AMERICAN ADOLESCENTS AT WORK

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Despite advances in technology and medicine, safety for working adolescents still challenges 21st century Americans. One would think that by now, in the beginning of the new millennium, America would have cured this disease of child labor that infects its younger population. Yet, injuries still maim and kill America's working youth. Politicians speak out against child obesity, and both celebrities and ordinary citizens criticize school violence, especially after a Columbine or Virginia Tech massacre. Human rights activists picket clothing lines that depend upon the work of underpaid children in developing countries, and Congress holds hearings to ensure that American consumers do not buy goods produced by these exploited children. However, health care providers, legislators, and the general public often relegate child labor to the back burner. Moreover, many diminish the role of child labor in the United States by viewing child labor as a social, economic, and political problem limited to developing countries. The employment of children in the work force should be in the forefront of domestic health policy because of its social and economic significance to public health. Even though current societal awareness indicates some understanding of the health risks of adolescent workers, statistics continue to show a bleak picture of preventable workplace injuries and fatalities of this vulnerable population.

This paper defines "child or youth" as any individual 17 or younger who engages in some kind of work. In discussing youth employment, the paper does more than just describe child

labor laws; it also focuses on the unique traits of this young population and the trends that characterize its employment. This gives an identity to the faceless young men and women who deal with the risks of the industrial and agricultural work places. Once presenting the current statistics on injuries and fatalities incurred by youth in both the industrial and agricultural sectors, the paper compares the similarities and differences in the major industries between youth and adult workers. It then moves into the legal arena, describing what has been done and what still needs to happen to combat child labor problems.

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PREFACE

I acknowledge Dr. Joseph Schwerha for his guidance, help, and encouragement. He is not only my program director and mentor, but also my friend. I especially thank him for his patience. Additionally, I thank Ronna L. Edelstein for all her support, time, and understanding. I am grateful to my children, Dean and Nawal, who accepted the long hours I spent on this project and the time away from them. Finally, I thank my family for their support and love.

1.0 INTRODUCTION

In 1836, the state of Massachusetts passed the first child labor law preventing industrial establishments from hiring adolescents 15 or younger who had not attended school for at least three months that year (U.S. Department of Labor, 2000). By 1913, child labor laws existed in a majority of states (U.S. Department of Labor, 2000). Employing children 17 and younger remained controversial, leading to the creation of the National Child Labor Committee in 1904. One would think that by now, in the beginning of the new millennium, America would have cured this disease of child labor that infects its younger population. Yet, injuries still maim and kill America's working youth. Politicians speak out against child obesity, and both celebrities and ordinary citizens criticize school violence, especially after a Columbine or Virginia Tech massacre. Human rights activists picket clothing lines that depend upon the work of underpaid children in developing countries, and Congress holds hearings to ensure that American consumers do not buy goods produced by these exploited children. However, most Americans respond with a blind eye to their adolescents being abused in the workplace and with a deaf ear to their pleas for help.

Despite advances in technology and medicine, safety for working adolescents still challenges 21st century Americans. Health care providers, government officials, and the general public, while agonizing about the growing epidemic of childhood obesity, the abuse of alcohol, drugs, and cigarettes, violence in schools, and teen pregnancies as well as sexually transmitted

diseases, often relegate child labor to the back burner. The employment of children in the work force not only should be in the forefront, but should also be of primary concern to those who care about the overall welfare of America's youth. Child labor, by significantly impacting the victims and their families, affects society as a whole. Even though current public awareness indicates some understanding of the health risks and consequences of adolescents in the work place, statistics continue to show a bleak picture of preventable workplace injuries and fatalities of this vulnerable population.

Americans display a smug attitude towards child labor, believing that the United States is no longer guilty of abusing its working youth. Moreover, many diminish the role of child labor in the United States by viewing child labor as a social, economic, and political problem limited to developing countries. It is imperative that lawmakers and public health officials remember that, from its inception, the United States has relied upon children in the work force. Whether toiling on their family's farms, working with fathers and brothers in the mines, or spending days locked in sweatshops, children historically and currently engage in dangerous, unhealthy, and often-illegal job activities. The United States government has enacted national laws intended to create a healthy, safe environment for its young workers, but it has not totally eradicated injuries, illnesses and, more importantly, deaths.

This paper defines "child or youth" as any individual 17 or younger who engages in some kind of work. Furthermore, the following terms are used interchangeably to refer to a person younger than 17: adolescent, young worker, child, children, youngsters, teens, and teenagers. In discussing youth employment, the paper does more than just describe child labor laws; it also focuses on the unique traits of this young population and the trends that characterize its employment. This gives an identity to the faceless young men and women who deal with the

risks of the industrial and agricultural work places. Once presenting the current statistics on injuries and fatalities incurred by youth in both the industrial and agricultural sectors, the paper compares the similarities and differences in the major industries between youth and adult workers. It then moves into the legal area, describing what has been done and what still needs to happen to combat child labor problems. Future generations should not have to cope with a problem that should have been solved many years ago.

1.1 ADOLESCENTS, WORK ENVIRONMENTS, EMPLOYERS

The adolescent years can be tumultuous ones for those experiencing them. Teenagers undergo many physical and emotional changes as they mature from children into young adults. They must deal with parental expectations, peer pressure, and cultural demands; they must also cope with self-identity issues. For many adolescents, just surviving the daily pressures with all of their rules, both spoken and unspoken, drains them of energy. Yet, many of these same children add to their schedules by working. In the United States, 80% of teens will have worked for some period before they graduate from high school (Steinberg and Cauffman, 1995; Light, 1995). Most teens are employed on a part-time basis and change jobs frequently (Loughlin and Barling 1999, 2001; NRC, 1998). Wide variation in the number of hours teens work between the school year and school vacations exist, with the hours teens work doubling during school vacations (U.S. Department of Labor, 2000). Specifically, slightly less than 50% of adolescents will have worked more than 20 hours per week during the school year; this percentage increases to 70% during the summer months (Bachman & Schulenber, 1993; Runyan and Zakocs, 2000). Those youth from lower income families, often expected to work to add to the family income, tend to

find employment in high-risk jobs such as construction, agriculture, and manufacturing (NRC, 1998). Those from middle or upper socioeconomic classes are encouraged to work as a way to learn responsibility, punctuality, and dependability, as well as time-management skills and positive work values (Aronson et al., 1996; Greenberger and Steinber, 1986). Although limited research has investigated the reasons behind why children and teens seek paying jobs, the principal impetus seems to be a financial one: having enough money to purchase necessities or "extras" (Greenberger and Steinber, 1986).

Entering the work force can both benefit and harm the adolescent. The extra money from a job offers a degree of independence and status (NRC, 1998). The job also creates a stronger sense of self-esteem in the working teen. Depending upon the nature of the employment, the teen can use the job as a stepping-stone to a future career or profession. However, all adolescents, whether working in industry or agriculture, face many hazards to their well-being. Sometimes the risk is a psychological one involving the firing of the vulnerable adolescent or forcing the adolescent to choose between work and school or work and co-curricular activities. Other times the risks result from the age of the population. Adolescents, more than adults, tend to frequently change jobs due to school and co-curricular demands (NRC, 1998). This increases the work risks since the adolescents do not often spend enough time in one employment situation to become familiar with the environment. Because they are easily distracted and enjoy "goofing off", this population, which lacks insight and maturity, is also often its own worst enemy. Other risks are more physical ones where the young worker confronts actual injury or, in the worst-case scenario, death. Many published literature describe fatal injuries among adolescents (Surda and Halperin, 1991; Dunn and Runyan, 1993; Castillo and Malit, 1997; Rivera, 1997; Windau et al., 1999, 2005).

The employment environment poses many dangers to its unsuspecting young workers. They can suffer from musculoskeletal disorders due to kneeling, squatting, repetitive motion, lifting, or working in awkward positions. They can also sustain injuries if hit by a foreign object or caught in, under, or between machinery. Falls, either from elevated surfaces such as ladders or roofs or from uneven flooring or defects in the ground, can further harm the teenage worker. Any teen whose job requires driving (pizza or newspaper delivery, for example) exposes them to a higher risk of motor vehicle accidents. Many youths, working alone or late at night, risk harm from work-related violence due to robberies (Runyan et al., 2003; Loomis et al., 2001, 2002).

Outdated machinery and processes can endanger new, inexperienced teenagers. These teens would rather attempt to work the equipment themselves than ask a co-worker or supervisor for help. The lack of personal protective equipment is another source of danger. Either the employer does not provide these essential items, or the teen is too naïve to understand the reasons why such equipment should be worn (NRC, 1998). Many teenagers choose to work in construction or health care facilities (U.S. Department of Labor, 2000). These environments may expose them to carcinogens, biohazards, reproductive toxins, and ergonomic hazards (NRC, 1998). All of these potential and real hazards create ongoing risks for the adolescent work population.

Adolescents working in the agricultural sector, like their peers in urban settings, encounter a myriad of dangers. As statistics verify, these young farm workers endure a higher occurrence and greater severity of injuries when compared to all young workers. (Heyer et al, 1992; Belville et al., 1993; Castillo et al., 1994; Rivara, 1997). Some reasons suggested for these alarming rates include inexperience in the job, a more hazardous work environment, and the belief held by many young workers that their age protects them from harm (Pollock &

Landrigan, 1990; NRC, 1998). Specifically, rural youth often operate machinery such as tractors that non-agricultural settings would limit to adult users only. Additionally, many farmers lack the sources or finances to replace older equipment, thus compromising the safety of their young users (NRC, 1998). Because so many governmental laws do not apply to agricultural workers, these adolescents tend to place themselves at greater risk to certain hazards (noise, respiratory irritants, toxic gases, fertilizers, and chemicals) by not either taking the necessary precautions or adhering to safety precautions (Kirkhorn and Garry, 2000; NRC, 1998). Finally, numerous hidden dangers, like pesticides, pose long-range health problems that may not manifest themselves until the adolescents reach adulthood (NRC, 1998). In later sections, this paper presents a more detailed discussion of both the industrial and agricultural work environments and their effects on youth.

In addition to the adolescents and the work environment, employers are also guilty of creating dangers for young employees. These employers, assuming that teenagers have adult skills and can do adult work, frequently withhold supervision (Greenberger and Steinberger, 1986). Due to individual personalities and work styles, the amount of supervision varies from employer to employer. Still, 50% of youth employees who participate in general employment surveys report that their employers did not give them adequate safety training or instruction (NRC, 1998). By not implementing up-to-date training programs tailored to this population, many employers leave their adolescent workers to fend for themselves. Whether employing five or five hundred workers, employers are not mandated by OSHA to have an on-site safety director or a formal written comprehensive safety program. Smaller companies cannot always afford an on-site safety director. As a result, their workplace lacks a comprehensive safety program that,

again, creates more danger for novice workers as opposed to older more experienced ones (NRC, 1998).

