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**Project Title:** Young Worker Fatalities and Violations of Labor and Safety Regulations: Moving Toward a Solution

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**LIST OF TERMS AND ABBREVIATIONS**

| | |
|---|---|
| CFOI | Census of Fatal Occupational Injuries |
| CLL | Child Labor Laws |
| DO | Detrimental Occupations |
| FACE | Fatality Assessment and Control Evaluation |
| FLSA | Fair Labor Standards Act |
| GAO | Government Accounting Office |
| HO | Hazardous Occupations Orders |
| IMIS | Integrated Management Information System |
| NCL | National Consumers League |
| NCWHA | North Carolina Wage and Hour Act |
| NIOSH | National Institute for Occupational Safety and Health |
| NTOF | National Traumatic Occupational Fatality Surveillance System |
| OCME | Office of the Chief Medical examiner |
| OSHA | Occupational Safety and Health Administration |
| USDOL | United States Department of Labor |
| WHB | Wage and Hour Bureau |
| WHD | Wage and Hour Division |

**ABSTRACT**

**Background and Purpose**: In recent years, enforcement of US labor regulations has been on the decline,child labor violations number in the hundreds of thousands annually, and little progress has been made in reducing the rates of young worker fatalities. Evidence shows that non-fatal injuries can occur when youth are illegally employed yet little research has looked at the relationship between fatal injuries and labor and safety violations. This study aimed to help close this knowledge gap by conducting a population level examination of the extent to which fatalities among workers under age 18 in North Carolina involved child labor violations and violations of the US Occupational Safety and Health Act. It also examined the enforcement activities in the state relative to these young workers deaths to determine if and where gaps exits, and to make recommendations for improvement.

**Methods**: This is a mixed methods study using analysis of primary source data and qualitative findings from focus groups. Using the records of the North Carolina Office of the Chief Medical examiner, cases were identified for inclusion among decedents aged 10-17 years who were fatally injured while working in a civilian setting between January 1, 1990 and December 31, 2008. Information from these case files were used to identify child labor violations. To characterize these fatalities and determine the extent to which they involved violations, we analyzed case data using descriptive statistics, and used tests of significance to determine differences among groups by demographic and employment characteristics. Investigation reports from the US and NC Departments of Labor were used to determine whether these cases were investigated, if child labor violations and/or Occupational Safety and Health Act violations were found, and what if any penalties were imposed on employers. Enforcement activities were analyzed descriptively and were supplemented by results from a focus group conducted with agency representatives to identify gaps and ways to improve enforcement to better protect young workers.

**Results:** We identified 31 work-related deaths among youth ages 11-17. All but three of the fatally injured workers were male and most were white. Over two-thirds were age 16 -17. Construction and Agriculture had the greatest number of deaths. Twenty percent of decedents were working for their parents. Vehicles and guns were responsible for the majority of deaths. Seventeen percent of the fatalities occurred after dark. Just over half involved one or more child labor violation. Of the 31 fatalities, nine were investigated by the US or NC DOL; among which four investigations identified child labor violations. Eleven cases were investigated by NC OSHA and all involved violations. Fines ranged between $200 and $12,000 across agencies. Focus group data revealed that gaps in investigations of young workers fatalities may result from complicated definitional, jurisdictional, and financial issues as well as a lack of resources within the agencies needed to fully carry out their enforcement mandates. During the study, investigators were asked to testify before the North Carolina state legislature and present the findings of this study. The legislature was considering bills to increase penalties for child labor violations and fines for OSHA violations that involve workers under the age of 18. Our testimony, in which we presented study findings, was among the inputs into the process which led the legislature to pass new laws protecting workers under age 18.

**Project Title:** Young Worker Fatalities and Violations of Labor and Safety Regulations: Moving Toward a Solution

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## SIGNIFICANT (KEY) FINDINGS

Below are the most important results of this study organized by study aim. These and other findings are elaborated on in our Scientific Report.

**Aim 1: To identify the extent to which violations of child labor laws and/or safety standards are associated with adolescent occupational fatalities by describing all agricultural and non-agricultural occupational fatalities in North Carolina among persons ages 10-17 from 1990-2007 with respect to demographic and employment characteristics, manner and cause of death, circumstances of the injury event and whether or not a child labor and/or safety standard violation was implicated in the death.**

- There remains a need to improve the safety of adolescent workplaces. Although the number of young worker deaths has been dropping in North Carolina, with annual averages decreasing from 2.9 during the 1980-1989 period to 1.6 per year in the current period (1990-2008) the 31 deaths identified in this study demonstrate that youth continue to be are at risk of fatal injury.
- Ethnic disparities exist among young worker fatalities. Hispanic youth made up the second largest proportion of fatalities, yet they represented a much smaller proportion of all North Carolina workers under 18, which is consistent with prior studies of young workers fatalities. Many youth who work for their families are dying of work-related injuries as are youth who are working alone, without any supervision.
- Child labor violations are common in young worker fatality cases. More than half of the fatalities occurring in the 19 year period studied involved activities that were prohibited by the child labor laws and/or OSHA health and safety standards. The high incidence of safety violations, whether directly linked to young worker deaths or not, indicates that youth are working in dangerous environments that pose threats to their safety and that improvements in employer compliance with laws and regulations is needed. Among the investigations conducted by US and/or NC DOL, 58% revealed some violation of either the child labor laws or OSHA health and safety standards.

**Aim 2: To understand the extent and nature of involvement by state health and safety enforcement authorities and federal or state child labor enforcement authorities in the identified fatality cases.**

- The extent of fatality investigations is lacking as many young worker deaths are not investigated by the state and federal agencies responsible for child labor and OSHA enforcement.

**Aim 3: To identify current challenges in enforcement and develop strategies to overcome these challenges.**

- It is questionable whether the current enforcement mechanisms have the capacity to urge employer compliance as deficits in enforcement activities are fueled by diminished enforcement agency resources, including budget cuts and personnel shortages, and inadequate penalty assessments.
- Complicated definitional and jurisdictional issues can preclude an agency from investigating a fatality. For example, the way each agency defines “work-related” can affect whether or not they have investigative authority. With OSHA, inspections of workplace violence and highway incidents are limited because these incidents fall under the jurisdiction of law enforcement. These technicalities inhibit enforcement.
- Fines collected for violations are so small that it is questionable as to whether they provide the proper compliance incentive for employers. Initial fines may be substantial but are typically reduced for such things as employer cooperation with the investigation (“good faith”) and for not having a prior violation history, which may reduce their power to urge employer compliance.

## TRANSLATION OF FINDINGS

Through this study we characterized young worker fatalities in a more complete manner than is typically allowed by existing surveillance systems, thus, the results of this study will allow for the development of new targeted interventions and enforcement activities to prevent cases of young worker deaths. For example, we have learned that many fatalities occur in family owned businesses. Intervening with small family business to help parents understand the safety risks their children fact on the job, develop safer work practices, and the child labor laws that are applicable to them, will help reduce injury to their employed children. We also learned

that fatalities often happen when youth are working alone which suggests there is a need for employers to understand the importance of providing adequate supervision. These results support the need for the development of resources to educate employers, parents, and youth on the importance of supervision to prevent injury and death at work and how to provide it. We also learned that Hispanics are more likely than other ethnic groups to suffer work-related fatalities. These findings support the development of interventions targeting both Hispanic youth and employers who tend to hire these workers in order to reduce the disproportionate fatality burden suffered by Latino adolescent workers.

Our finding that more than half of all fatality cases involve a child labor violation is perhaps the most significant of this study. These findings should be seen by state and local enforcement officials as indicators that employers are not complying with the child labor laws and as a result children are dying from work-injuries that could be prevented by following the law. These findings can be used by enforcement officials, legislators and advocates to justify increases in enforcement agency resources that will allow them to increase their activities - both inspections and educational campaigns – to affect a reduction in the number of deaths due to violations.

