

Health Hazards to Children in Agriculture

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Children comprise a significant portion of the agricultural workforce and are exposed to many workplace hazards, including farm machinery, pesticides, poor field sanitation, unsafe transportation, and fatigue from doing physically demanding work for long periods. Migrant farmworker children face the additional hazard of substandard or nonexistent housing in the fields. Children account for a disproportionate share of agricultural workplace fatalities and disabling injuries, with more than 300 deaths and 27,000 injuries per year. The most common cause of fatal and nonfatal injury among children in agriculture is farm machinery, with tractors accounting for the greatest number. Remedies to the problems of child labor must take into account family economics and the need for child care. Labor law reform and rigorous enforcement of existing laws and of workplace health and safety requirements are vital to better protect the children and adults working in agriculture. © 1993 Wiley-Liss, Inc.

Key words: child labor, agriculture, migrant farmworkers, farm machinery, pesticides, labor law reform, Fair Labor Standards Act, OSHA, EPA

INTRODUCTION

U.S. agriculture is diverse, and includes such workplaces as fruit, nut, and vegetable farms and orchards, sugar cane fields, grain and livestock operations, mushroom sheds, vineyards, and nurseries and greenhouses that grow trees, ferns, flowers, and ornamental plants.

The agricultural workforce is also diverse. The four million migrant and seasonal (nonmigrating) farmworkers and their children [Migrant Health Program, 1990] who are hired to work at those agricultural worksites are predominantly people of color—Latino, African American, Haitian, Asian, West Indian, and Native American.

Agriculture is big business. While we tend to first think of the small family farm when we think about U.S. agriculture, the reality is that the industry is getting bigger and relying on more hired workers. For example, the Department of Labor estimates that the largest ten percent of farms that use hand laborers employ more than a third of all field workers. Eighty percent of California agriculture is in labor-intensive crops: vegetables, fruits, nuts, and ornamental plants and shrubs [Villarejo, 1992].

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In the 1980 census, children less than 14 years of age accounted for over 1.1 million of the people living on farms [Rivara, 1985]. There are no comprehensive statistics that encompass the total number of children working in agriculture. Such statistics would need to include the children of farm owners and operators, the children of hired migrant and seasonal farmworkers, and the children of rural families who work but do not live on farms.

This article describes the work that children do on the farm, the hazards that they face in the agricultural workplace, and recent studies of childhood deaths and injuries in agriculture. A special focus of this paper is migrant farmworker children, who face distinct workplace hazards, including substandard or makeshift housing in the fields.

The lack of good studies with solid data severely limits our knowledge of the extent of the problem of childhood injuries and the interplay of the numerous causal factors. Such knowledge is essential in designing preventive strategies as well as in shaping policy. The epidemiologic literature is incomplete because studies have largely focused on Midwestern family farms and have not included children living in other areas of the country, of farm employees, of nonresident populations who migrate, or of people of color, including American Indian, Hispanic, or African American farm children [Lee and Gunderson, 1992; Rust, 1990].

MORTALITY AND MORBIDITY DATA

Most recent data from the National Safety Council place agriculture as the second most deadly occupation in the United States, with 42 deaths per 100,000 workers, after mining with 43 per 100,000 [National Safety Council, 1991]. These statistics do not include the approximately 300 children and adolescents under 16 who die each year [Rivara, 1985; 1990].

Recent estimates derived from research funded by the Centers for Disease Control suggest that an estimated 27,000 children aged 19 or younger are injured annually. Even this estimate may be low, since it excludes children who work but do not live on American farms or ranches [Lee and Gunderson, 1992]. Children account for a disproportionate share of agricultural workplace fatalities and disabling injuries [Purschwitz and Field, 1990; Heyer et al., 1992].

Stallones [1992] conducted death certificate studies of farm fatalities among children in Colorado and Kentucky, and found differences between boys and girls, as well as differences among causes of death in the two states. In Colorado, almost all farm machinery deaths occurred among boys. Animals (horses and cattle) and drownings (mostly irrigation ditches) were other major causes of death. In Kentucky, farm boys died predominantly by drowning and from farm machinery.

Animals, drowning, and suffocation (house fires) were the three top causes of deaths among Colorado girls. Suffocation among children working on farms can also occur from falls into grain bins or grain-filled wagons. In Kentucky, the major causes of death among girls were drowning and farm machinery. Besides irrigation ditches, children working on farms can also drown in rivers or ponds or in manure pits.

Heyer et al. [1992] examined workers' compensation claims in Washington State filed by children under 18 from 1986 through 1989 (over 16,000 claims), and compared farmworkers with food service workers and children working in all other industries. Severe injuries were those claims for amputations, asphyxiation or drown-

ing, concussion, and fracture or multiple injuries. Injuries with payments for time-loss were considered to be "disabling."