Employers sometimes exploit their innocent adolescent workers by having them work long hours or extra shifts (NRC, 1998). Deliberately or inadvertently, employers can be culpable for contributing to the risk-taking behaviors of America's youth. Several studies have shown that teenagers who attend high school and work long hours are at a higher-risk for abusing alcohol, drugs, and tobacco (Mortimer et al., 1996; Bachman and Schulenberg, 1993). Perhaps the greatest employer weakness is ignorance of the child labor laws or, even worse, knowing the laws but not practicing them by placing young workers in prohibited hazardous occupations or tasks (NRC, 1998). For example, while no accurate data available are available on children currently employed in "sweatshops" (NRC, 1998), a 1997 study conducted by Kruse estimates that 13,000 minors might be working illegally in apparel sweatshops in New York City (NRC, 1998). Sweatshops, any employment establishment, that repeatedly break safety-and-health, wage-and-hour, or child-labor laws still exist in the U.S. (NCR, 1998).

Unlike adults who have years of experience or unions representing them, teens often work unaware of the above mentioned potential hazards and the laws that already exist to protect them (Castillo, 1999). They deserve more governmental and societal support. Yet, they rarely voice their concerns about their employment environment. If they complain to their employer, they fear losing their job since they know another peer is waiting to replace them. They also worry about peer ridicule should they be fired (NRC, 1998). Teens, more anxious about fitting in than adults, have concerns about being ostracized by their boss and their co-workers.

These problems face all teen workers, but the intensity of the problem varies with the age of the worker. Teens 14- and 15-years of age are more naïve than 16- and 17-year-olds. With

each year, the teen develops physically, emotionally, socially, and cognitively. Employers need to understand this when hiring young workers; they need to be cognizant of the added social responsibility that a young worker places upon them. Legislators, in order to be effective, must make sure that all laws involving child labor address age discrepancies and the malleable nature of young adults. Furthermore, they need to understand the roles race, ethnicity, and socioeconomic status play in youth employment (NRC, 1998). For example, more minorities than whites work in the service industry, and more low-income teens are employed in such hazardous industries as agriculture, construction, and manufacturing (U.S. Department of Labor, 2000; NRC, 1998).

1.2 DEMOGRAPHICS OF 14- AND 15-YEAR-OLDS IN THE WORK PLACE

Some children begin working at young ages as either babysitters or neighborhood lawn care providers (U.S. Department of Labor, 2000). While roughly 50% of all 12-year-olds find employment outside the home, these children when entering high school as 14- and 15-year-olds progress from such freelance work to more formal, consistent employment (U.S. Department of Labor, 2000; Windau and Meyer, 2005). Most of these teens work after school and/or on weekends, with a majority devoting their summers to some kind of job (NCR, 1998). Very few studies, however, have researched the impact of work on 14- and 15-year-olds or those even younger (Centers for Disease Control and Prevention, 2007). Official annual employment data for those 15 and younger are not even available (Centers for Disease Control and Prevention, 2007). Those studies that have explored this age group have discovered certain trends and have provided the overall knowledge upon which some of the laws have been based.

Data show that 14- and 15-year-olds who work exhibit both gender and racial differences. Girls favor independent work like babysitting, while boys prefer more formal jobs such as working in construction (U.S. Department of Labor, 2000). Both females and males often seek employment in the retail and/or service industries (eating and/or drinking establishments, recreation services, construction, grocery stores, newspapers, and landscaping) (Windau and Meyer, 2005). Whites tend to work more than their black or Hispanic counterparts, and children from two-parent families tend to work more than their counterparts who live only with one parent (U.S. Department of Labor, 2000).

1.3 DEMOGRAPHICS OF 16- AND 17-YEAR-OLDS IN THE WORK PLACE

As children age, more data become available that detail their involvement with the work force. Statistics indicate that in 2005, nearly 2.3 million adolescents ages 16 and 17 worked outside the home (Center for Disease Control and Prevention, 2007). Despite this impressive number, statistics show that the rate of employment for 16- and 17-year-olds has been declining (Windau and Meyer, 2005). The year 2000 boasted a rate of 2.8 million 16- and 17-year-olds in the work place, while 2004 only reported 2.2 million employed (Windau and Meyer, 2005). One reason for this decrease is that some adolescents in this age category have taken the initiative to become self-employed entrepreneurs (Windau and Meyer, 2005).

Similarly to the younger 14- and 15-year-olds, the 16- and 17-year-olds choose to work in the retail and/or service industries (Windau and Meyer, 2005). Specifically, they often seek jobs in restaurants and small shops (Windau and Meyer, 2005). Another similarity with younger teens is that these older adolescents work more in the summer, especially during the month of

July (NRC, 1998). Unlike these younger teens, the older ones work longer hours, although statistics show that today's 16- and 17-year-olds work fewer hours than in previous years (19.7 hours per week in 2000 vs. 18.0 hours in 2004) (Windau and Meyer, 2005).

1.4 DEMOGRAPHICS OF ADOLESCENTS IN AGRICULTURE

Although the picture changes when moving from youths working in industry to those working in agriculture, limited data still exist for 15-year-olds and younger (Center for Disease Control and Prevention, 2007). In 2004, farms attracted about 790,000 teens 18 and younger; 591,000 of these belonged to the farm family, while the remaining 199,000 functioned as hired help (Center for Disease Control and Prevention, 2007). Statistics from 2005 show that approximately 6000 adolescents, ages 16 and 17, worked for their families, often as unpaid agricultural laborers (Center for Disease Control and Prevention, 2007). That same year, an estimated total of 50,000 youths, again ages 16 and 17, also worked annually in some kind of agricultural or rural-related job (Center for Disease Control and Prevention, 2007).

2.0 CHILD LABOR LAWS

Any person who works deserves a safe environment. This is especially true for the more vulnerable 17-year-olds and younger who need the government and society to intervene on their behalf. President Franklin Delano Roosevelt understood this, paying particular attention to the youth of America during his presidency (1933-1945) (Windau et al., 1999). As a result, he approved Congress passing the Fair Labor Standards Act (FLSA) in 1938, better known as the Federal Wage and Hour Law, the primary federal law governing child labor (U.S. Department of Labor, 2000; Windau et al., 1999). The Wage and Hour Division (WHD) of the Employment Standards Administration in the Department of Labor (DOL) has the responsibility for administering and enforcing child labor laws mandated by the FLSA (Center for Disease Control and Prevention, 2002). This Act not only sets the minimum age standards for employment, but it also regulates the age discrepancies between nonagricultural and agricultural employment (U.S. Department of Labor, 2000). The FLSA provides additional protection for youth as compared to adults by restricting the types of tasks/occupations that the U.S. Secretary of Labor deems hazardous for persons younger than 18 (NRC, 1998). By acknowledging that different age groups require different kinds of protection, the FLSA does not restrict the hours of 16- and 17-year-olds working in any non-hazardous job, but does place greater limitations on 14- and 15-year-olds (Table 1). This is to ensure that employment will not interfere with their schooling and

compromise their health (NRC, 1998). Appendices A and B detail the specific federal laws, organized by age, that apply to child labor in nonagricultural and agricultural venues.

Table 1 Federal limits on the hours that youths may work and the types of work that they may perform in nonagricultural industries (Centers for Disease Control and Prevention, 2003; NRC, 1998)

Age of Youth	Limits on the type of work	Limits on number of hours and time of the day
16- to 17-year-olds	Banned from performing those occupations that the Secretary of Labor determines to be particularly hazardous for this age group	No limits
14- to 15-year-olds	Banned from work in most industries and from various occupations. May be employed in retail, food service, and gasoline service establishments	Places limits on the total number of hours per day and per week, as well as on the time of day that work may be performed
Under 14 years of age	Banned from most work. May perform tasks for which no covered employment relation-ship arises, such as babysitting on a part-time, irregular basis	

Twenty-eight Hazardous Orders (HOs) ban workers under the age of 18 from engaging in potentially dangerous nonagricultural and agricultural occupations (Center for Disease Control and Prevention, 2007). Disturbingly, only 11 HOs apply to the agricultural industry. The remaining 17 hazardous orders, which deal with industry, primarily relate to the following physical hazards a youth may be asked to perform: using power tools, working with explosives, engaging in mining, operating power-driven machinery, and driving vehicles with passengers (NRC, 1998). The government legally recognized HOs in nonagricultural occupations between 1939 and 1963, while it set the agricultural HOs in 1970 (Center for Disease Control and Prevention, 2007). The Administrative Procedures Act since 1993 outlines the process and procedures in which the federal hazardous orders can be updated (NRC, 1998). Additionally,

the DOL recognizes how cultural and technological changes have impacted today's youth. To provide optimal protection of working youth and their health, safety, and education, the DOL constantly reviews and updates all federal youth employment provisions.

While the federal government sets the guidelines for child labor laws, each state can pass its own regulations that may be more or less stringent than the national ones. When a difference between federal and state law occurs, the stricter law takes precedence (U.S. Department of Labor, 2000). In the absence of an applicable state law, the federal child labor laws apply as long as the employer conforms to the laws mandated by the federal government. If a business or farm does not meet federal criteria for coverage, then a state's standard may come into play.

States vary in their regulations of young workers. While the FLSA by definition only includes businesses that have a yearly gross income of more than 500,000 and are involved in interstate commerce, some states embrace all workers, regardless of the employers' revenues (Centers for Disease Control and Prevention, 2003). Unlike the FLSA, some states extend coverage to those children who work as newspaper carriers or who are employed in movie, radio, and theatrical businesses (Windau and Meyer, 2005). Despite federal laws regulating the number of permissible hours a youth can work, several states enact their own laws that are either more restrictive or more lenient than the national ones (NRC, 1998). The state of Washington places stronger restrictions on the hours adolescents younger than 17 can work; New York abides by the federal regulations for its 14- and 15-year-olds but is less restrictive than federal rules for its 16- and 17-year-olds (NRC, 1998). Furthermore, the minimum ages and conditions under which an adolescent operates a vehicle depend on the state where the individual resides. Any youth younger than 18 years of age may not operate a vehicle in the workplace in Maine and Massachusetts (Center for Disease Control and Prevention, 2002). Overriding state laws, the

federal government does permit "occasional and incidental driving" by teens 17-or under when the situation demands it (U.S. Department of Labor, 2000). Again, many states deviate from the FLSA by requiring work permits issued either by the local school district, a social service agency, or the State Labor Department; some of these permits may necessitate a physician's signature or proof of age (Windau and Meyer, 2005). The numerous legal inconsistencies that exist from one state to another and between individual states and the federal government create confusion and concerns for working youth.

The federal and state laws become less restrictive when applied to the youth labor force in the agricultural industry (Windau and Meyer, 2005). Youth producing agricultural products for interstate commerce have their own set of FLSA standards. For example, those youth 16 or older can perform any farm job with no time limitation (U.S. Department of Labor, 2000). However, youths younger than 15 are not only prohibited from hazardous occupations in agriculture, but also face time constraints. Even though all federal rules aim at protecting the health and safety of young farm workers, these same minors can work at any age and at any job on farms owned or operated by their parents as long as they have their parents' consent (NRC, 1998). To address this contradiction, some states should begin to enact laws that set standards for child labor in agriculture within their jurisdiction.