The most innovative aspect of this work involved understanding the level of enforcement of child labor laws and OSHA regulations and challenges faced by enforcement agencies. Our findings have been prepared in a report and distributed to representatives at the US and NC Departments of Labor. In our report we argued that to further enhance existing enforcement mechanisms so they have the potential to more effectively *prevent* young worker deaths involving violations, consideration should be given to the following:

1. Because jurisdictional rules are complex, and each agency has different definitions of work-related and rules for reporting and investigating fatalities, the examination of patterns of injury and opportunities for prevention can easily be overlooked. Consideration should be given to aligning relevant definitions and rules across state and federal government agencies responsible for young worker health and safety.
2. Limitations exist in the ability of the state to enforce the laws due to staffing shortages and a failure to invest adequately in enforcement using both federal and state resources. Consideration should be given to increasing funding for these agencies to support their enforcement activities.
3. To ensure that penalties provide adequate incentives for employer compliance, penalties for violating OSHA standards and the child labor laws need to be of sufficient magnitude.
4. Efforts to prevent violations through education and training of employers could be enhanced and should rely on careful coordination among groups with different jurisdictional authority regarding young worker safety (e.g., transportation, schools, employers, OSHA, wage and hour division). Though educational strategies alone cannot be relied upon, they are an important adjunct to regulatory approaches.

**OUTCOMES/ IMPACT**

**Potential Outcomes:** As mentioned above, targeted interventions with specific types of employers and youth, if implemented, could produce a reduction in young worker risks and subsequent fatal injuries among Hispanic youth and youth who work for their families. Educational campaigns on the importance of supervising adolescent workers properly, if implemented, could help prepare supervisors on how youth should be supervised, which in turn would create a safer work environment and reduce the risk of injury and death. Lastly, if our recommendations relative to enforcement of the labor and safety laws were implemented, agencies would be better equipped to conduct adequate surveillance that would better ensure that youth are employed in safer workplaces in which their risk of injury and death is significantly diminished.

**Intermediate Outcomes**: During the study, investigators were asked to testify before the NC legislature and present study findings. The legislature was considering increasing fines for child labor violations and OSHA violations that involve workers under the age of 18. Our testimony was among the inputs into the process which led the legislature to increase both penalties, thereby helping to better protect workers under age 18.

**End Outcomes:**We cannot point to documented reductions in young worker fatalities directly due to our study, yet, given the impact this work has had on child labor and OSHA policy in NC, we feel there is strong potential for this study to impact a reduction in the number of young worker fatalities in the state in the coming years.

## SCIENTIFIC REPORT

## Background

### *Overview*

Despite numerous safety regulations, and child labor laws meant to protect minors from dangerous working conditions, one worker under the age of 18 dies every five days in the US from a preventable work-related injury (1). In recent decades, little progress has been made to significantly reduce adolescent worker fatality rates (2-5). At the same time, active enforcement of labor and safety regulations has generally been on the decline (6-11). Inspections by the Occupational Health and Safety Administration (OSHA), under the US Department of Labor (USDOL), declined by 14% between 1992-2000 but have risen slightly since, and the number of child labor inspections by the USDOL's Wage and Hour Division (USWHD) began its current decline in the mid-1990s (6-10). Simultaneously, there has been a rise in compliance assistance activities at these agencies (7, 12, 13), which has come under scrutiny from safety advocates (7, 14) and government officials (8). A particularly salient criticism came in 2002 from the US Government Accounting Office (USGAO), saying of the USDOL, "its efforts to improve employer compliance suffer from limitations that hamper its enforcement of the law" ((8), p. 33). Hundreds of thousands of US youth are employed illegally every year (6, 15-17), often exposing them to dangerous working conditions that put them at risk of work-related injury. What we don't know, and what this study has addressed, is the relationship between these violations and adolescent occupational injuries and how the current enforcement environment impacts this relationship.

### Adolescent Occupational Fatalities

### *Extent and Nature*

According to the National Institute for Occupational Safety and Health (NIOSH), approximately 70 workers under 18 die every year (18). Between, 1992 and 2000, 63-73 workers under 18 died each year between 1992 and 2000, totaling 613 fatalities during the period (19). Over 89% of those who died were males; 74% were white, and 61% were 16 or 17 years old. These data also showed that Hispanic youth made up the second largest proportion (16%) of fatalities in the period, while they represented a much smaller proportion of workers under 18. Three-fourths of the deaths of workers under 18 are concentrated in three industries: agriculture, construction and retail trade (19). Work in retail often involves the exchange of cash, a risk factor for robbery and worker assaults (20-24). Robberies are responsible for 25-50% of all youth fatalities in retail (25). In construction, falls and electrocutions are leading causes of youth fatalities (26). Overall, transportation incidents are the most common cause of young worker fatalities (19). Among youth, homicides were slightly more common than highway incidents as the leading cause of death at work (25). Though highway incidents continue to be the leading cause of occupational death for adults, a larger proportion of vehicle-related incidents occurring on farms, industrial premises or in parking lots involved young workers (25).

Dunn and Runyan's prior study of adolescent fatalities in North Carolina, which this study extended, documented 71 work-related deaths among youth 11-19 years old during the period of 1980-89 (27), 29 of which were among youth under age 18. Nearly 80% of all decedents were white and more males than females were identified. Agriculture was the industry in which most fatalities occurred. This study by Dunn and Runyan is one of very few that have documented the relationship between child labor violations and young worker fatalities. They found that 86% of the deaths to workers under age 18 involved activities that appeared to violate federal child labor laws (27). Most of which involved the use of motorized vehicles. Suruda's national study of young construction workers, found that among the deaths to those under 18, nearly half were due to apparent child labor violations (28). This study was based on OSHA investigation data yet the relationship between the fatalities and violations of OSHA standards was not explored. It did report, however, that the employers of fatally injured teens compared to those of fatally injured adults, were more likely to have been cited for an OSHA violation.

### *Data and Surveillance*

Existing national surveillance systems (i.e., Census of Fatal Occupational Injuries, the National Traumatic Occupational Fatality Surveillance System (NTOF)), use death certificates, medical examiner reports, workers' compensation data, and hospital records to document worker fatalities. These systems are limited is in their ability to recognize adolescent deaths as work-related. Because youth are not often thought of as "workers"

many work-related deaths among them go undetected (3). Often data sources list "student" as the occupation of teenage decedents' (27). The problem of detection is particularly acute for youth working for their families, especially in farming (3). Other limitations in detecting young worker fatalities, specific to each surveillance systems include: NTOF's sole reliance on death certificates, which are estimated to miss 20% of all occupational fatalities (3), and its non-reporting of fatalities to workers under 16--systematically excluding a substantial proportion of working youth (29, 30); the structure of the NIOSH Fatality Assessment and Control Evaluation (FACE) program, which investigates only a subset of causes (i.e., confined spaces, electrocutions) leaving many deaths among youth unexamined; and finally, the multiple challenges that exist within IMIS. The IMIS system, which is run by OSHA, reports only on the deaths the agency has investigated, which is estimated to be about 30% of all occupational fatalities (3). In addition, it does not investigate most transportation related fatalities on public roads or workplace homicides, both of which are common causes of young worker fatalities (19, 25).