Although farmworkers accounted for only 7% of all claims, they made up 36% of claims filed by children under age 14, and 17% of claims filed by children aged 14 or 15. In contrast, food workers represented 43% of all claims filed by minors, of which only 16% were filed by children under age 14, and 38% by children aged 14 or 15.

These authors found that farmwork contributes substantially to the total number of severe or disabling injuries among the two youngest age groups. Among workers aged 13 or younger, farmwork accounted for 50% of all severe injury claims and for 48% of all disabling injury claims, compared with 5% and 7.4%, respectively, among food service workers. (See also Hopkins [1989] for estimates of the incidence of farm injuries by age groups, per 1,000 population.)

The findings of Heyer et al. represent the "tip of the iceberg" because workers' compensation data only reflect those injuries or illnesses which result in the filing of a claim. The use of workers' compensation data for making national estimates of workplace injuries among farmworkers is even more limiting because, in most states, the workers' compensation system either partially or completely exempts agriculture.

LACK OF WORKER PROTECTIONS IN AGRICULTURE

Agriculture is not only a very dangerous occupation, it is one of the least regulated due to the strength of the agribusiness lobby at all levels of government. Using the rationale "agriculture is different," agribusiness special interests have prevented or limited farmworkers from enjoying even the most basic workplace protections afforded other U.S. workers. Examples of this two-tiered system of workplace justice are evident in labor, occupational safety and health, and pesticide laws.

There are few Occupational Safety and Health Administration (OSHA) standards for agriculture (e.g., roll-over protective structures or ROPS for tractors, sanitation in temporary labor camps), and OSHA enforcement is limited to farms with more than ten employees or to those that maintain a temporary labor camp. The U.S. Department of Labor, for example, estimates that only 36% of farmworkers are covered by the field sanitation standard, which requires employers who hire more than ten employees to provide them with drinking water, toilets, and handwashing facilities in the fields free of charge [OSHA, 1987]. So many farmworkers are excluded from coverage by the field sanitation standard because of the small farm exemption. Additionally, OSHA even exempts small farms with temporary labor camps from coverage—unlike its requirements for the other agricultural regulations.

More comprehensive protections for workers exposed to agricultural pesticides were finally issued by the EPA in 1992, after nine years of delay. These will be phased in between 1993 and 1995. Meanwhile, enforcement of current laws and regulations is minimal.

Child labor laws for agriculture are woefully weak. Even young children can legally work on farms. The legal age limit to work on larger farms, which are covered under the Fair Labor Standards Act, is 12. Minors younger than 12 may be employed outside school hours in nonhazardous activities either on a farm owned or operated by their parent or on a small farm (that is, one exempted from coverage under the Fair

Labor Standards Act) with the written consent of their parent. In contrast, in other industries, 16 is the legal age limit to work.

Hazardous activities such as operating heavy machinery, driving tractors, climbing ladders, and handling or applying toxic pesticides are prohibited in farming only until the age of 16. In other industries, hazardous work is prohibited until the age of 18. In agriculture, all hazardous work on family farms is totally exempted from these age limits.

Why do children work in agriculture? It is a question of economics for both farm and farmworker families. A survey of Iowa farm families, for example, showed that one-third of respondents cited economic reasons for their children working on the farm [Tevis, 1992]. Migrant and seasonal farmworker families, who have an average annual income of \$4,700 [Oliveira and Cox, 1988], need their children's work to survive. Farmworkers are generally paid on a "piece rate" rather than on an hourly basis, i.e., by the bushel or bin of fruit or vegetables harvested or by the row of crop thinned or weeded. One-half of all farmworkers are legally exempted from any guarantee to the federal minimum wage [Migrant Clinicians Network, 1990].

Child labor is also a child care issue. Parents bring their children to the fields because there is little accessible, affordable day care in rural areas. Thus, infants, toddlers, and young children are exposed to the same workplace hazards as their parents. The Farmworker Justice Fund sponsored a national meeting of farmworker women in 1991, and the participants identified child care as a top priority for farmworker families [Wilk and Lawrie, 1991].

To successfully get children out of the fields, parents must be able to make a living wage without their children's labor. Additionally, accessible and affordable child care facilities must be available in these rural areas so that parents indeed have caretakers for their children, away from farming activities.

An important part of the work of the Farmworker Justice Fund, Inc. (FJF), a national not-for-profit organization based in Washington, D.C., is to advocate for better wages and working conditions for migrant and seasonal farmworkers in the United States. Most recently, FJF is working to strengthen and reform the Migrant and Seasonal Agricultural Worker Protection Act of 1983, to ensure that agriculture is included in any new OSHA ergonomic standard, to monitor the phase-in and enforcement of the new EPA worker protection regulations for agricultural pesticides, and to reform national child labor law to provide protections for children who work in agriculture that are equal to those provided to children who work in nonagricultural jobs.