In addition to the FLSA and state laws, the Occupational Safety and Health Administration (OSHA) plays a significant role in protecting children and adolescents in the work force. OSHA, as part of the Department for Labor, specifically deals with creating and enforcing laws that ensure the safety and health of all workers, including the young. While it excludes youth who work on small farms (those with fewer than 11 employees) and those involved in the family business, it does focus on those young adults who work for pay in both the

public and private sectors (Windau and Meyer, 2005). OSHA regulations, unlike those of the FLSA and state laws, do not differentiate on the basis of age. However, OSHA does require that all potential employers who have interest in hiring workers 18 or under must familiarize themselves with the OSHA standards in order to establish a safe working place. Not only does OSHA set the laws, but it also follows through by investigating work places and any infractions of the laws.

Although OSHA tries to shield workers of all ages, its standards tend to fall short when it comes to agricultural workers, especially the young (NRC, 1998). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) safeguards agricultural workers, both children and adults, by regulating the use of pesticides. Like FIFRA, the EPA's Worker Protection Standards Regulations (40 C.F.R. 170) focus on pesticide protection (NRC, 1998). This C.F.R. specifically addresses those employees who come into direct contact with pesticides by determining when it is safe for these workers to return to the newly sprayed areas and when to contact workers about dangerous areas (NRC, 1998). It also encourages the use of personal protective equipment and educating employees about pesticide usage (NRC, 1998). Another measure that attempts to shelter children from pesticide harm is The Food Quality Protection Act of 1996. While it does deal with pesticide-tainted foods and how those foods can infect young consumers, it fails to include those children who work on farms where pesticides are commonly used (NRC, 1998).

3.0 LEGISLATION AND EDUCATION

Although the nation and the separate states have come a long way since the Roosevelt administration began to address the issue of child labor, many more improvements still need to occur. The Occupational Safety and Health Act (OSH Act) of 1970 established the National Institute for Occupational Safety and Health (NIOSH), the research institute responsible for investigating occupational injuries and illnesses. Since then, NIOSH has become part of the Centers for Disease Control and Prevention (CDC) in the U.S. Department of Health and Human Services (DHHS). NIOSH takes center stage when it comes to keeping child labor laws relevant for a developing technological society. It researches the occurrence of young worker injuries, both nonfatal and fatal, and then makes recommendations to all sectors of the government and labor forces about how to avoid such incidences. NIOSH prevention information, easily accessible through a variety of publications (NIOSH Alerts, Current Intelligence Bulletins, Hazard Controls and Hazard IDs, Fact Sheets, Criteria Documents, etc.), educates the youth population about potential hazards; additionally, it reminds lawmakers of the necessity of amending current child labor laws in order to keep them relevant with the changing times (refer to Table 2) (Center for Disease Control and Prevention, 2007).

Table 2 Key resources for young worker safety and health (Adapted from http://www.cdc.gov/niosh/topics/youth/)

Report/Publication Title	Date	Description
Working together for safety-A state team approach to preventing occupational injuries in young people	May 2005, DHHS (NIOSH) Publication No. 2005-134, May 2005	Presents two case studies that demonstrate the value of the state team approach and their activities in fostering a safe and healthful youth employment
Injuries among youth on farms, 2001	December 2004, DHHS (NIOSH) Publication No. 2004-172	Describes risks and prevention for children who live and work on farms
Safe work for youth in construction	December 2003, DHHS (NIOSH) Publication No. 2004-113	Describes risks and prevention for young workers doing construction
NIOSH safety checklist programs for schools	October 2003, DHHS (NIOSH) Publication No. 2004-101	Presents information needed by schools to maintain safe classrooms, shops, and labs
NIOSH alert: Preventing deaths, injuries, and illnesses of young workers	July 2003, DHHS (NIOSH) Publication No. 2003-128	Provides case reports and examples of risks young workers may face while on the job and gives prevention tips
Promoting safe work for young workers	November 1999, DHHS (NIOSH) Publication No. 99-114	A guide to young workers safety and health issues
Child labor research needs-recommendations from NIOSH Child Labor Working Team: A special hazard review	August 1997, DHHS (NIOSH) Publication No. 97-143, August 1997	Provides information about youth employment, occupational injury, and illnesses in young workers as well as federal and state child labor regulations and national objectives
Data on young worker injuries and illnesses in worker health chartbook	2004, DHHS (NIOSH) Publication No. 2004-146, pp. 266-276	Describes data on fatal and nonfatal injuries and illnesses for young workers
Fatality Assessment and Control Evaluation (FACE) reports of young worker deaths		NIOSH and state partners investigate deaths of young workers through the FACE program
Are you a working teen? What you should know about safety and health on the job	1997, DHHS (NIOSH) Publication No. 97-132	Provides answers to questions about teen worker rights, hazard recognition, laws and regulations

One specific NIOSH publication, A *Special Hazard Review-Child Labor Research Need* (July 1997), emphasizes the importance of a team approach in combating dangers in the work force for young laborers (Centers for Disease Control and Prevention, 1997). This publication based its findings on the efforts of NIOSH's Child Labor Working Team (Centers for Disease Control and Prevention, 1997). Formed in April, 1994, this team specifically investigates the physical, emotional, and developmental challenges children and adolescents might encounter when working (Centers for Disease Control and Prevention, 1997).

NIOSH, responding to the Department of Labor, has addressed the need to update Hazardous Orders (HOs). In conjunction with researchers and child labor advocates, NIOSH suggested in 2002 that changes be made in 21 already existing hazardous orders and that 17 new hazardous orders be enacted (Center for Disease Control and Prevention, 2007). The federal government embraced this NIOSH report as a comprehensive one that should set the guidelines for future child labor laws (Center for Disease Control and Prevention, 2007). The most important element of the NIOSH recommendations is that HOs must undergo constant scrutiny in order to keep the laws current in a society that is becoming both more technological and global. These HOs include nonagricultural occupations for those 18 or younger and agricultural occupations for those 16 and younger (Center for Disease Control and Prevention, 2007). The DOL showed its approval of this report by funding NIOSH for its research (NRC, 1998; Centers for Disease Control and Prevention 2007).

Even though this NIOSH report has made significant strides in the area of child labor, it illustrates the complexity of the problem and how no single report can be all-encompassing. For example, the 2002 document ignores Child Labor Regulation No. 3, which determines the hours that 14- and 15-year-olds can work (Center for Disease Control and Prevention, 2007).

Furthermore, NIOSH excludes such legal issues as minimum age for work in HOs and exemptions from the FLSA (Center for Disease Control and Prevention, 2007). By writing the report for the DOL, NIOSH refers to but does not detail each HO, something with which the DOL should already be familiar. Yet, the NIOSH report does encompass those concerns beyond the focus of the DOL regulatory authority in order to better combat illnesses, injuries, and even fatalities involving young workers.

Although laws and research contribute to an understanding of child labor and how to create a positive working environment for these youth, these regulations cannot be effective unless their message reaches all sectors of society. The federal and state governments, including but not limited to OSHA, NIOSH, and the DOL, have created a library of resources to educate both professionals and lay people about hazards for youth in the work place. The Board on Children, Youth, and Families of the National Research Council and the Institute of Medicine created a Committee on the Health and Safety Implications of Child Labor (NRC, 1998). It assigned this committee the task of investigating existing data relating to child injuries and illnesses due to work. After extensive research, the committee published a report in 1998 entitled "Protecting Youth at Work" that details its findings and recommendations (NRC, 1998).

Two years later, the Department of Labor added its input in its "Report on the Youth Labor Force" (U.S. Department of Labor, 2000). After presenting a brief historical summary of child labor within the United States, the DOL listed the positive and negative consequences of child labor with specific emphasis on the differences between the industrial and agricultural work environments (U.S. Department of Labor, 2000).

Even though federal and state laws have helped reduce the morbidity and mortality of youths in the workplace, many children, adolescents, parents, and employers still remain

unaware of all the existing rules. To reach the general public, not just the youth labor force, the Department of Labor created Youth Rules! (2002) (http://www.youthrules.dol.gov/). Along with its website, Youth Rules! motivates other organizations to also implement their own programs to help disseminate knowledge to all sectors of the general public. Specifically, the Equal Employment Opportunity Commission has a web site, Youth@Work, with information for youth about their rights and responsibilities as workers, while the National Young Worker Safety Resource Center (YWSRC) provides training, technical assistance, and resource materials to state and community groups (http://youth.eeoc.gov/; http://socrates.berkeley.edu/%7Esafejobs/nation/index.html#contactinfo).

The general public must extend beyond those working in the industrial sector to those laboring in agricultural communities. This is why the National Education Center for Agricultural Safety (NECAS), part of the National Safety Council (NSC), embodies all young farmhands in its efforts to curtail job-related injuries and deaths. For example, the NECAS initiated a farm safety curriculum target for high school students in rural areas (http://www.nsc.org/necas/). Moreover, numerous educational and outreach programs exist to help prevent injuries and illnesses in agricultural workers (NRC, 1998). The 4-H Federal Extension Service Training Program (formerly known as the Future Farmers of America) identifies the rural population of 14- and 15-year-olds who come into contact with tractors and/or other farm machinery in their work (Center for Disease Control and Prevention, 2007). The National Children's Center for Rural and Agricultural Health and Safety, funded by NIOSH and the Federal Maternal and Child Health Bureau, offers information relevant to all children exposed to agricultural hazards (http://www.cdc.gov/niosh/topics/youth/). Farm Safety 4 Just Kids and the North American Guidelines for Children's Agricultural Tasks (NAGCAT) are two other important resources

geared to helping young rural workers (http://www.cdc.gov/niosh/topics/youth/). In addition to education, the goal is prevention – using knowledge to eliminate hazards.

OSHA, following the DOL example, implemented its own multi-year campaign to raise awareness about on-the-job safety for young workers. The first campaign, "Landscaping – Plant Your Feet on Safe Ground," targets those teens working in summer landscaping jobs (http://www.osha.gov/SLTC/youth/summerjobs/lawncare.html). While OSHA and the DOL are taking steps in the right direction in terms of education, the high injury and fatality statistics in today's society indicate that not enough information reaches all individuals in both urban and rural areas.

Education must co-exist with legislation. Certain states, for example, are learning from their experiences. After a youth camp counselor died in Oregon due to a cannon exploding, the state turned this tragedy into a 2005 child labor law that forbids any adolescent 18 or younger from working with such hazardous materials as explosives (Center for Disease Control and Prevention, 2007).

The federal government, also using current knowledge, has recently created The Children's Act for Responsible Employment of 2005 (CARE Act of 2005, HR 3482) (http://www.nclnet.org/labor/childlabor/CARE_Summary_2005.pdf). This law, submitted by Representative Roybal-Allard to the House of Representatives, specifically addresses the rural population (http://www.nclnet.org/labor/childlabor/CARE_Summary_2005.pdf). It eliminates the discrepancies between the agricultural and industrial child labor laws by creating the same age and work hour standards in accordance with the FLSA guidelines (http://www.nclnet.org/labor/childlabor/CARE_Summary_2005.pdf). The law has significant consequences for those who ignore it: an increase from $10,000 to $50,000 in fines as well as a

possible imprisonment of five years (http://www.nclnet.org/labor/childlabor/CARE_Summary_2005.pdf). The United States needs more laws like this one to make employers very aware of the seriousness of adhering to child labor laws. In February of 2005, the federal government enacted such a law which impacts those youth who work on roofs, who interact with compactors, balers, and/or explosives, and who drive (Center for Disease Control and Prevention, 2007).