**The Child Labor Laws**

Most of the child labor laws in place today are rooted in the Fair Labor Standards Act (FLSA) of 1938 (12, 31), which covers employers engaged in interstate commerce but not those with annual gross sales incomes of <$500,000, nor certain family owned enterprises (32). The FLSA regulates youth employment by limiting the hours minors may work and the types of jobs they may perform. The Act limits the types of jobs teens may hold through its Hazardous Occupations Orders (HO), which designates particular jobs as too dangerous for workers under a certain age. For non-agricultural work, there are 17 HOs that apply to workers under age 18, and for agricultural work there are eleven that apply to workers under age 16 (32). Neither agricultural workers over age 16 nor those who work on family owned farms are covered under the FLSA (33). In addition to the HOs, the Act sets forth eleven non-agricultural "occupational standards" and ten "special provisions" that designate certain jobs in retail, and food and gasoline service establishments, as too dangerous for workers under 16 (32). While such jobs as babysitting and yard work are allowed, most formal jobs are prohibited for anyone under age 14. The FSLA also restricts the hours of work for 14- and 15-year-olds, which differ depending on the time of year. In addition to limiting the number of hours a teen can work in a week, the FLSA prohibits 14- and 15-year-olds from working between the hours of 7am and 7pm during the school year and 7 a.m. and 9 p.m. in summer (32) (referred to as "nightwork"). The limits for 16- and 17-year-olds are set by states and vary widely.

In North Carolina, youth employment is regulated by the FLSA and the state's own child labor laws enacted under the 1979 North Carolina Wage and Hour Act (NCWHA), which covers most employers in the state (agricultural, governmental and domestic employers excluded) (34). In addition to incorporating the FLSA's Hazardous Orders, the NCWHA designates nine additional non-agricultural "Detrimental Occupations" (DO) too dangerous for workers under age 18 (34). The NCWHA also limits the hours youth may devote to work, prohibiting anyone under the age of 18 from working between 11 p.m. and 5 a.m. when there is school the next day (34).

***Enforcement***

The federal child labor laws are enforced by the USWHD (12) while the North Carolina child labor laws are enforced by the NC Department of Labor's Wage and Hour Bureau (NCWHB). The federal enforcement strategy employed by the USWHD is to combine targeted enforcement, increased employer compliance through education and outreach, strong partnerships, and heightened public awareness of the child labor laws (12). To further enhance enforcement at the federal and state levels, the USWHD has ongoing partnerships with state departments of labor to promote coordinated enforcement and educational outreach (12). Since the mid 1990s, however, there has been a significant and increasing shift at both the state and federal levels away from active enforcement toward greater employer compliance assistance. The percent of man-hours spent on child labor investigations went from 11% in 1990 to 7% in 2001(8). The following year, the USGAO put out a report in which it criticized the increasing focus on compliance assistance at the USWHD, saying of the Division, "its efforts to improve employer compliance suffer from limitations that hamper its enforcement of the law" (p. 33) (8). Since this report was issued, the Division has continued to decrease its child labor investigations and increased its focus on compliance assistance. The amount of time it spent on compliance assistance went from 1,314 hours in 2001 to 6,815 hours in 2005, an approximate 400% increase (7) with the greatest increase occurring between 2004 and 2005. In 2005, the USWHD carried out only 1,784

investigations - the lowest number of annual investigations the Division carried out in the past ten years (7).

The situation in North Carolina has been much the same. According to a Deputy Administrator at the NCWHB (35), in 2001, the newly elected (and current) Commissioner of Labor charged the Bureau with emphasizing "outreach and training" to employers and since, investigations have gone down. Data given to us by the NCWHB show that the number of its annual investigations went from 303 in 2001 to 125 in 2007. The Deputy Administrator also commented that the Bureau is understaffed, with only 14 field officers to oversee all employment in the state covered by the NCWHA (not just its child labor provisions).

### *Violations*

In 2003, the USWHD identified 7,228 minors employed in violation of the FLSA (15). The same year, a survey of state labor departments carried out by the National Consumers League (NCL) identified 4,755 minors (in 30 states) illegally employed (6). Using multiple data sources, Kruse and Mahoney estimate that as many as 295,800 15- to 17-year-olds (in non-agricultural industries) are illegally employed annually (16). Rauscher et al.'s, analysis of child labor violations among national sample of retail and service sector workers (17) showed that over one-third of those under age 18 reported using at least one piece of federally prohibited equipment, 11% reported a federal nightwork violation, and 39% did not have the required work permits.

Child labor violations occur mainly in trade industries with smaller yet substantial percentages occurring in services, manufacturing and construction (8, 16, 36) The USGAO reports reports that Hispanic youth, non-US citizens, adolescents from low income families, and males are all more likely to be illegally employed (8, 16). Kruse and Mahoney (2000) reported similar findings among non-US citizens but found that white non-Hispanics were most likely to be illegally employed. Rauscher et al.'s study (17), which looked at the activities of workers in 2003, showed that racial differences existed with respect to hour violations only, with minorities being more likely to work outside these limits than whites.

Data provided to us by the NCWHB show that during 2001-2007, they found 938 child labor violations, mostly in eating and drinking places (75%) that involved 4,258 youth, the majority of which were 16 or 17 years old (82%). The NCWHB does not collect data on the sex, race, or ethnicity of illegally employed youth. The data provide do not distinguish between HO or nightwork violations but when young North Carolina construction workers were surveyed directly about using equipment or performing tasks that are prohibited under the FLSA, Runyan et al.'s previous research found that as many as 84% of 16- and 17-year-olds performed one or more such tasks and that 47% had performed three or more (36).

## Occupational Health and Safety Regulations

In 1970, the US Congress passed the Occupational Safety and Health Act, under which OSHA was created. OSHA is responsible for promulgating and enforcing workplace health and safety standards. In North Carolina standards are set and enforced under a "state plan" approved and monitored by OSHA. The North Carolina state plan is operated by the NC Department of Labor's (NCDOL) Division of Occupational Safety and Health (NCDOSH).

### *Enforcement and Violations*

In addition to conducting general schedule inspections of randomly selected firms, the NCDOSH carries out health and safety inspections based on worker complaints and does targeted inspections based on work-related fatality and injury data. Unlike with the NCWHB, NCDOSH has the authority to enter any North Carolina workplace and does so without giving advance warning. The Division also conducts follow-up inspections of firms cited for violations to see if recommendations have been carried out (37). NCDOSH carries out approximately 5,500 inspections annually, although this number has gone down in recent years, (37) NCDOSH is the only agency charged with carrying out investigations of work-place fatalities. In 2006, it carried out 91 such investigations, up from 72 in 2005. According to a recent report put out by the NCDOSH, the Division cited 12,412 violations in 2006. This was a 4% increase from 2005 and a 2% increase from 2004. From 2004 to 2006, the number of violations per inspection and the number of "serious" violations increased in each year. Because NCDOSH standards apply to workers of all ages, it is not possible to know how many young workers, specifically, may have been affected by these violations.

## Specific Aims

The specific aims of this study were as follows:

**Aim 1:** To identify the extent to which violations of child labor laws and/or safety standards are associated with adolescent occupational fatalities by describing all agricultural and non-agricultural occupational fatalities in North Carolina among persons ages 10-17 from 1990-2007 with respect to demographic and employment characteristics, manner and cause of death, circumstances of the injury event and whether or not a child labor and/or safety standard violation was implicated in the death.

**Aim 2:** To understand the extent and nature of involvement by state health and safety enforcement authorities and federal or state child labor enforcement authorities in the identified fatality cases.

**Aim 3:** To identify current challenges in enforcement and develop strategies to overcome these challenges.

## Methodology

### *Data Collection*

Case Definition*:* Cases eligible for inclusion in the study were youth ages 10-17 who were fatally injured while working in a civilian setting in North Carolina during the period of January 1, 1990 through December 31, 2008, excluding suicides. Using the Work Related Injury Statistics Query System's "Operational Guidelines for Determination of Injury at Work" (38), we defined a "work-related" injury as one that either, 1) occurred on employer premises while the decedent was engaged in a work activity or while on his/her break, or 2) occurred off employer premises while the decedent was engaged in a work activity such as traveling to and from jobsites or transporting materials or where a vehicle is considered the work environment (e.g., truck driver), or 3) occurred while the decedent was working in a family business including on a family farm doing tasks that are in support of a profit-driven enterprise.