WORKPLACE HAZARDS IN AGRICULTURE

What do children do in agriculture? They harvest fruits and vegetables. They climb ladders to prune and thin orchards. They carry and lift buckets and bags laden with produce. They care for farm animals. They drive or ride on tractors and are exposed to noise, vibration, dust, and chemicals. They operate other farm machinery.

Farm Machinery

The most common cause of fatal and nonfatal injury among children in agriculture is farm machinery, with tractors accounting for the greatest number [Rivara,

1990; Hatcher et al., 1992]. A survey by *Successful Farming* magazine showed that almost 30% of farm boys are driving tractors at ages 7-9, and 95% are riding on tractors by that age [Tevis, 1992].

Sheldon and Field [1992] analyzed fatal farm injuries of children through age 17 in Indiana and Wisconsin, 1970-1990. These investigators found that older children were much more likely to die from a tractor overturn than any other cause. However, in both preschool and elementary school-age children, tractor and equipment runovers were more common. Children ride on the wheel rim of the tractor, fall off, and are run over by the tractor or by the equipment being pulled by the tractor.

Farm and farmworker children work around other dangerous farm equipment. Rapidly rotating equipment such as augers that move grain and power take-off shafts attached to tractors can kill or seriously disable children if these moving parts are not equipped with safety guards. Clothing or hair can get caught in the moving parts and rip off limbs or the scalp [Rivara, 1990]. In hand-labor-intensive crops, trucks and heavy wagons are brought into the fields to transport produce. Packing and sorting operations often are set up in the fields, and children are working around conveyor belts and other machinery.

Pesticides

Children working in agriculture are exposed to pesticide spray, drift, and residues in the soil and on foliage. Pesticides are thought to pose a considerably higher risk to children than to adults [U.S. Congress, 1990]. Children are at risk of acute pesticide poisoning and long-term adverse health effects. Little is known about the extent or magnitude of chronic health problems related to occupational exposure to pesticides [Moses, 1989]. Studies have linked pesticide exposure to increased risk of cancer, neuropathy, neurobehavioral effects, and immune system abnormalities, among other conditions. The Office of Technology Assessment has called for more research on the long-term health effects of pesticides on children [U.S. Congress, 1990].

A lack of wash water in the fields means that farmworker children and adults are not able to wash off pesticide residues before eating or going to the bathroom. Instead, they suffer prolonged exposure to these chemicals.

Children working in agriculture are exposed to pesticides in other ways. Migrant labor camps are often located in the fields, and the workers' living quarters are sprayed or drifted upon when the fields are treated with pesticides.

Improper pesticide storage and disposal of containers is another hazard for children living and working on farms. For example, an 8-year-old migrant farmworker child was severely poisoned from playing with an open bag of highly toxic pesticide that the employer had illegally dumped [Arizona State Auditor General, 1990]. The child went into a coma, was hospitalized, and did survive.

Pollack et al. [1990] interviewed Mexican American migrant farmworker children who work in New York State. They found that 48% of the children had worked in fields still wet with pesticides, and 36% had been sprayed directly or indirectly by drift while working in fields or orchards. Despite the prohibition of hazardous work by children under age 16, four boys reported they had mixed pesticides, and three said they had applied pesticides.

Poor Field Sanitation

Farmworker children are at high risk of contracting parasitic and other infectious diseases that are spread by poor sanitation in the fields. Studies of migrant farmworker adults and children have shown rates of parasitic infection ranging from 20 to 78%, compared to a 3% level among the general U.S. population [Occupational Safety and Health Administration, 1987].

Besides disease transmission by the fecal-oral route, communicable diseases are also spread by the use of shared drinking cups. Although the federal field sanitation regulations require that employers provide workers with disposable drinking cups, employer compliance is poor. As well, most farmworkers are not covered by the federal field sanitation standard. A lack of drinking water in the fields also puts farmworker adults and children at risk of heat disorders.

Unsafe Transportation

Work-related transportation accidents claim dozens of farmworkers' lives each year, with many more injured. Farm labor contractors or crewleaders (i.e., the middlemen whom farm owners hire to recruit and supervise workers) transport farmworker adults and children to and from the fields in overcrowded trucks and vans that have had all seats and seatbelts removed in order to pack in as many workers as possible. Many times these vehicles are operated by unlicensed, uninsured, and intoxicated drivers [Associated Press, 1992; Runnels, 1990].