Sadly, even this plethora of federal legislation has not significantly reduced or eliminated the number of employer citations or employee injuries. Fiscal year 2006 reveals frightening statistics (refer to Table 3): employers illegally hired 3,723 minors, forcing these adolescents 16 and younger to work beyond the regulated time stipulations (http://www.dol.gov/esa/whd/statistics/200631.htm). One third of situations undermining the well-being of youth included such hazardous orders violations as the abuse of paper balers, meat slicers, and drivers (http://www.dol.gov/esa/whd/statistics/200631.htm). Those employers and companies who broke the child labor laws received assessments approaching $3 million from the WHD in fiscal year 2006 (http://www.dol.gov/esa/whd/statistics/200631.htm).

Table 3 Number of minors employed in compliance with child labor laws, 2006 (http://www.dol.gov/esa/whd/statistics/200631.htm)

Child Labor Statistics	FY 2005	FY 2006	Change (2005-2006)
Self-Directed Child Labor	1406	952	(32.3%)
Cases with Child Labor Violations	1129	1083	(4.1%)
Minors Employed in Violation	3703	3723	0.5%
Minors per Case	3.3	3.4	3.0%
Cases with HO Violaions	396	361	(8.8%)
Minors Employed in Violation of HOs	1091	994	(8.9%)

4.0 INJURIES BY WORK ENVIRONMENT

Industrial risks vary across occupational sectors in type, probability, and degree of injury. Many industries have hazard patterns almost like fingerprints, since the types of labor required, equipment used, and overall environment can all be distinctive. While laws try to protect young workers in industry, these teens still risk the same hazards in carrying out their jobs as more experienced and psychosocially developed adults. Both age groups suffer injuries not only in high-risk occupations, where one would expect them, but also in jobs throughout the economic hierarchy. Common injuries in certain industrial and/or retail areas include the following:

- Office—Eyestrain, back pain, and injuries from repetitive motion and/or falls…harm from customers and/or co-workers who act inappropriately
- Retail—Back injuries, repetitive motion injuries from checkout scanners, harm from customers and/or co-workers who act inappropriately
- Food Service—Burns, cuts, slips and falls, dermatitis, back injuries, harm from customers and/or co-workers who act inappropriately
- Grocery—Cuts, back injuries, repetitive motion injuries from checkout scanners, slips and falls, dermatitis, frostbite from cold storage areas, harm from customers and/or co-workers who act inappropriately
- Movie Theater—Burns or electric shocks, slips and falls, dermatitis, back injuries

4.1 RETAIL/SERVICE INDUSTRY

While retail and service industries, such as restaurants, groceries, and department stores, heavily rely upon their adult employees, they also depend upon teenagers as part-time workers. These young workers are usually employed as cooks, food counter workers, stock handlers, and baggers as well as kitchen workers, food preparers, waiters/waitresses, and busboys (Windau and Meyer, 2005).

Each of the above jobs has its own dangers for both adults and adolescents. For example, common hazards in restaurants include misusing knives in food preparation due to lack of training on the safe use of knives and slicers, not using puncture or cut proof gloves and slicer guarding, or cutting toward rather than away from one's hand or body (Mardi and Pratt, 2003; NRC, 1998). Burns, another potential hazard, result from accidentally touching something hot such as pots, pans, or cooking surfaces (stoves, ranges, etc), or being splashed by liquids such as cooking oil or water (Mardi and Pratt, 2003; NRC, 1998). Slipping on wet or greasy floors is yet another peril that commonly causes bodily injury (NRC, 1998). Food preparation workers are also at risk for repetitive motion injuries as well as falls or accidents (especially if the floor surface is uneven or damaged), dermatitis, allergies, and asthma (NRC, 1998; U.S. Department of Labor, 2000).

Restaurant work can further expose staff to toxic chemicals. When mixed improperly, cleaning compounds release chlorine or ammonia gas; both are potential poisons (Center for Disease Control and Prevention, 2003). Depending on the amount inhaled, the worker can experience irritation of the eyes and respiratory tract, coughing, vertigo, and chest pain (Center for Disease Control and Prevention, 2003). Severe exposure may cause serious lung injury including pulmonary edema (accumulation of fluid in lung tissues) or pneumonia (Centers for

Disease Control and Prevention, 1991). Chlorine exposure can also result in chronic symptoms similar to asthma (Leroyer et al., 1998).

In grocery stores, on the other hand, sprains and strains are common (Windau, 2005, NRC 1998). They can arise when workers move inventory, lift customer bags, or push strings of shopping carts from parking lots. Incorrect lifting techniques, awkward lifting, and over-reaching all contribute to musculoskeletal disorders. Additionally, frequent lacerations occur from opening cartons with sharp tools (Windau 2005; NRC, 1998). With all of the above-mentioned jobs, adults bring experience and maturity, while teens, lacking these qualities, become more vulnerable to risks.

On paper, child labor laws recognize this adult/youth disparity by prohibiting young workers from using certain machinery (food choppers, cutters, slicers and grinders, paper balers, forklifts, dough and batter mixers, and bread cutting machines) common in retail establishments (Centers for Disease Control and Prevention, 2003). However, these laws are not always enforced. As a result, young workers, trying to demonstrate their maturity or independence, often decide to operate this machinery, regardless of proper training (Centers for Disease Control and Prevention, 2003). Sometimes employees even endanger their teen workers through ignorance or a disregard of child labor laws by knowingly expecting or asking them to operate prohibited equipment.

4.2 CONSTRUCTION

The hard hat, the symbol of construction work, paints a clear picture of the potential dangers of working in this industry. Statistics validate this: construction jobs are among the most hazardous

not only for experienced adult workers, but especially for novice adolescent workers (Windau, 2005; U.S. Department of Labor, 2000; NRC, 1998). Construction sites bring with them a great deal of complexity. As structures rise, they constantly evolve, increasing the chance of accidents. Moreover, workers do not experience a long tenure with each job; the nature of the work results in laborers moving from one site to another (Ringen et al., 1995). By the time both young and adult workers adjust to the demands of the specific work environment, they find themselves in a new area with its own challenges and tasks. This rapid turnover from one job to another increases the risk of injury by creating a varying degree of supervision that often isolates teenage workers when they perform high-risk tasks amid noise, dust, power tools, or heavy equipment (Center for Disease Control and Prevention, 2002; NRC 1998). It also requires more responsibility from the workers to familiarize themselves with each new environment so that they can protect themselves from potentially dangerous tools, machinery mishaps, and other workplace threats (Ringen et al., 1995). While no worker remains completely safe from falls, electrocution, building collapses, plummeting objects, and motor vehicle crashes, younger workers are more susceptible to these dangers due to their lack of experience and naivety when it comes to perceiving health hazards (Center for Disease Control and Prevention, 2007). The construction industry specifically endangers its laborers, both young and old, to musculoskeletal disorders, falls, and chemical-related illnesses (Centers for Disease Control and Prevention, 2007; Ringen et al. 1995).

Contrary to adults, whose skills and experience usually assign them to higher-level positions within the construction industry, the more novice teenagers often find themselves working as laborers and helpers (Center for Disease Control and Prevention, 2007). In this capacity, the teens may be forced to do menial jobs (lifting heavy objects, repetitive motions,

etc.) that expose them to musculoskeletal disorders (Center for Disease Control and Prevention, 2007). Significant numbers of construction workers suffer nonfatal injuries and illnesses stemming from such musculoskeletal work; the fact that this number includes workers under 18 is objectionable (Centers for Disease Control and Prevention, 2007).

Falls on construction sites from year to year are ranked among the leading causes of workplace fatalities (Centers for Disease Control and Prevention, 2007). Typically, such falls occur from roofs, ladders, scaffolds, or stages (Centers for Disease Control and Prevention, 2007). Although many falls are nonfatal ones, too many still result in such injuries as fractures, contusions, or bruises (U.S. Department of Labor, 2000). Researchers have discovered that youth, even more than adults, incur serious injuries, especially involving falls from ladders or down stairs and steps (Centers for Disease Control and Prevention, 2007). Not only do these falls impact the victims' physical well-being, but they also negatively affect employers who lose money when employees miss work. In one study, young workers missed an average of 20 days of work as a result of falling off ladders (U.S. Department of Labor, 2000).

Beyond the risk of immediate physical injury, construction workers face exposure to harmful chemicals whose impact may not surface for years due to long latency periods (Sullivan et al., 1995). The substances linked to occupational disease include: asbestos, cement, synthetic vitreous fibers, silica, and wood dust; fumes containing cadmium, lead, copper, zinc, and asphalt; and solvents and other chemicals such as polyurethanes, toluene, epoxy resins, and methylene chloride (Centers for Disease Control and Prevention, 2007). Illnesses from such exposure include but are not limited to lead poisoning, asbestosis, and other lung disorders caused by inhaling fibers, cancers, asthma, chronic obstructive pulmonary disease, bronchitis, skin rash or inflammation, and silicosis (Ringen et al.1995; Rühl and Kluger 1995; Sullivan et al. 1995).

Workers do not have to be directly engaged with the labor to be infected; they risk danger just by being at the site (Ringen et al., 1995).

This exposure to hazardous chemicals is a problem that has no age boundaries. The complexity of interplay between potential identifiable and unidentifiable exposures and characteristics of youth leave unresolved answers as to whether young people are more susceptible to certain dangers, whether harm is worse if first exposure occurs at an early age, and whether consequences flow from multiple lifetime exposures (NRC, 1998). To prevent needless suffering, health care professionals must identify and fully catalogue both the short and long term health effects of exposure to hazards in the workplace.

4.3 AGRICULTURE

Families have historically and globally seen children as an important source of farm labor, and this view remains alive today in the United States. Indeed, children often begin farm work while still very young: five-year-olds gather eggs, and 11-year-olds drive pickups (NRC, 1998). Boys tend to start farm work earlier than girls (NRC, 1998). As a result, agriculture is a special case for farmers of all ages. Its working conditions may cause obvious, immediate distress, may give rise to serious problems that masquerade as milder ones, or may result in insidious damage that lies latent for years.

Some chores, such as carrying a feed bucket, are safer than those jobs involving the spraying of pesticides or the use of outdated farm equipment (NRC, 1998). Yet, since regular exposure to certain pesticides may yield flu-like symptoms (NCR, 1998), work-related causes of chronic diseases in the agricultural sector can go unnoticed that allows the illness to progress into

adulthood. Moreover, youngsters in the fields often go near machinery, including moving trucks and tractors. Like adults, they can fall off ladders when picking fruit in trees, or they can suffer from dehydration if they stay outdoors too long without water (NCR, 1998). Falls and animal injuries are the most common minor afflictions children suffer, while tractors and moving machinery generally cause the worst harm (Rivara, 1997; Stallones and Gunderson, 1994). Specific risks common to rural workers include: sunburn, heat-related illness, dermatitis, eye injuries, strains and sprains, harm from equipment and machinery, back injuries, falls, and chemical exposure (NCR, 1998).