Data Source*:* The primary data source used to identify cases was the records of the North Carolina Office of the Chief Medical Examiner (OCME). By state law, all deaths that are unattended, suspicious, or the result of trauma (homicide, suicide, and "accident") are investigated and certified by the system. Included in all case files is the Report of Investigation by Medical Examiner in which MEs record many details (particularly in the narrative portion) about the decedent and the fatal event. In addition to a work-relatedness item, other data specific to our research aims are contained in this report including the date, time, and location of the injury event, the activity of decedent at the time of injury, the decedent's occupation, and employer's name. MEs also complete a Medical Examiner's Death Certificate that is filed within the state's vital statistics system. Case files also contain a toxicology report and if homicides or highway related, autopsies, and police reports. All of these data were used to achieve the aims of this study.

Case Ascertainment*:* Cases were ascertained by first identifying all cases that met our inclusion criteria and were coded in the OCME electronic database as occurring "on-the-job." We then manually reviewed the case files (n=3618) for all non-suicide deaths among youth ages 10-17 during the study period to identify work-related cases that were not coded as such by the OCME. Once all deaths meeting the study criteria were identified, variables of interest were extracted from the OCME database and the case file documents including the Report of Investigation by the Medical Examiner, death certificate and any additional documents with pertinent information regarding the death (e.g., police or autopsy reports).

Coding Child Labor and OSHA Violations: We investigated six areas of the child labor laws at the state and federal level described below. When determining if a violation occurred we used the applicable state and/or federal laws in place at the time of the fatal injury (33, 39-44). Violations of the prohibited jobs/tasks were determined based on independent reviews of each case file by three study team members and were also informed by the enforcement agencies' investigation reports, when available.

*Minimum Age to Work.* The minimum age at which a person can work in both the agricultural and non-agricultural industries is set by federal law at age 14(39, 40). This restriction does not apply when a youth is employed by a parent in agriculture, when a parent gives permission for their child to work for someone else in agriculture or when a youth is employed by a parent outside agriculture (39, 40). We coded a "minimum age to work" violation when the decedent was under age 14 and was not working for a parent at the time of the fatal

injury, or if investigation records indicated the youth under age 14 was working in agriculture but did not have parental permission to do so.

*Hours of Work.* The hours during which minors are allowed to work are determined by state or federal law and are based on the industry in which one works, worker age and the time of year. For non-agricultural work, the allowable hours of work for youth ages 14-15 are set by federal law and are 7am till 7pm during the school year, and 7am till 9pm during the summer (40). The allowable work hours for 16- and 17-year olds are set by the state. In North Carolina, these are 5am till 11pm, during the school year, with no summer restrictions(34). For agricultural work, federal law allows youth under age 16 to work any time of day except during school hours, yet youth who work for their parent(s) have no time restrictions. There are also no time restrictions for those who are over age 16(39). North Carolina laws do not restrict agricultural work hours for youth of any age when employed by their parents(34). We coded a violation when the fatal injury occurred outside of the hours during which the decedent was allowed to work, based on his/her age at the time of injury, the industry in which s/he was working, and whether s/he was working for a parent.

*Non-agricultural Hazardous Occupations Order*s. There are 17 Hazardous Occupations Orders(HOs) set by federal law that prohibit youth under age 18 from performing dangerous jobs or tasks in a non-agricultural setting (e.g., driving a motor vehicle, roofing, mining)(40). These prohibitions apply even if a youth is employed by a parent. We coded a violation when the decedent was under age 18 at the time of the fatal injury and the activity in which s/he was engaged was prohibited by the HOs.

*Agricultural Hazardous Occupations Orders*. There are 11 Agricultural Hazardous Occupations Orders(AHO) set by federal law that prohibit youth under age 16 from performing dangerous jobs or tasks in agricultural settings (e.g., applying pesticides, riding on a tractor)(39). Youth are not prohibited from these jobs, however, when they work for a parent. We coded a violation when the decedent was under age 16 when injured, was not working for his/her parent, and was engaged in an activity that is prohibited by the AHOs.

*Non-agricultural Occupational Standards/Special Provisions.* In addition to the HOs, there are 23 occupational standards and special provisions in the child labor laws that prohibit youth under age 16 from performing dangerous jobs or tasks in a non-agricultural setting (e.g., construction, baking)(40). These jobs are prohibited regardless of whether a youth is employed by a parent. We coded a violation when the activity in which the decedent was engaged at the time of the fatal injury was prohibited by these standards and the decedent was under age 16 when the injury occurred.

*North Carolina Detrimental Occupations.* There are nine Detrimental Occupations (DO) set by North Carolina state law that prohibit youth under the age of 18working in non-agricultural settings from performing dangerous jobs and tasks (e.g., welding, work in confined spaces) (34). These jobs are prohibited regardless of whether a youth is employed by a parent. We coded a violation when the decedent was under age 18 at the time of the fatal injury and s/he was performing and activity prohibited by the DOs.

*OSHA Violations*: As it was impossible to determine whether a fatality involved a violation of OSHA standards based on a review of the case file, we relied on the NCDOSH's investigation reports to determine if OSHA violations were involved. We coded a case as involving a violation whenever a violation was cited in a NCDOSH investigation report. If a case was not investigated, the determination as to whether a violation occurred was coded as "unknown." These reports were also used to determine whether one or more of the cited violations were noted as contributing to the young worker's death.

Investigations of Child Labor and Safety Standard Violations: The NCWHB, the USWHD, and the NCDOSH investigation reports are public record. To ascertain if a fatality was investigated by these agencies, the PI contacted each agency to find out whether or not an investigation was carried out and if so, she requested a copy of the investigation report. These investigation reports were thoroughly analyzed to code, whether or not an investigation took place, by whom, if violations were detected including if there was no work permit on file, or any other wage and hour violations, the amounts of monetary penalties assessed and paid if any, the action that prompted each investigation (i.e. complaint, interagency referral, required investigation), the follow up activities carried out by the investigating agencies, if any, the complaint and/or violation histories of the employers involved in the identified fatality cases, if any, and lastly, what actions were taken by enforcement agencies when past violations were detected and what were the results of these actions.

Enforcement Challenges and Developing Solutions: Upon compiling the findings derived from Aims 1 and 2, a draft report was created and a meeting with 5 enforcement officials across US and NC DOLs was held in which we presented and discussed the findings. This meeting served as the forum for our focus group, led by the PI with support from Co-investigator Runyan. Through this focus group we elicited participants' interpretation of our study findings, and obtained their views on the challenges of enforcement and on how to overcome these challenges to improve the enforcement process. Our original intention was to also conduct key informant interviews with enforcement agency field officers to elicit *their* views on the same topics covered in the focus group, however, we were unable to do that as high level officials at the DOLs reversed their earlier support of this activity and would not allow us to talk to field officers.

### *Data Analysis*

Quantitative Data Analysis: We used descriptive statistics to analyze the case characteristics of the fatalities as well as the frequency and distribution of the types of violations (child labor and OSHA) among the cases. Chi square test of significance and ANOVA were used to test for significant differences across groups. We also used descriptive statistics to analyze the percent of cases that were investigated by the respective enforcement agencies, whether these investigations identified violations, if penalties were assessed and how much was collected.

Qualitative Data Analysis: Notes from the focus group with enforcement officials were analyzed to identify common themes that arose in the discussion of challenges and barriers to enforcing the child labor laws and OSHA regulations.