Fatigue

Children work long hours in agriculture. Health providers have documented children working more than 60 hr/week, with some working 80 or more hours [Pollack et al., 1990]. Long work hours can be fatal for children. For example, a 14-year-old farmworker boy was run over and crushed to death by a truck in a hop field in Washington State when he lay down to rest while cutting vines at 2:30 a.m. [Lester, 1988].

The Washington Association of Apple Growers [1989] surveyed 614 farmers in Central Washington—568 orchardists and the rest vegetable and hops growers. More than 98% of these growers reported employing minors—more than 2,500 children in all, and 73% used children under 16 years of age. Almost 97% of these children were working with older family members.

The number of hours worked per week during the school year ranged from 4 to 32, with 86% reporting less than 24 hr/week. During the summer months, children worked 20–55 hr/week. Almost 80% of the respondents said the minors worked a 40-hr week.

One of the principal hazards of child labor is interference with school performance. Employed children often have inadequate time for school homework and increased fatigue on school days. Teachers have noted declines in the academic performances of previously adequate students [Pollack et al., 1990].

Strenuous Labor

Heavy lifting, carrying, and prolonged stooping and bending affect the musculoskeletal development of children. A medical team studying farmworker health in

Texas 20 years ago reported that young patients had back, hip, and lower extremity pain that resembled the pain of degenerative osteoarthritis [U.S. Senate, 1970].

Substandard Housing

Another aspect of life for migrant farmworker children is substandard, overcrowded labor camps, makeshift housing of cardboard, plastic or wood in the fields, or no housing at all. Substandard housing contributes to an increased risk of accidents and sanitation-related diseases for farmworker adults and children. Migrant worker housing may have faulty electrical wiring or appliances; it may lack adequate lighting, proper fire exits, or fire extinguishers. Overcrowding, inadequate or nonexistent heating, poor ventilation, and unsanitary conditions inside and outside a unit enhance the spread of communicable diseases such as upper respiratory tract infections, influenza, and tuberculosis. Garbage heaps and stagnant water are breeding grounds for rats, insects, and flies, which harbor and transmit disease. Inadequate or faulty plumbing systems can produce contaminated drinking water, often resulting in gastrointestinal illnesses [Wilk, 1986].

CONCLUSION

Agriculture is a dangerous occupation for adults and children. Better data are needed to document work-related injuries and illnesses, especially among children. When considering solutions to child labor in agriculture and when developing strategies to prevent childhood deaths and injuries, the economics of farm and farmworker families and the need for child care must be taken into account. Labor law reform is crucial in the process of bringing protection for agricultural workers up to the standards for non-agricultural labor. Additionally, rigorous enforcement of existing laws that protect farmworker adults and children is necessary, yet sorely lacking. Most recently, the Farmworker Justice Fund and other farmworker advocates are working to strengthen the Migrant and Seasonal Agricultural Worker Protection Act of 1983, to include agriculture in any new OSHA ergonomic standard, to monitor the phase-in and enforcement of the new EPA worker protection regulations for agricultural pesticides, and to reform national child labor legislation to increase the protections for children working in agriculture.

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Health Hazards to Children in the Service Industries

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The purpose of this article is to examine the persistent, yet underrecognized, problem of adolescent occupational injury. There is little appreciation for the magnitude and scope of this problem, including, particularly, the underlying causes and factors of adolescent occupational injury; this is especially so outside the occupational health field. There are many reasons why the scope of adolescent occupational injury remains unappreciated. For example, injury surveillance systems, including workers' compensation records, do not reveal the level of this problem because many injuries are not properly compensated. This paper examines health hazards to children in the service industries from various perspectives. This scrutiny will include an examination of adolescent occupational injury levels and the reasons why this problem is large and growing. In closing, we consider ways to improve public policies in order to portray this problem accurately, the first step toward meaningful injury prevention strategies. © 1993 Wiley-Liss, Inc.

Key words: child labor, occupational injuries, service industries, fast food employment, psychological burden, adolescents, OSHA, history of labor reform

INTRODUCTION

There are many examples of the tragic nature of occupational fatalities among adolescents. There were more than 100 adolescents killed from job-related injuries in 1990 and more than 70,000 more injured. These estimates, covered in more detail below, were made in *Sacrificing America's Youth: The Problem of Child Labor and the Response of Government*, a report issued by National Safe Workplace Institute in 1992. Perhaps one reason why injuries are this numerous has to do with the failure of compensation systems and the inability of Federal and state regulators to adequately enforce clearly weak laws. From an economic perspective, the employer has transferred or externalized the costs from the work environment to the family and society. In the case of work-related deaths of adolescents, compensation is limited to a range of \$700 in Delaware to \$5,000 in a small number of states [National Safe Workplace Institute, 1992, pp 22-23].

Others have made estimates that are generally consistent with the Institute's findings. Epidemiologists have estimated about 100 such deaths in recent years [Su-

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