Other conditions that pose risks are poor sanitary facilities, inadequate housing, long hours in the fields, and heavy lifting and carrying of produce (NRC, 1998). Public health officials must respect those adults who choose to work in agricultures while also reaching out to the many children whose family situation requires their labor. The law somewhat protects rural child workers, but more legislation is needed to protect those children from the possible acute and long-term effects of farm work.

Farm work often entails hefting heavy loads, laboring in awkward postures, and repeating acts for long periods of time. Researchers have linked such arduous work to musculoskeletal trauma (Bernard, 1997). Blistering field temperatures can compound the problem, breeding heat-related illnesses and injuries for which young workers are known to be at a greater risk (NRC, 1998). Fatigue exacerbates work place injuries in general and farm injuries in particular (NRC, 1998; Rosa, 1995). Farm children, in addition to attending school, may also perform regular chores (milking cows) or seasonal work (hay baling) that require early morning or late evening effort (NRC, 1998, U.S. Department of Labor, 2000). Drowsiness from such long work hours may lower judgment and tempt all workers, children and adults, to take unnecessary risks

or shortcuts (NRC, 1998). Fatigue may especially affect adolescents who require more sleep (Rosa, 1995). Health care professionals, once acknowledging the vulnerability of children and teenagers, must focus on lobbying for laws that protect this population from labor-intensive farm work.

Like fatigue and other problems, poor sanitation raises health concerns for rural workers (NRC, 1998). The Occupational Safety and Health Act regulations exempt farms and ranches that employ 10 or fewer employees and do not have labor camps. Thus, farm workers often lack adequate hand-washing facilities (NRC, 1998). Parasites, which thrive in these conditions, can cause infections, dermatitis, urinary tract problems, respiratory illnesses, eye disease, and other illnesses (NRC, 1998). Children, with less developed immune systems, tend to have a harder time fighting these ailments.

Two other specific conditions are worth mentioning when describing the relationship between agriculture and its workers. Green tobacco sickness (GTS), an acute nicotine poisoning that occurs when nicotine penetrates the skin, threatens workers who handle tobacco leaves (McKnight and Spiller, 2005). The tobacco cultivators and harvesters of agricultural communities like those in Kentucky must deal with this unique problem (McKnight and Spiller, 2005). Sufferers experience nausea, vomiting, headache, muscle weakness, and dizziness (McKnight and Spiller, 2005). Children may be especially vulnerable to GTS for several reasons. They are smaller than adults relative to the nicotine dose they receive. Because few smoke, they lack tolerance (McKnight and Spiller, 2005). They generally do not realize the risks of GTS, especially after a recent rain, and may fail to take effective precautions (McKnight and Spiller, 2005). Though insufficiently studied, GTS is another preventable hazard to young workers.

Secondly, although asthmatic episodes can occur almost anywhere, farms harbor an unusual number of triggers for them. Work-related asthma can arise from a variety of sources, including pollen, arduous labor, dust, smoke, paint, and an array of farm smells or gases (NRC, 1998). The classic symptoms of asthma for both adults and children include wheezing, chest tightness, shortness of breath, and coughing. Like GTS, asthma is controllable. Child labor laws can decrease its prevalence in children by enacting laws that curtail the amount of hours a child is exposed to farm work.

4.3.1 Pesticides

The U.S. agricultural industry's widespread use an array of pesticides endangers its workers. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) defines these pesticides as "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, or weeds or any other forms of life declared to be pests; any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant" (Center for Disease Control and Prevention, 2007). Farm workers inhale these chemicals, ingest them, and absorb them directly through the skin. Workers may come in contact with these chemicals when mixing and applying them, and they can inhale them when crop dusters trail the substances over fields (NRC, 1998). Farmers imbibe invisible residues while weeding, harvesting, and eating pesticide-tainted fruits and vegetables in the field (NRC, 1998). Workers can drink, cook with, or bathe in contaminated water (NRC, 1998). Table 4 lists the tasks directly related to pesticide exposure and its risks.

Table 4 Tasks involving risk of exposure to pesticides (Centers for Disease Control and Prevention, 2007)

- Mixing, loading, transferring, or applying pesticides
- Disposing of pesticides or pesticide containers
- Handling opened containers of pesticides
- Acting as a flagger for aerial applications
- Cleaning, adjusting, handling, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues
- Assisting with the application of pesiticides
- Entering a greenhouse or other enclosed areas after the application
- Entering a treated area outdoors before expiration of the restricted-entry interval

Investigators have linked these toxic chemicals to a variety of acute and chronic health effects. The nature of the illness depends upon the chemical make-up of the pesticide. Organophosphates, a group of pesticides that affects both pests and humans, are primarily responsible for most pesticide poisonings (Schenker, 1998). By inhibiting the enzyme acetylocholinesterase, a build-up of neurotransmitter acetylcholine (ACH) occurs (Schenker, 1998). Many organs in the body depend upon ACH for the transmission of nerve cell impulses. As a consequence, the following symptoms can develop: nervous system hyperactivity, neuromuscular paralysis, and central nervous system dysfunction (Schenker, 1998). Specific symptoms associated with organophosphate poisonings appear in Table 5.

Table 5 Acute symptoms associated with organophosphate poisoning (Centers for Disease Control and Prevention, 2007)

- Blurred vision caused by eye muscle contraction
- Tearing, salivation, nausea, vomiting, pulmonary edema, urination, and perspiration caused by stimulation of secretory endocrine glands
- Cardiac arrhythmias caused by impaired impulse conduction to the heart
- Constriction of the bronchial airways caused by smooth muscle contraction
- Cramps, weakness, and paralysis caused by skeletal muscle contraction
- Headache, dizziness, malaise
- Hallucination, convulsion, depression and loss of consciousness, and respiratory depression caused by central nervous system excitation followed by depression

In addition to organophosphates, other pesticides threaten those working in rural settings. Carbamates, like organophosphates, lead to over-stimulation of the central nervous system, producing dizziness, disorientation, paresthesias, tremors, and confusions (Center for Disease Control and Prevention, 2007). Fumigants and nematocides have the opposite effect on the central nervous system, causing depression and respiratory irritation (Center for Disease Control and Prevention, 2007).

Not only do pesticides have acute effects like the ones listed above, but they also produce many more chronic symptoms (Coye, 1985). Even though limited knowledge exists about these chronic effects, research does indicate that pesticides can produce a multitude of maladies: chronic dermatitis, sterility, adverse reproductive outcomes, blood disorders, abnormalities in liver and kidney function, and chronic neurotoxicity (NRC, 1998; Rosenberg, 1990). As with acute exposure to pesticides, chronic exposure can also affect the central nervous system, causing headaches, fatigue, drowsiness, insomnia, mental confusion, concentration and memory issues, and anxiety (Rosenberg, 1990; Rosenstock et al., 1990). Although not a documented effect, the risk of cancer from pesticides remains a concern. The International Agency for Research on Cancer deems some pesticides as likely human carcinogens (Centers for Disease Control and Prevention, 2007).

Although both teenagers and adults risk harm from pesticides, those youth working in agriculture face the greater danger. Children and adolescents have less developed biochemical and physiological functions than adults (Center for Disease Control and Prevention, 2007). Their age affects their metabolic rates and ability to detoxify and eliminate potentially lethal compounds (Center for Disease Control and Prevention, 2007). Several studies, which have researched the relationship between age and pesticide impact, have shown a strong association

between the chemicals and lower stamina, poorer eye-hand coordination, and reduced cognitive functioning (Guillette et al., 1998). Attention deficit disorder, a rapidly growing problem for school-aged children, may also be linked to pesticide exposure (Weiss, 1997). Unfortunately, even adolescents working in industry are not immune to this problem. They, like their rural counterparts, risk pesticide exposure every time they enter a building or construction site or do any kind of lawn-care work (Centers for Disease Control and Prevention, 2007). In fact, an estimated 32% of work-related pesticide exposures by young workers happen in nonagricultural jobs (Calvert, 2001).

The government faces many obstacles in protecting America's youth, both rural and urban workers, from pesticide related illnesses. Legislators confront more barriers when dealing with farm workers due to the laborers lack of knowledge about chemicals or their hesitation in reporting their symptoms (NRC, 1998). Additionally, many migrant farm workers complicate the issue because they rarely see physicians (NRC, 1998). When they do, a doctor may miss the symptoms of pesticide-related illness and reach an incorrect diagnosis. The workers themselves may not know which pesticides have surrounded them. New regulations do require owners to notify workers when they spray a field, but government officials do not always monitor how often or effectively these warnings are implemented (NRC, 1998). Because insufficient information exists on the effects of exposure to pesticides on children and adolescents, no clear guidelines dictate the amount of time children as opposed to adults should stay in sprayed fields (NRC, 1998). To rectify the situation, the US Environmental Protection Agency (EPA) recently banned the use of several highly toxic pesticides that pose neurotoxic and neurodevelopmental risks to children working on farms (Center for Disease Control and Prevention, 2007). For those

children working in industry, NIOSH recommends restrictions be placed on the handling of pesticides by youth (Centers for Disease Control and Prevention, 2002).

Numerous regulations refer to outdated machinery and processes, yet laws generally fail to address the full range of workplace safety hazards caused by new technologies. While both adults and children face these dangers the minute they enter a work environment, whether it is an industrial or agricultural one, adults have more access to training videos, union representation, and other support. Many questions still exist about the extent and effectiveness of current legal protections for young people. None of the current laws seeks to alleviate the special risks to young workers caused by exposure to carcinogens, reproductive toxins, and ergonomic hazards, whose effects may not emerge until adulthood.

5.0 MOTOR VEHICLE ACCIDENTS

Although differences exist between the urban industrial world and the rural agricultural world, motor vehicle accidents transcend both sectors as a very significant contributor to injuries and/or deaths for both youth and adults. Bureau of Labor Statistics (BLS) identifies transportation accidents as any incident involving either a moving motor vehicle or industrial vehicle driving on or off the highway (Windau et al., 1999). In 2005, “rates by type of event or exposure were similar among age groups, with highway incidents accounting for the highest rate among all age groups” (cite – see graph MMWR 2005). Child labor laws ban workers 18 and younger from operating most mobile machinery and driving most vehicles (Center for Disease Control and Prevention, 2003). The law, by allowing 17-year-olds to drive in special circumstances, places them at risk for transportation-related injuries and deaths.

Adolescents tend to be more inexperienced drivers than adults. They frequently disobey mandatory state laws about the use of seat belts, engage in risk-taking, fail to adjust to changes in the condition of the road or weather, ignore or misinterpret road signs, become easily distracted, and often drive over the suggested speed limit (Center for Disease Control and Prevention, 2007). These realities, combined with the added pressures of time deadlines and job demands, can place teenagers, whether driving a car, truck, or tractor, at excessive risk for accidents (Center for Disease Control and Prevention, 2007).