## Results & Discussion by Aim

**Aim 1: To identify the extent to which violations of child labor laws and/or safety standards are associated with adolescent occupational fatalities by describing all agricultural and non-agricultural occupational fatalities in North Carolina among persons ages 10-17 from 1990-2007 with respect to demographic and employment characteristics, manner and cause of death, circumstances of the injury event and whether or not a child labor and/or safety standard violation was implicated in the death.**

### *Findings*

Sample Characteristics: We identified twenty eight cases that met the study criteria using the OCME database and found three additional cases through manual reviews of case files for a total of 31 cases of workers ages 11-17 who died from work-related injuries during the period of January 1, 1990 to December 31, 2008. The number per year ranged from zero to four, with a mean of 1.6. The majority of fatalities occurred between 1990 and 1999, with one per year between 2000 and 2007 and none in either 2004 or 2008. Table 1 below shows decedents' personal and employment demographics, manner and means of death, time and season of injury and other select characteristics for all cases. Age is categorized into two groups (11-15 and 16-17) following the delineations in the child labor laws, which allow 16- and 17-year-olds to perform a greater variety of jobs (45). All but three of the fatally injured young workers were male and the majority was white. Over two-thirds were 16 or 17 years of age and none was under age 11. Construction (NAICS 22) and Agriculture, Forestry, Fishing & Hunting (NAICS 11) were the industries in which the greatest number of deaths occurred. The proportion of young worker deaths in the construction industry decreased over the study period, with no deaths occurring in construction since 2004. Conversely, the proportion of deaths in retail (third most common), increased between 1995 and 2008. We were able to determine ownership of the company for which the injured youth worked for all but one case and found that six (20%) involved youth who were working for their parent(s).

Manner and Means of Death: Twenty eight cases were classified by OCME as accidents and three as homicides (Table 1). Vehicles were responsible for the largest number of young worker deaths (n=13); seven of which occurred between 1990 and 1994 alone. Of all vehicle-related deaths, four involved tractors, three pickup trucks, two trucks with more than two axles, two passenger cars, one skid steel loader, and one boat. Five of those killed by vehicles were pedestrians, four were drivers, and four were passengers riding on the outside of the vehicle. Guns were responsible for the second largest number of deaths (n=5) with three youth having been shot with handguns and two with long guns (i.e., rifle, shotgun). Four young workers died as the result of falls; all of which occurred between 1990 and 1999. One fell over 1500 feet from a radio tower while

others fell distances of between 20 and 40 feet. Four youth died by electrocution, all but one of whom was working with electrical equipment or tools (e.g., drills, switches) when fatally injured. The fourth was baling hay in a barn and stepped on a wet electrical cord. All deaths attributable to electrocution occurred in the five years between 1990 and 1994. Of the two young workers killed by instruments or machinery, one was struck in the head by a falling tree and the other became fully entangled in a wood mulching machine. Among the three remaining deaths listed as "other," one was a camp counselor who drowned in a lake after his canoe capsized, one was struck by lightning in a tobacco field, and one suffocated when buried with a load of cotton in a trailer.

Season and Time of Injury**:** Nearly equal numbers of youth died during summer months (June-August) as died during months when school was in session (September-May) (Table 1). However, at 5.3 per month, the rate of deaths during the summer was higher compared to the school year during which 1.7 deaths occurred per month. Among the 30 cases for which time of day could be determined, almost half occurred between 1:00pm–7:59pm and the fewest number (n=5) occurred between 8:00pm–12:30am. Based on the date and time of the injury event, we estimate that 5 (16.7%) of these injuries occurred after dark.

Working Alone and Workplace Violence**:** We were able to assess if decedents were working alone or in the presence of others when injured in 28 cases, among which ten (35.7%) involved youth who were working completely alone. Workplace violence was responsible for three fatalities. Two of these three homicides were committed during robberies and in one robbery case, the youth was working alone at the time of the incident. The third homicide was the result of a drive-by shooting at the convenience store where the decedent worked. These results are shown in Table 1.

Differences by Demographic and Employment Characteristics*:* Differences by sex, age group and race/ethnicity appear in Table 2 below. Slightly less than half of all males were killed in incidents involving vehicles and only males were found to have been working alone. Decedents in the older age group (16-17) were the only ones to be killed in incidents involving falls or instruments/ machinery. Among the older decedents, the largest proportion of deaths occurred between 1:00pm and 7:59pm, while among the younger decedents, the largest proportion occurred between 7:00am and 12:59pm.

Differences by industry appear in Table 3. Just over half of all deaths in Agriculture involved incidents with vehicles (n=5) while in Retail, over two-thirds of deaths were attributable to guns (n=4). In construction, vehicles and falls were responsible for the majority of young worker deaths (n=8). There were few differences with respect to season; however time of injury varied markedly by industry. Over half of the deaths in agriculture occurred between 7:00am and 12:59pm (n=5), more than three-fourths of those in construction occurred between 1:00pm and 7:59pm (n=8), and two-thirds of those in retail occurred after 8:00pm (n=4). The two youth who worked in manufacturing were each working alone at the time they were injured as were half of those working in construction. Two-thirds of the youth working in retail were working after dark (n=4). In two-thirds of the cases where youth were working for their parents, guns were involved (n=6). All three cases of workplace violence involved youth working for their parents in convenience stores.

Among those youth who worked for their parents, twice as many died in the summer (n=4) than died during the school year (n=2). Half of all decedents who worked for their parents were killed during the late evening hours between 8:00pm and 12:30am (n=3). Data not shown in table.

Child Labor Violations: Fifty-two percent of the fatalities (16 cases) involved one or more child labor violation. Among these, three cases involved a violation of the federal minimum age for employment and 13(42%) involved a job/task prohibited by the federal Hazardous Occupations Orders or the "Regulation 3" restrictions. Most cases involved only one suspected violation, however one case had two and another had three violations. While there was a range of job/task violations, the most common were operating motor vehicles (five cases) and roofing (four cases) (see Table 4).No cases involved a violation of North Carolina hour or task restrictions or the federal Agricultural Hazardous Orders.Among the 16 cases that we identified as involving a child labor violation, the North Carolina DOL investigation records confirmed our determinations in four cases. We could not confirm if a violation occurred in the other 12 cases because they were either never investigated by the DOL (6 cases), or the cases were investigated but the files had been destroyed (6 cases).

Though not statistically significant, a higher proportion of fatalities among youth ages 16 or 17 (55%) involved a violation (any type) compared to those between the ages of 11 and 15 (45%).Comparing by ethnicity, 67% of Hispanic decedents, 55% of white decedents and 33% of African-American decedents, were working in

violation the child labor laws. Half of the male deaths (14 of 28) and two of three female deaths involved violations. The largest proportion of fatalities involving child labor violations occurred in the manufacturing and construction industries. Laborers and roofers had the largest proportions of fatalities involving violations (see Table 5. below). Among those working in non-agricultural settings, the proportion of fatalities involving a violation was far smaller among those who worked in their parents' business, compared to those who worked in businesses not owned by their parents (20% vs.75% respectively).

OSHA Violations: Among the 11 cases (35%) that were investigated, all investigations found 1 or more OSHA violation (Table 6).The number of violations found in each investigation ranged from 1 to 33. The majority of violations found were of the General Industry standards (47 violations) and the Construction standards (32 violations). Within the General Industry standards, Electrical standards (13 violations) were the most frequently violated. Within Construction standards, Electrical and Fall (12 and 11 violations, respectively) standards were the most frequently violated. It is important to note that these are violations found at the worksite where the fatality occurred and are not all necessarily contributors to the young worker deaths.

