This ban covers such machinery wherever used.

**HO 12.<sup>†,‡</sup>** Power-driven paper products machines: bans the operation of power-driven paper products machines such as scrap paper balers, paper box compactors, and platen-type printing presses. Sixteen- and 17-year-olds may load, but not operate or unload, certain scrap paper balers and paper box compactors under very specific guidelines.

**HO 13.** Manufacturing of brick, tile, and related products: bans most jobs in the manufacture of brick, tile, and similar products.

**HO 14.<sup>†,‡</sup>** Power-driven circular saws, band saws, and guillotine shears: bans the operation of various types of power-driven band and circular saws and guillotine shears, no matter what kind of items are being cut by the saws and shears.

**HO 15.** Wrecking, demolition, and ship-breaking operations: bans most jobs in wrecking, demolition, and ship-breaking operations, but does not apply to remodeling or repair work that is not extensive.

**HO 16.<sup>†</sup>** Roofing operations: bans most jobs in roofing operations including work performed on the ground and removal of the old roof.

**HO 17.<sup>†</sup>** Trenching and excavation operations: bans most jobs in trenching and excavation work, including working in a trench more than four feet deep.

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\*School hours are determined by the local public school in the area where the minor is residing while employed (even if the minor does not attend the public school).

<sup>†</sup>The regulations provide a limited exemption for apprentices and student learners who are at least aged 16 and enrolled in approved programs.

<sup>‡</sup>Prohibited tasks also extend to setting up, adjusting, repairing, oiling, or cleaning the equipment.

## Appendix C

### Child Labor Provisions of the Fair Labor Standards Act (FLSA) for Agricultural Occupations [DOL 2002b, 2003].

Minimum age requirements and hours restrictions for employment in agricultural production are as follows (These restrictions apply to directly hired workers, employees of farm labor contractors, and migrant children. They **do not** cover young workers employed on their parents' or guardians' farms.):

**Age 16:** Once a young person turns 16, he or she can legally work on any day, for any number of hours, and in any job in agriculture.

**Ages 14–15:** A 14- or 15-year-old can work in agriculture, on any farm, but only in jobs other than those prohibited by Hazardous Orders. Some exemptions apply (see below under HO/A 1 and HO/A 2).

**Ages 12–13:** A 12- or 13-year-old can work in agriculture only (1) with written parental permission *or* if the farm also employs their parent(s); (2) during hours when school is not in session; and (3) in jobs other than those prohibited by Hazardous Orders.

**Under age 12:** If a worker is younger than 12, he or she can work in agriculture, but *only* on small\* farms where none of the employees are subject to the minimum wage requirements of the FLSA. Workers under age 12 may be employed on these “small” farms only (1) with written parental permission *or* if the farm also employs their parent(s); (2) during hours when school is not in session; and (3) in nonhazardous jobs. Local workers ages 10 and 11 may harvest short-season crops outside school hours for no more than 8 weeks between June 1 and October 15 if their employers have obtained special waivers from the Secretary of Labor.

### Hazardous orders for agricultural work [HO/As]

The Secretary of Labor has found that the following agricultural occupations are hazardous for workers under age 16. No worker under age 16 may be employed at any time in any of these hazardous occupations in agriculture (HO/A) unless specifically exempt, as noted. These prohibitions do not apply to workers of any age working on farms owned or operated by their own parent(s) or legal guardian(s).

**HO/A 1.<sup>†‡</sup>** Operating a tractor of over 20 PTO (power-take-off) horsepower, or connecting or disconnecting implements or parts to such a tractor.

**HO/A 2.<sup>†‡</sup>** Operating or helping to operate any of the following machines (operating includes starting, stopping, adjusting, or feeding the machine or any other activity involving physical contact with the machine):

(a) Corn picker, cotton picker, grain combine, hay mower, forage harvester, hay baler, potato digger, or mobile pea viner;

(b) Feed grinder, crop dryer, forage blower, auger conveyor, or the unloading mechanism of a non-gravity-type self-unloading wagon or trailer; or,

(c) Power post-hole digger, power post driver, or nonwalking-type rotary tiller.

**HO/A 3.<sup>†</sup>** Operating, or assisting to operate any of the following machines (operating includes starting, stopping, adjusting, or feeding the machine, or any other activity involving physical contact with the machine):

(a) Trencher or earthmoving equipment;

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See footnotes at end of Appendix C on page 22.

- (b) Fork lift;
- (c) Potato combine; or,
- (d) Power-driven circular, band, or chain saw.

**HO/A 4.**<sup>†</sup> Working on a farm in a yard, pen, or stall occupied by a

- (a) Bull, boar, or stud horse maintained for breeding purposes; or
- (b) Sow with suckling pigs, or cow with newborn calf with umbilical cord present.

**HO/A 5.**<sup>†</sup> Loading, unloading, felling, bucking, or skidding timber with a butt (large end) diameter of more than 6 inches.

**HO/A 6.**<sup>†</sup> Working from a ladder or scaffold at a height of over 20 feet (working includes painting, repairing, or building structures, pruning trees, picking fruit, etc.).

**HO/A 7.** Driving a bus, truck, or automobile when transporting passengers, or riding on a tractor as a passenger or helper.

**HO/A 8.** Working inside:

- (a) A fruit, forage (feed), or grain storage structure designed to retain an oxygen deficient or toxic atmosphere—for example, a silo where fruit is left to ferment;
- (b) An upright silo within 2 weeks after silage (fodder) has been added or when a top unloading device is in operating position;
- (c) A manure pit; or,
- (d) A horizontal silo while operating a tractor for packing purposes.

**HO/A 9.** Handling or applying agricultural chemicals if the chemicals are classified under the Federal Insecticide, Fungicide

and Rodenticide Act as Toxicity Category I—identified by the word “Danger” and/or “Poison” with skull and crossbones; or Toxicity Category II—identified by the word “Warning” on the label. (Handling includes cleaning or decontaminating equipment, disposing of or returning empty containers, or serving as a flagman for aircraft applying agricultural chemicals.)

**HO/A 10.** Handling or using a blasting agent including, but not limited to dynamite, black powder, sensitized ammonium nitrate, blasting caps and primer cord.

**HO/A 11.** Transporting, transferring, moving, or applying anhydrous ammonia (dry fertilizer).

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\*“Small” farm means any farm that did not use more than 500 “man-days” of agricultural labor in any calendar quarter (3-month period) during the preceding calendar year. “Man-day” means any day during which an employee works at least 1 hour.

<sup>†</sup>Student-learners in a bona fide vocational agriculture program may work in this hazardous occupation under a written agreement, signed by the student-learner, the employer, and a school authority, which provides that the student-learner’s work is incidental to training, intermittent, for short periods of time, and under close supervision of a qualified person; that safety instructions are given by the school and correlated with on-the-job training; and that a schedule of organized and progressive work processes has been prepared.

<sup>‡</sup>Exemptions for 4-H Federal Extension Service Training Program and the Vocational Agriculture Training Program: Minors aged 14 and 15 who hold certificates of completion of either the tractor operation or machine operation program may work in the occupations [(HO/A1 and HO/A2, respectively)] for which they have been trained.

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