Different laws try to remedy this situation. The Drive for Teen Employment Act bans 16-year-olds from driving on the job and puts constraints on the type of driving 17-year-olds can perform (Center for Disease Control and Prevention, 2007). Many legislators endorse a Graduated Driver Licensure (GDL), a system that recognizes, as all Child Labor Laws must recognize, the role of age in the ability of the individual to perform a task (Center for Disease Control and Prevention, 2007). The GDL first allows a teen to drive only with adult supervision and limited night driving, it also regulates the number of young passengers the teen driver can have (Center for Disease Control and Prevention, 2007). As the teen matures, the GDL provides more flexibility to those who have proven they can make correct decisions while driving in challenging situations (Center for Disease Control and Prevention, 2007). Although the GDL is still a new program, it has already shown its strengths. Kentucky, for example, has a 31% reduction in car crashes since implementing the GDL (Center for Disease Control and Prevention, 2007).

6.0 OCCUPATIONAL FATALITIES AND NONFATAL INJURIES IN YOUTH WORKERS

No one governmental agency has the responsibility to monitor child labor in terms of injuries and fatalities. As a result, too few sources about work place injuries of youth exist. In 1992, the government tried to address this weakness by developing comprehensive national data programs that detail occupational injuries and fatalities for working youth (U.S. Department of Labor, 2000). These programs gave birth to two BLS programs: the Census of Fatal Occupational Injuries (CFOI) and the Survey of Occupational Injuries and Illnesses (SOII) (U.S. Department of Labor, 2000). The CFOI, operative in all 50 states and the District of Columbia, relies upon an approach that incorporates death certificates, workers' compensation reports, and federal and state agency administrative reports (NRC, 1998; U.S. Department of Labor, 2000).

Unlike the CFOI, the SOII relies more on injury logs than surveys (NRC, 1998; U.S. Department of Labor, 2000). However, by excluding the self-employed, farmers who employ less than 11 workers, private homes, and government jobs, SOII, like the CFOI, paints a less than accurate picture of workers under the age of 17 and their injuries and/or deaths (NRC, 1998; U.S. Department of Labor, 2000). To make the picture even less clear, the data from workers' compensation, death certificates, emergency room visits, and injury logs not only vary from state to state but also are incomplete (NRC, 1998; U.S. Department of Labor, 2000). Table 6 lists four key sources of federal data on work-related fatalities.

Table 6 Four key Sources of federal data on work related fatalities (U.S. Department of Labor, 2000)

Census of Fatal Occupational Injuries
National Traumatic Occupational Fatality Surveillance System
Fatality Assessment and Control Evaluation Program
Integrated Management Information System

6.1 FATALITIES IN YOUTH WORKERS

Fatality trends from the early 1990s to the present among workers younger than 17 show little significant improvement. Windau and Meyer extensively examined fatality data through three approaches: age, industry, and nature of event. By taking their research one step further in comparing fatalities within two time periods, 1993-1997 and 1998-2002, they discovered that an average of 46 youths per year died from work-related injuries between 2001 and 2004 (Windau and Meyer, 2005). From 1992 to 2000, the BLS CFOI indicates that an average of 68 youths per year under the age of 17 was killed on the job (Windau and Meyer, 2005). Correspondingly, youth aged 15- to 17- had a fatality rate of 2.7 injuries per 100,000 full-time equivalents (FTE) workers in 2004; this was an increase from 2002 (2.3 injuries per 100,000 FTE) (Windau and Meyer, 2005). Deaths per 100,000 fulltime equivalents are an outcome measure that reports rates of fatal occupational injuries and accounts for hours of work. FTE assumes 2,000 hours per fulltime worker per year (Centers for Disease Control and Prevention, 2002). Although the

statistics indicate a step in the right direction, none of these fatalities, especially those that happened from activities banned by child labor laws, should have occurred.

The following chart can be interpreted in two opposite ways (Figure 1). Despite an occasional increase or decrease from year to year, the rate of fatal work injuries has remained somewhat steady. This lack of dramatic increase in deaths can be viewed with optimism. However, the data presented in the chart also can also be seen with pessimism since these fatality trends have not substantially declined. It is imperative that the government, through legislation and education, ends these unnecessary and preventable adolescent fatalities in the work environment. No one, whether young or old, should lose his or her life due to a work accident.

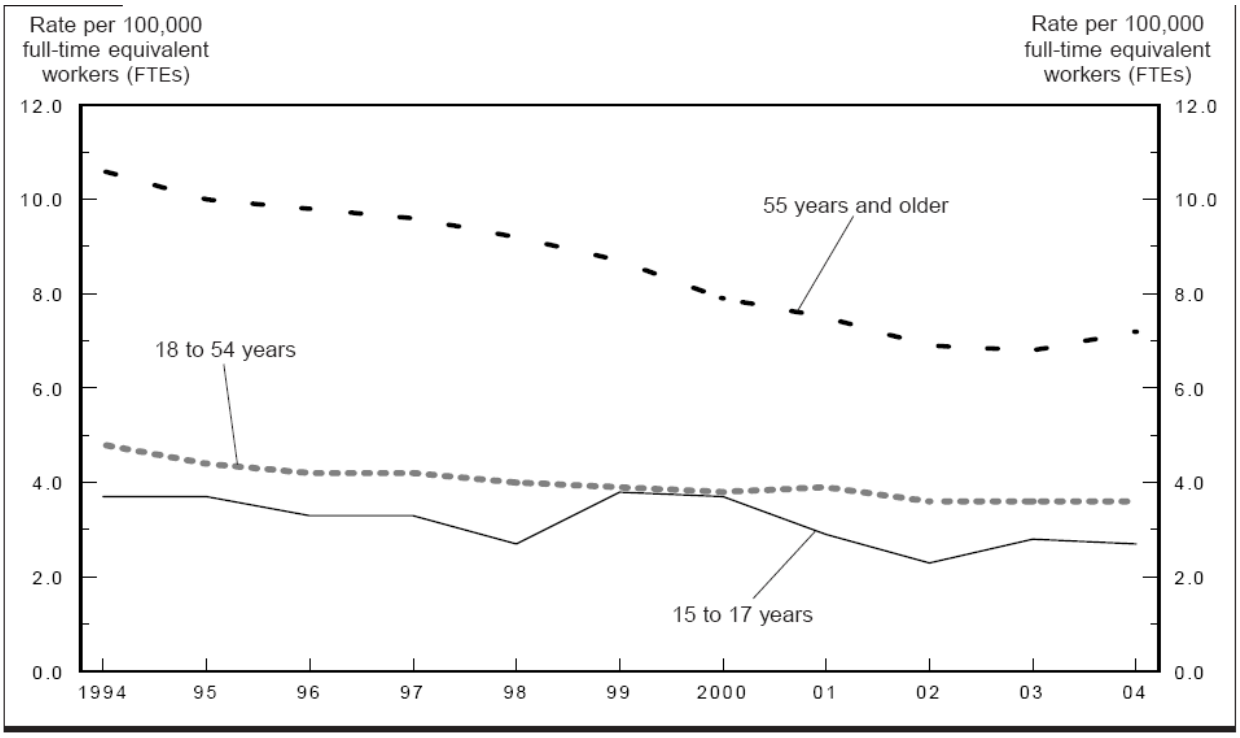

Figure 1 Fatal work injury rates by year, U.S. workers 15 and older, 1994-2004 (Windau and Meyer, 2005)

6.1.1 14- and 15-years-olds

Laws apparently are failing to protect young workers since the fatality rate for 14- and 15-year-olds rose dramatically during both time periods (Windau and Meyer, 2005). This age bracket had a 34% increase in fatalities between 1999 and 2003; as a consequence, injury death rates for them are now comparable to workers aged 18-34 (Windau and Meyer, 2005). No demographic group was immune to this trend (Windau and Meyer, 2005). Whether working for an employer or family member, in industry or agriculture, too many young teens died on the job (Windau and Meyer, 2005).

6.1.2 16- and 17-years-olds

While the two-time periods of 1993-1997 and 1998-2002 indicate an overall decline in fatal injuries by 13%, the picture is a less favorable one when analyzing certain specific industries (Windau and Meyer, 2005). Even though the number of fatalities in agriculture, forestry, and fishing, along with construction and manufacturing, did not change, deaths among youths employed in the services and public-sector industries increased in the 1998-2002 intervals (Windau and Meyer, 2005).

6.2 NONFATAL INJURIES IN YOUTH WORKERS

SOII does offer some interesting insight about young workers and their on-site injuries, especially when compared to their adult counterparts. For example, SOII can look at the number of days adults miss work to ascertain the severity of their injuries. However, because many teenagers do not work a full 40 hour work week, they may only miss a few days of work but still be incapacitated for much longer (NRC, 1998). Additionally, the injuries or illnesses that affect adolescents often linger longer than those that impact adults. Many teen workers complain of permanent disabilities and/or restrictions from an injury or illness sustained while working (NRC, 1998).

Past studies indicate certain trends about injury and illness within youth employment. Despite the maturity and greater experience of older adolescents, they still suffer more non-fatalities than their younger colleagues (NRC, 1998; U.S. Department of Labor, 2000). Researchers attribute this statistic to the kind of jobs older teens are allowed to perform under the law (NRC, 1998; U.S. Department of Labor, 2000). Child labor laws more strongly restrict those 16 and under from doing hazardous jobs; they also limit the hours that these teens can work outside of school. Therefore, the older teens, finding themselves in more risky work environments with longer hours, tend to sustain more injuries. Employers may give added responsibilities to their older teen employees; expecting more from them places these older teens at greater risk (NRC, 1998; U.S. Department of Labor, 2000). The data show older adolescent males have more occurrences of injury and illness compared to females of the same age (NRC, 1998; U.S. Department of Labor, 2000). Age and gender, then, play a significant role in work-related non-fatalities. While no information exists on the long-term human and economic burden of occupational injuries suffered by these young workers, research does predict that what occurs

in the present will impact the future of the workers' health and employment status; society does not yet comprehend the ongoing economic and social cost of teen injuries.

Past studies have yielded certain generalizations about nonfatal injuries to adolescent (17 or younger) workers, but current research has produced much more specific information. Unfortunately, a year-to-year comparison to establish trends cannot be made because BLS occupational injury, illness, and fatality statistics uses new industry and occupation classification systems beginning in 2004. Inherent in all of these available data sources is the understanding that any single source is not all encompassing and does not provide a complete representation of working youth (Windau, 2005; NRC, 1998). In spite of these limitations, the 2005 data do reveal disappointing progress in the ongoing effort to protect young workers. The following paragraphs and tables, based upon my research, detail the nature of the most common injuries and illnesses incurred by youth aged 16 and 17 in 2005. Approximately 7,640 of these youths in 2005 suffered from a diversity of injuries and illnesses, leading to lost days of work (BLS, 2005 website). The lack of accessible data prevents an accurate assessment of 14- and 15-year-olds for 2005. Therefore, this paper can neither make any comparisons or conclusions about this specific population during this time period.