Aim1 Tables:

**Table 1. Characteristics of Work-related Fatalities among North Carolina Youth Ages 11-17 (1990-2008)**

| Characteristics | Number | Percent |
|---|---|---|
| **All** | 31 | 100 |
| **Age** | | |
| 11-13 | 4 | 12.9 |
| 14-15 | 7 | 22.6 |
| 16-17 | 20 | 64.5 |
| **Sex** | | |
| Males | 28 | 90.3 |
| Females | 3 | 9.7 |
| **Race** | | |
| Asian | 2 | 6.5 |
| Black (non-Hispanic) | 3 | 9.7 |
| Hispanic | 6 | 19.4 |
| White (non-Hispanic) | 20 | 64.5 |
| **Worked for parent(s)** | 6 | 20.0 |
| **Industry** | | |
| Construction (NAICS 22) | 11 | 35.5 |
| Agriculture, Forestry, Fishing & Hunting (NAICS 11) | 9 | 29.0 |
| Retail Trade (NAICS 44-45) | 6 | 19.3 |
| Manufacturing (NAICS 31-33) | 2 | 6.5 |
| Transportation and Warehousing (NAICS 48) | 1 | 3.2 |
| Other | 2 | 6.5 |
| **Manner** | | |
| "Accident" | 28 | 90.3 |
| Homicide | 3 | 9.7 |
| **Means** | | |
| Vehicles | 13 | 41.9 |
| Guns | 5 | 16.1 |
| Falls | 4 | 12.9 |
| Electricity | 4 | 12.9 |
| Instruments/machinery | 2 | 6.5 |
| Other | 3 | 9.7 |

| | | |
|---|---|---|
| **Time of Year[a]** | | |
| Summer | 16 | 51.6 |
| School year | 15 | 48.4 |
| **Time of Day[b]** | | |
| 7:00am - 12:59pm | 11 | 36.7 |
| 1:00pm - 7:59pm | 14 | 46.7 |
| 8:00pm - 12:30am | 5 | 16.7 |
| **Working Alone[c]** | 10 | 35.7 |
| **Working After Dark** | 5 | 16.7 |
| **Workplace Violence** | 3 | 9.7 |

[a] Summer = June-August (3 months), School year = September-May (9 months).
[b] Time of day could be determined for only 30 cases.
[c]Working alone could be determined for only 28 cases.

**Table 2. Characteristics of Work-related Fatalities among North Carolina Youth Ages 11-17 by Sex, Age Group and Race/ Ethnicity (1990-2008)**

| | Number (Percent) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Sex | | Age Group | | Race/Ethnicity^ | | | |
| | Males (n=28) | Females (n=3) | 11-15 (n=11) | 16-17 (n=20) | White (n=20) | Hispanic (n=6) | Black (n=3) | Asian (n=2) |
| **Means** | | | | | | | | |
| Vehicles | 12 (42.9) | 1 (33.3) | 5 (45.5) | 8 (40.0) | 9 (45.0) | 3 (50.0) | 1 (33.3) | 0 |
| Guns | 4 (14.2) | 1 (33.3) | 2 (18.2) | 3 (15.0) | 3 (15.0) | 0 | 0 | 2 (100) |
| Falls | 4 (14.3) | 0 | 0 | 4 (20.0) | 2 (10.0) | 1 (16.7) | 1 (33.3) | 0 |
| Electricity | 4 (14.3) | 0 | 1 (9.1) | 3 (15.0) | 4 (20.0) | 0 | 0 | 0 |
| Instruments/machinery | 2 (7.1) | 0 | 0 | 2 (10.0) | 1 (5.0) | 1 (16.7) | 0 | 0 |
| Other | 2 (7.1) | 1 (33.3) | 3 (27.3) | 0 | 1 (5.0) | 1 (16.7) | 1 (33.3) | 0 |
| **Time of Year[a]** | | | | | | | | |
| Summer | 14 (50.0) | 2 (66.7) | 7 (63.6) | 9 (45.0) | 12 (60.0) | 2 (33.3) | 0 | 2 (100) |
| School year | 14 (50.0) | 1 (33.3) | 4 (36.4) | 11 (55.0) | 8 (40.0) | 4 (66.7) | 3 (100) | 0 |
| **Time of Day[b]** | | | | | | | | |
| 7:00am - 12:59pm | 10 (37.0) | 1 (33.3) | 4 (40.0) | 7 (35.0) | 7 (36.8) | 3 (50.0) | 1 (33.3) | 0 |
| 1:00pm - 7:59pm | 13 (48.2) | 1 (33.3) | 3 (30.0) | 11 (55.0) | 10 (52.6) | 3 (50.0) | 1 (33.3) | 0 |
| 8:00pm - 12:30am | 4 (14.8) | 1 (33.3) | 3 (30.0) | 2 (10.0) | 2 (10.5) | 0 | 1 (33.3) | 2 (100) |
| **Worked Alone[c]** | 10 (40.0) | 0 | 3 (30.0) | 7 (38.9) | 5 (27.8) | 3 (60.0) | 1 (33.3) | 1 (50.0) |
| **Worked After dark** | 4 (14.8) | 1 (33.3) | 3 (30.0) | 2 (10.0) | 2 (10.5) | 0 | 1 (33.3) | 2 (100) |
| **Workplace Violence** | 2 (7.2) | 1 (33.3) | 2 (18.2) | 1 (5.0) | 1 (5.0) | 0 | 0 | 2 (100) |

^White, Black and Asian youth are all non-Hispanic.
[a] Summer = June-August (3 months), School year = September-May (9 months).
[b] Time of day could be determined for only 30 cases.
[c]Working alone could be determined for only 28 cases.

**Table 3. Characteristics of Work-related fatalities Among North Carolina Youth Ages 11-17 by Industry (1990-2008)**

| | Industry | | | | |
|---|---|---|---|---|---|
| | **Agriculture, Forestry, Fishing & Hunting (n=9)** | **Construction (n=11)** | **Retail Trade (n=6)** | **Manufacturing (n=2)** | **Other (n=3)** |
| **Means** | | | | | |
| Vehicles | 5 (55.6) | 4 (36.6) | 2 (33.3) | 1 (50.0) | 1 (33.3) |
| Guns | 1 (11.1) | 0 | 4 (66.7) | 0 | 0 |
| Falls | 0 | 4 (36.6) | 0 | 0 | 0 |
| Electricity | 1 (11.1) | 3 (27.3) | 0 | 0 | 0 |
| Instruments/machinery | 0 | 0 | 0 | 1 (50.0) | 1 (33.3) |
| Other | 2 (22.2) | 0 | 0 | 0 | 1 (33.3) |
| **Time of Year** [a] | | | | | |
| Summer | 4 (44.4) | 6 (54.6) | 3 (50.0) | 1 (50.0) | 2 (66.6) |
| School year | 5 (55.6) | 5 (45.5) | 3 (50.0) | 1 (50.0) | 1 (33.3) |
| **Time of Day**[b] | | | | | |
| 7:00am - 12:59pm | 5 (55.6) | 2 (20.0) | 1 (16.7) | 1 (50.0) | 2 (66.6) |
| 1:00pm - 7:59pm | 3 (33.3) | 8 (80.0) | 1 (16.7) | 1 (50.0) | 1 (33.3) |
| 8:00pm - 12:30am | 1 (11.1) | 0 | 4 (66.7) | 0 | 0 |
| **Working Alone**[c] | 3 (33.3) | 4 (50.0) | 1 (16.7) | 2 (100) | 0 |
| **Working After Dark** | 1 (11.1) | 0 | 4 (66.7) | 0 | 0 |
| **Workplace Violence** | 0 | 0 | 3 (50.0) | 0 | 0 |

[a] Summer = June-August (3 months), School year = September-May (9 months).
[b] Time of day could be determined for only 30 cases.
[c] Working alone could be determined for only 28 cases.

**Table 4. Work-related Fatalities Involving Jobs/Tasks Prohibited by the US Child Labor Laws Among North Carolina Youth Ages 11-17 (1990-2008) (N=31)**

| **Violation** | **Percent* (# cases)** |
|---|---|
| US Non-agricultural Hazardous Orders& Regulation 3 Standards (≥1) | 41.9(13) |
| Motor-vehicle driving and being an outside helper on vehicle (HO2) | 16.1 (5) |
| Roofing operations and all work on or about a roof (HO16) | 12.9 (4) |
| Operating power-driven hoisting apparatus, including forklifts (HO7) | 6.5 (2) |
| Operating power-driven woodworking machines (HO5) | 3.2 (1) |
| Logging and sawmilling (HO4) | 3.2 (1) |
| Excavation operations (HO17) | 3.2 (1) |
| Manufacturing occupations (OS1) | 3.2 (1) |
| Construction occupations (OS9d) | 3.2 (1) |

*Violations are not mutually exclusive . Some cases involve more than one violation.

| **Table 5. Employment Characteristics of Fatality Cases Attributable to one or more Violation of the US Child Labor Laws Among North Carolina Youth Ages 11-17 (1990-2008)** | | |
|---|---|---|
| **Characteristics** | **N** | **Percent* (# cases)** |
| Industry | | |
| Agriculture | 9 | 22.2 (2)^ |
| Construction | 11 | 81.8 (9) |
| Retail | 6 | 33.3 (2) |
| Manufacturing | 2 | 100 (2) |
| Other | 3 | 33.3 (1) |
| Job type | | |
| Laborer | 9 | 77.8 (7)* |
| Roofer | 4 | 100 (4) |
| Farm worker | 8 | 25.0 (2) |
| Cashier | 3 | 0 (0) |
| Other | 7 | 42.9 (3) |
| Work in Parents' Business (non-agriculture) | | |
| Yes | 5 | 20.0 (1)* |
| No | 16 | 75.0 (12) |
| Significance: *$p$<0.05, ^$p$=0.54 | | |

| **Table 6. OSHA Violations Cited during Investigations of Work-related Fatalities Among North Carolina Youth Ages 11-17 (1990-2008)*** | | |
|---|---|---|
| OHSA Standards | | # Violations |
| 1910 | General Industry | 47 |
| | Electrical | 13 |
| | Hazard Communication | 5 |
| | Machinery and Machine Guarding | 5 |
| | Materials Handling and Storage | 5 |
| | Welding, Cutting, and Brazing | 5 |
| | General Environmental Controls | 4 |
| | Fire Protection | 4 |
| | Personal Protective Equipment | 3 |
| | Walking-Working Surfaces | 3 |
| 1926 | Construction | 32 |
| | Electrical | 12 |
| | Fall Protection | 11 |
| | General Safety and Health Provisions | 5 |
| | Helicopters, Hoists, Elevators, and Conveyors | 4 |
| | Personal Protective and Life Saving Equipment | 1 |
| 1904 | Recordkeeping | 3 |
| 1928 | Agriculture | 2 |

| | | |
|---|---|---|
| | Safety for Agricultural Equipment | 1 |
| | General Environmental Controls | 1 |
| NC General Statutes | | 2 |
| | General Duty Clause | 1 |
| | Fatality Reporting Requirement | 1 |
| *These are violations found at the worksite where the fatality occurred and are not all necessarily contributors to the young worker deaths. | | |

### *Discussion*

We found 31 cases of work-related fatalities among youth ages 11 through 17 in the State of North Carolina during a 19 year period. Since 2000, seven young workers have been killed at work. This study's findings are consistent with the larger body of literature which shows that adolescent occupational fatalities occur mainly among males, 16 to 17 years of age (4, 46-48). They are also consistent with other studies showing young worker fatalities are most often the result of vehicle-related incidents (4, 46, 49), occur mainly in agriculture, construction and retail trade (4, 46, 48) and that 25-50% of fatalities that happen in retail occur during robberies (4, 25). Compared to an earlier North Carolina study covering 1980-1989 (27), our results indicate there has been a drop in the prevalence of adolescent occupational fatalities. The average annual number of worker deaths among youth ages 11-17 decreased from 2.9 during the 1980-1989 period to 1.6 per year in the current period. Construction replaced Agriculture as the industry in which the greatest number of young worker fatalities occurred. In the prior study, retail was not an industry that was separately coded, thus it is impossible to compare retail deaths across the two periods. In both periods, the large majority of deaths were among white males. Although Hispanic youth made up the second largest proportion of fatalities in both periods, they represented a much smaller proportion of all North Carolina workers under 18 both during the current and prior study periods ((50)).

The number of young worker deaths in North Carolina averages less than two per year and has declined in recent years, suggesting improvements in safety. However, more than half of the fatalities occurring in the 19 year period studied involved activities that were prohibited by the child labor laws and/or OSHA health and safety standards. The high incidence of safety violations, whether directly linked to young worker deaths or not, indicates that youth are working in dangerous environments that pose threats to their safety. This demonstrates the need for improved employer compliance with laws and regulations. It is questionable, however, whether the current enforcement mechanisms have the capacity to urge employer compliance as deficits in enforcement activities are fueled by diminished enforcement agency resources, and inadequate penalty assessments. This is elaborated upon under the Aim 3 discussion.

**Aim 2: To understand the extent and nature of involvement by state health and safety enforcement authorities and federal or state child labor enforcement authorities in the identified fatality cases.**

### *Findings*

Child Labor Investigations: Because we did not have employer names for some cases, we could only determine whether 22 of our 31 cases were investigated by the US Department of Labor Wage & Hour Division. Of these 22 cases, 41% (n=9) were investigated by USWHD. Among those nine cases, at least four involved a violation of the child labor laws and one did not. For the remaining four, we could not determine if a violation occurred because the investigation reports had been destroyed[1] In three of the four cases where a violation was found, the USDOL investigation report indicated that at least one violation contributed to the young workers' death, with as many as four violations recorded. Penalties of $900 and $11,000 were assessed in two of four cases where violations were found and 2 yielded no penalties.

Because the NC Wage &Hour Bureau moved to an online database and subsequently destroyed all physical investigation records prior to October 2000, we were only able to determine whether fatalities occurring after 2000 were investigated by the Bureau. Since 2000, seven work-related fatalities occurred and of those, only

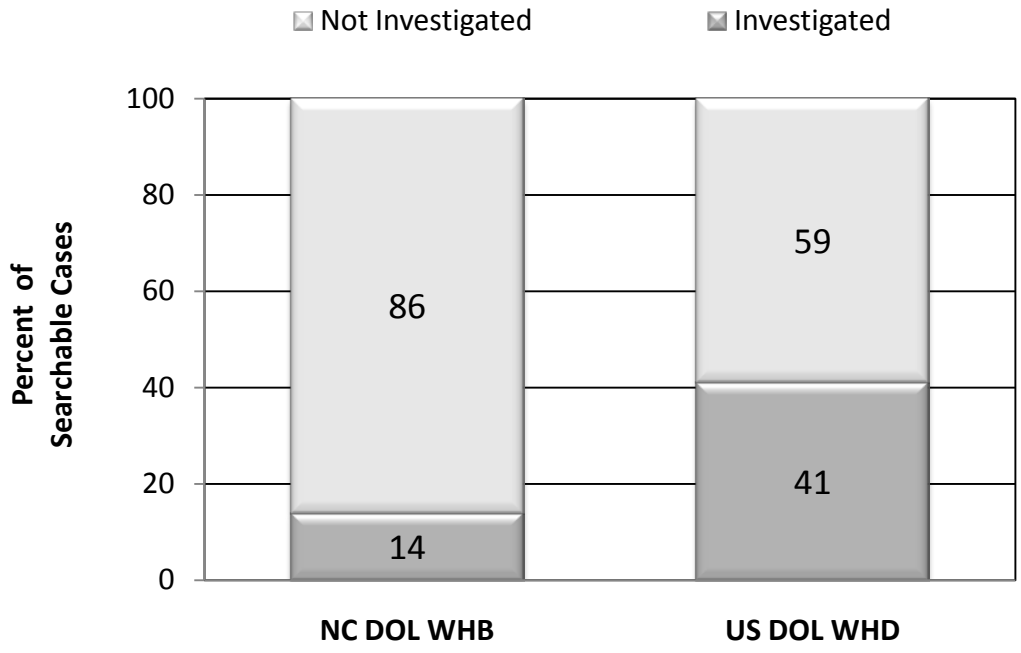
[1]Reported by a USWHD representative.

one was investigated by NCWHB. In this case, a violation of the state's work permit regulations was found and a penalty of $250 was assessed.