Different ways exist to classify youth injuries. One is by body part. The upper extremities, the lower extremities, and the trunk incur 42%, 27%, and 17% of all injuries, respectively (Figure 2). These body parts account for the majority (86%) of injuries. Another way to look at the data is to examine the mechanism that produced the injury or illness. Some of these primary events or occurrences include being struck by an object (29%), being struck against an object (14%), falls on the same level (17%), overexertion (11%), exposed to harmful substances (10%), and caught in an object, equipment and material (8%) (Table 7). A third

approach to understand youth injuries is through an analysis of the source of the injury. Containers as well as the classification all other accounted for the largest percentage injury sources at approximately 18% each Figure 3). Floors/ground surfaces were addition major sources of injury to teens. A fourth approach to understand youth injuries is through an analysis of the industry in which the injury occurs. Ninety percent happen in the service industry and 10% occur in the goods producing industries resulting in lost workdays in private and salaried jobs (Table 8). Of the 90%, 24% of injuries take place in the retail trade and 45% transpire in the leisure and hospitality sector (Table 8). The construction, manufacturing, and agriculture, forestry, fishing and hunting each accounted for three to four percent of all injuries/accidents in the goods producing industry. Lastly, injuries can be broken down by occupation. As might be expected, the greatest number of youth injuries (4,310) result in the service sector due to the preponderance of adolescents who choose to work in that area (Figure 4).

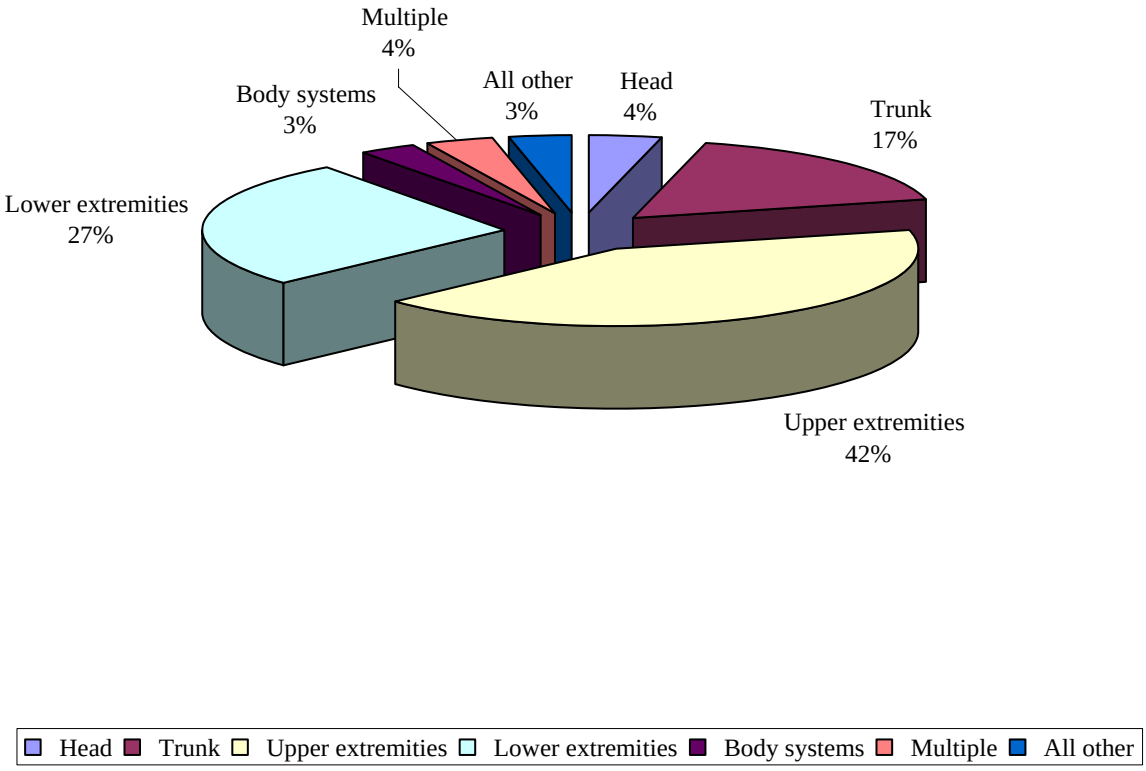

Figure 2 Distribution of nonfatal occupational injuries for 16- and 17-year-olds by body parts, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Table 7 Number and percent of nonfatal occupational injuries for 16- and 17-year-olds by event or exposure, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Event or exposure:	Number of Cases to Workers 16 and 17 Years	% Distribution
Contact with object, equipment	**3960**	**52**
Struck by object	2230	29
Struck against object	1050	14
Caught in object, equipment, material	590	8
Fall to lower level	**90**	**1**
Fall on same level	**1300**	**17**
Slips, trips	**160**	**2**
Overexertion	**870**	**11**
Overexertion in lifting	530	7
Repetitive motion	**30**	**0**
Exposed to harmful substance	**760**	**10**
Transportation accidents	**130**	**2**
Fires, explosions	**0**	**0**
Assault, violent act	**0**	**0**
by person	0	0
by other	0	0
All other	**290**	**4**
Total No. of Cases	***7590***	***100***

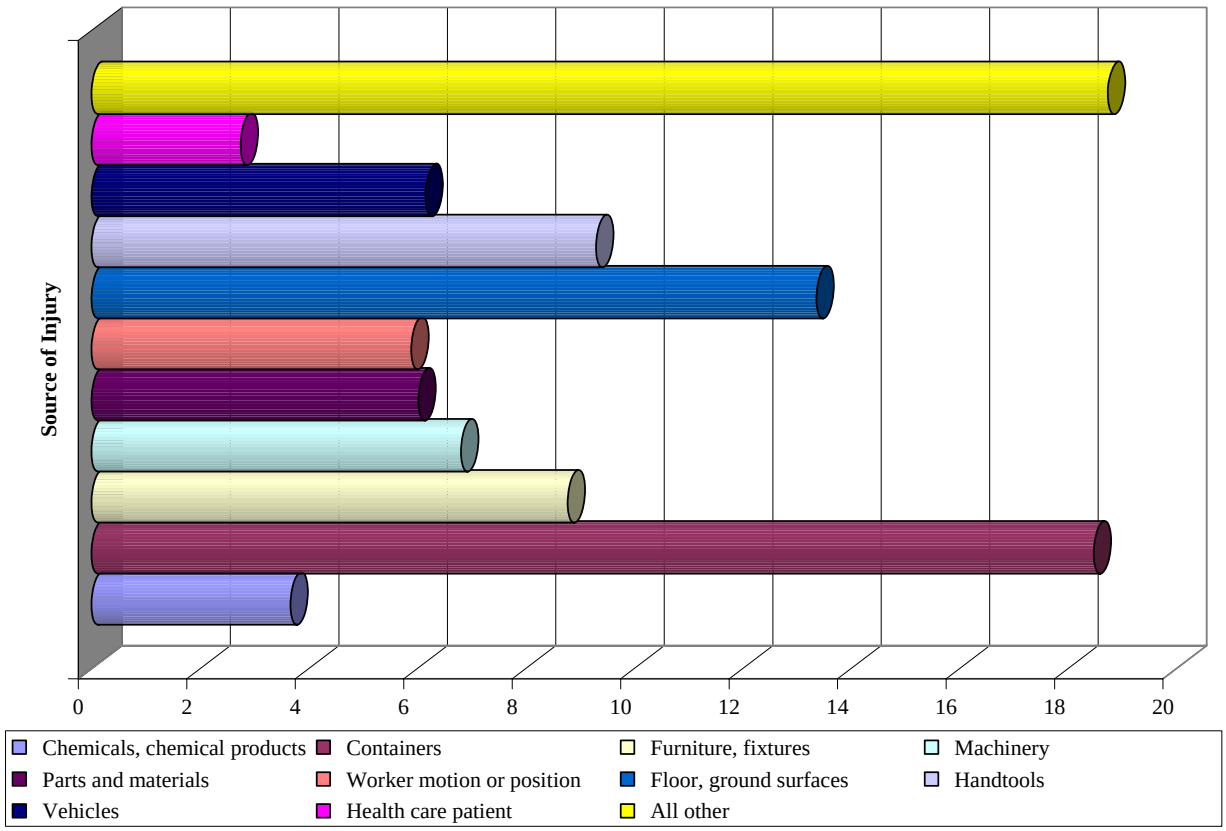

Figure 3 Percent distribution of nonfatal occupational injuries for 16- and 17-year-olds, by source of injury, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Table 8 Number and percent of nonfatal occupational injuries for 16- and 17-year-olds by industry sector, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Industry sector:	Number of Cases to Workers 16 and 17 Years	% Distribution
I. Goods producing industries	**760**	**10**
Natural resources and mining	260	3
Agriculture, Forestry, Fishing and Hunting	260	3
Mining	0	0
Construction	290	4
Manufacturing	210	3
II. Service providing industries	**6870**	**90**
Trade, Transportation and Utilities	2020	26
Wholesale Trade	110	1
Retail Trade	1800	24
Transportation and Warehousing	100	1
Utilities	0	0
Information	50	1
Financial activities	70	1
Finance and Insurance	20	0
Real Estate and Rental and Leasing	50	1
Professional and business services	320	4
Professional, Scientific, and Technical	0	0
Management of Companies and Enterprises	0	0
Administrative,Support,Waste, Remediation	310	4
Education and health services	730	10
Educational Services	50	1
Health Care and Social Assistance	690	9
Leisure and hospitality	3410	45
Arts, Entertainment, and Recreation	250	3
Accommodation and Food Services	3160	41
Other services	240	3
Other Services, except Public Administration	240	3
Public Administration	0	0
Total No. of Cases	***7630***	***100***

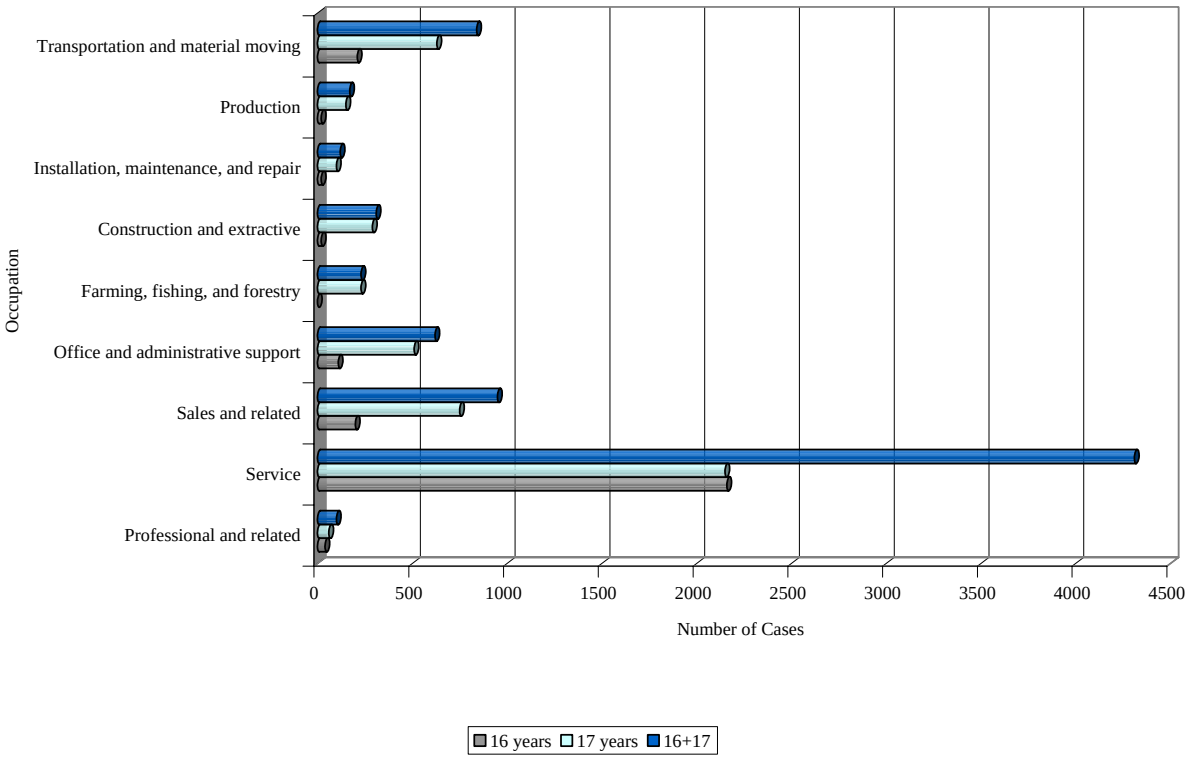

Figure 4 Number of cases of nonfatal occupational injuries for 16- and 17-year-olds by occupation, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

7.0 CONCLUSION

The current status of child labor in the United States resembles a giant jigsaw puzzle. Some pieces represent the younger 14- and 15-year-olds, while others symbolize the older 16- and 17-year-old workers. Other pieces reflect the industrial work environment with its diverse job offerings, benefits, and potential dangers. A few pieces refer to the agricultural community and its less strict laws, despite its inherent threats such as tractor driving and its common use of pesticides. The most disturbing pieces are the ones that reveal the injuries and fatalities of America's working youth corp. While the shape and size of the pieces may vary from year to year, the overall result is the same: more pieces of protective laws must be added to the mix in order to create a more positive picture for the adolescent work force.

To accomplish this goal takes more than the federal government creating committees or passing legislation. It requires more than each state enacting laws or each employer creating a list of rules. To ensure that every teen worker is safe on the job necessitates a joint effort by the national, state, and local governments; it demands that politicians, healthcare providers, educators, employers, and parents work together for the welfare of the young. All concerned adults must communicate with one another about the nature of jobs for adolescents, the hours involved, the state of the work environment, and the kind of safeguards in place. These adults must not only applaud those young adults who work for financial or psychological reasons, but they must also ensure that they will remain safe wherever they work.

Education plays a key role in achieving safety for adolescent workers. Every person involved in the process must understand the nature of teenagers, must be cognizant of existing laws, must be knowledgeable about resources, and must be apprised of how to implement change. The federal government can pass a myriad of laws, but the laws will be meaningless words on paper if the states do not enforce them, if employees are not supervised, and if parents are not watchful.

High schools could implement classes on child labor laws, teaching their students not only the history of these laws but also what laws presently exist to protect them. Communities could hold classes for employers who tend to hire adolescent workers. They could also insist that teenagers, their parents, and potential employers attend seminars together so that everyone is on the same page when it comes to youth entering the work force.

The federal government needs to extend its budget to include funding for the implementation of child labor laws. Professionals should be hired to teach the community, oversee the work place, and advocate for the young laborers. These professionals cannot limit themselves to the more heavily populated urban areas, but they must also enter the rural environment to speak with families who tend to use their children as laborers without fully thinking of the consequences.

Researches must continue to study this population of young workers and to gather statistics about their on-job responsibilities and challenges, injuries and fatalities. Once armed with the facts, the researchers must speak to local congressmen, healthcare providers, and lobbying groups in order to keep child labor a top priority in America's domestic agenda.

The hard-edged pieces of the jigsaw puzzle can be smoothed out; the ill-fitting pieces can be made to fit. Through effective legislation and education, America's adolescents can contribute to the work force knowing they will be safe and protected.

APPENDIX A CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT (FLSA) FOR NONAGRICULTURAL OCCUPATIONS

Table 9 Minimum Federal age standards for nonagricultural employment

(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) (Centers for Disease Control and Prevention, 2003; NRC 1998)

Age	Employment
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 nonhazardous 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.

Table 10 Permitted occupations for workers aged 14 and 15 in nonagricultural employment (Centers for Disease Control and Prevention, 2003; NRC 1998)

Child Labor Regulation No. 3 limits the industries and occupations in which workers aged 14 and 15 may be employed.
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. Prohibited from working at tasks covered by Hazardous Orders or in occupations involving transportation, construction, warehousing, communications, and public utilities. 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.

Table 11 Hours standards for workers aged 14 and 15 in nonagricultural employment (Centers for Disease Control and Prevention, 2003; NRC 1998)

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 non-school 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. *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).

Table 12 Hazardous occupations orders for nonagricultural work (Centers for Disease Control and Prevention, 2003; NRC 1998)

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). ski resorts nor to electric and pneumatic lifts used to raise cars in garages and gasoline service stations. **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.**†,‡ 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.**†,‡ 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.

Table 12 Cont'd

HO 10.†,‡ 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

HO 11.‡ 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.†,‡ 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.†,‡ 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.† Roofing operations: bans most jobs in roofing operations including work performed on the ground and removal of the old roof.

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

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

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

APPENDIX B CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT (FLSA) FOR AGRICULTURAL OCCUPATIONS

Table 13 Minimum age requirements and hours restrictions for employment in agricultural production

(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) ((Centers for Disease Control and Prevention, 2003; NRC 1998)

AGE	Employment and Hours
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-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.

Table 14 Hazardous orders for agricultural work (Centers for Disease Control and Prevention, 2003; NRC 1998)

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.†,‡ 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.**†,‡ 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.**† 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; (b) Fork lift; (c) Potato combine; or, (d) Power-driven circular, band, or chain saw. **HO/A 4.**† 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.**† Loading, unloading, felling, bucking, or skidding timber with a butt (large end) diameter of more than 6 inches. **HO/A 6.**† 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.

Table 14 Cont'd

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). *"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.

*"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.

† 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.

‡ 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.

APPENDIX C NUMBER OF NONFATAL OCCUPATIONAL INJURIES AND ILLNESSES INVOLVING DAYS AWAY FROM WORK BY SELECTED WORKER AND CASE CHARACTERISTICS AND AGE, ALL U.S., 2005

Table 15 Raw data for the number of nonfatal occupational injuries and illnesses involving days away from work (1) by event or exposure, All U.S., private industry, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Characteristic	All ages	16 years	17 years	tot16+17
Total:	**1234680**	2780	4860	**7640**
Event or exposure:				
Contact with object, equipment	**338080**	1800	2160	**3960**
Struck by object	**167730**	1030	1200	2230
Struck against object	**85500**	590	460	1050
Caught in object, equipment, material	**54970**	160	430	590
Fall to lower level	**79310**	-	90	**90**
Fall on same level	**167180**	510	790	**1300**
Slips, trips	**36150**	-	160	**160**
Overexertion	**298130**	220	650	**870**
Overexertion in lifting	**159970**	110	420	530
Repetitive motion	**43790**	30	-	**30**
Exposed to harmful substance	**51860**	90	670	**760**
Transportation accidents	**61170**	30	100	**130**
Fires, explosions	**2600**	-	-	**0**
Assault, violent act	**21470**	-	-	**0**
by person	**14560**	-	-	**0**
by other	**6910**	-	-	**0**
All other	**134940**	80	210	**290**
				7590

(1) Days away from work include those that result in days away from work with or without job transfer or restriction.

Table 16 Raw data for the number of nonfatal occupational injuries and illnesses involving days away from work by industry sector, All U.S., private industry, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Characteristic	All ages	16 years	17 years	tot16+17
Industry sector:				
Goods producing industries (2)	**394090**	50	710	**760**
Natural resources and mining (2) , (3)	**27890**	-	260	260
Agriculture, Forestry, Fishing and Hunting (2)	**18870**	-	260	260
Mining (3)	**9020**	-	-	0
Construction	**157070**	30	260	290
Manufacturing	**209130**	20	190	210
Service providing industries	**840580**	2720	4150	**6870**
Trade, Transportation and Utilities (4)	**380720**	490	1530	2020
Wholesale Trade	**80170**	30	80	110
Retail Trade	**175880**	450	1350	1800
Transportation and Warehousing (4)	**117440**	-	100	100
Utilities	**7230**	-	-	0
Information	**20690**	-	50	50
Financial activities	**38250**	40	30	70
Finance and Insurance	**14090**	20	-	20
Real Estate and Rental and Leasing	**24150**	20	30	50
Professional and business services	**91840**	320	-	320
Professional, Scientific, and Technical Services	**24810**	-	-	0
Management of Companies and Enterprises	**9710**	-	-	0
Administrative and Support and Waste Management and Remediation Services	**57320**	310	-	310
Education and health services	**186400**	210	520	730
Educational Services	**10500**	30	20	50
Health Care and Social Assistance	**175900**	190	500	690
Leisure and hospitality	**93900**	1600	1810	3410
Arts, Entertainment, and Recreation	**18230**	80	170	250
Accommodation and Food Services	**75670**	1520	1640	3160
Other services	**28790**	50	190	240
Other Services, except Public Administration	**28790**	50	190	240
Public Administration	**-**	-	-	**7630**

Table 16 Cont'd

(2) Excludes farms with fewer than 11 employees.

(3) Data for mining (Sector 21 in the North American Industry Classification System -- United States, 2002) include establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in oil and gas extraction and related support activities. Data for mining operators in coal, metal, and nonmetal mining are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded from the coal, metal, and nonmetal mining industries. These data do not reflect the changes Occupational Safety and Health Administration made to its recordkeeping requirements effective January 1, 2002; therefore estimates for these industries are not comparable with estimates for other industries.

(4) Data for employers in railroad transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation. These data do not reflect the changes Occupational Safety and Health Administration made to its recordkeeping requirements effective January 1, 2002; therefore estimates for these industries are not comparable with estimates for other industries.

Table 17 Raw data for the number of nonfatal occupational injuries and illnesses involving days away from work by body part for 16- and 17-year-olds, All U.S., private industry, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Characteristic	16 years	17 years	16 + 17 years
Part of body affected:			
Head	90	200	**290**
Eye	40	80	120
Neck	-	20	**20**
Trunk	510	800	**1310**
Back	350	560	910
Shoulder	-	120	120
Upper extremities	1110	2100	**3210**
Finger	710	900	1610
Hand, except finger	120	520	640
Wrist	90	140	230
Lower extremities	970	1070	**2040**
Knee	240	440	680
Foot, toe	140	310	450
Body systems	-	240	**240**
Multiple	90	180	**270**
All other	-	260	**260**
			7640

Table 18 Raw data for the number of nonfatal occupational injuries and illnesses involving days away from work by source of injury, All U.S., private industry, 2005 (http://data.bls.gov/GQT/servlet/RequestData)

Characteristic Source of injury, illness	16 years	17 years	16 + 17 years
Chemicals, chemical products	20	260	**280**
Containers	790	620	**1410**
Furniture, fixtures	510	160	**670**
Machinery	140	380	**520**
Parts and materials	30	430	**460**
Worker motion or position	100	350	**450**
Floor, ground surfaces	210	810	**1020**
Handtools	320	390	**710**
Vehicles	160	310	**470**
Health care patient	20	190	**210**
All other	470	960	**1430**
			7630

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