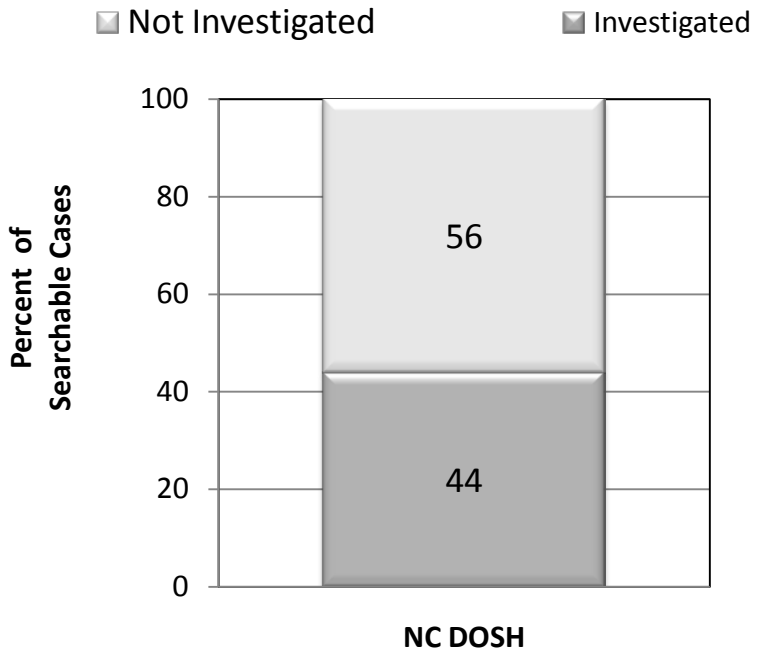
OSHA Investigations: We were able to determine NCDOSH investigation activity for all 31 cases. Eleven cases (35%) were investigated and 5 cases (3=workplace violence, 1=highway, 1=open waters) were outside NCDOSH jurisdiction. All of the 11cases investigated involved violations. In 9 of the 11 cases where a violation was found, the NCDOSH investigation report indicated that at least one violation contributed to the young workers' death. The number of violations per case ranged from one to 33 and fines ranged from $200 to $12,000. As shown in Table 6 above, violations of the General Industry Standards were the most frequently cited followed by Construction Standards. In both of these areas, Electrical Standards were the most frequently cited violations. At least 18 cases (58%) involved either a child labor or an OSHA violation and at least 9 (29%) involved both types of violations.

Aim 2 Figures: Figures 1 & 2 below show the percentages of cases investigated by agencies within the US and NC Departments of Labor, among cases for which we could determine investigation activity.

**Figure 1. Investigated Young Worker Fatality Cases, by Child Labor Law Enforcement Agency**



## Figure 2. Investigated Young Worker Fatality Cases, by the NC Department of Occupational Safety and Health




***Discussion***

Far too few young worker fatalities were investigated by either the US or NC Departments of Labor. This lack of investigations is particularly troubling given that, among the investigations that did occur, almost three-fourths of the cases involved a violation of either the child labor laws or OSHA health and safety standards. If the agencies responsible for worker health and safety are unlikely to investigate even the most serious cases – fatalities – how can employers be motivated to comply with the laws and be held accountable when they do not. When violations were identified, the fines assessed were so small that it is questionable as to whether they provide the proper compliance incentive for employers. For several violations, no fines were assessed. In addition, while penalties may start out high, they are typically reduced for such things as employer cooperation with the investigation ("good faith") and for not having a prior violation history. For example, one case had fines assessed at $61,000that were reduced to $8,250 for good faith and no history of violations, and later reduced (after attorney involvement), to $4,125.Despite concern over insufficient penalties, the most pressing issue is the lack of fatality investigations by state and federal safety agencies so as to ensure that employers provide a safe work environment for youth and hold them accountable for violations.

**Aim 3: To identify current challenges in enforcement of the CLL and OSHA standards and develop strategies to overcome them.**

***Findings***

Our focus group with US and NC DOL enforcement officials revealed that financial considerations, including budget cuts and personnel shortages, have hampered their ability to carry out enforcement duties. In addition, officials explained that there are complicated definitional and jurisdictional issues that can preclude an agency from investigating. For example, the way each agency defines "work-related" can affect whether or not they have investigative authority. With OSHA, inspections of workplace violence and highway crashes are limited because these incidents fall under the jurisdiction of law enforcement. Even with full financial resources, technicalities such as these will continue to inhibit agency enforcement.

### *Discussion*

Whether due to negligence, financial constraints, or legal barriers, enforcement must be addressed if we are to adequately protect young workers. To further enhance the existing enforcement mechanisms so they have the potential to be more effective in *preventing* young worker deaths involving violations, consideration should be given to the following:

1) simplification and consistency in the definitions and jurisdictional authority of the agencies involved to improve investigations of adolescent fatalities;

2) requiring agencies to maintain records so as to allow tracking of violations over time;

3) instituting sufficient penalties to motivate compliance either by eliminating penalty reductions and/or increasing initial amounts; and

4) increasing funding to more fully support enforcement mandates, insure that no young worker death ever goes unexamined and no liable employer ever goes without penalty.

## Study Conclusions

Although the average annual number of young worker deaths is dropping in North Carolina, the 31 deaths identified in this study demonstrate that there remains a need to improve the safety of adolescent workplaces. What's more, more than half of the fatalities occurring in the 19 year period studied involved activities that were prohibited by the child labor laws and/or OSHA health and safety standards. The high incidence of safety violations, whether directly linked to young worker deaths or not, indicates that youth are working in dangerous environments that pose threats to their safety.

Also of concern is the fact that too few young worker fatalities were investigated by either the US or NC Departments of Labor. This lack of investigations is particularly troubling given that, among the investigations that did occur, almost three-fourths of the cases involved a violation of either the child labor laws or OSHA health and safety standards. If the agencies responsible for worker health and safety are unlikely to investigate even the most serious cases – fatalities – how can employers be motivated to comply with the laws and be held accountable when they do not. This study found that agencies face financial challenges, including budget cuts and personnel shortages, which have hampered their ability to carry out their enforcement duties. Other barriers to enforcement include complicated definitional and jurisdictional issues that may preclude an agency from investigating. For example, the way each agency defines "work-related" can affect whether or not they have investigative authority. With OSHA, inspections of workplace violence and highway incidents are limited because these incidents fall under the jurisdiction of law enforcement.

Another aspect of enforcement that is in need of improvement is the penalty system which imposed marginal fines, which are often reduced as a matter of standard practice. We found that when violations were identified, the fines assessed were so small that it is questionable as to whether they provide the proper compliance incentive for employers. For several violations, no fines were assessed. In addition, while penalties may start out high, they are typically reduced for such things as employer cooperation with the investigation ("good faith") and for not having a prior violation history. For example, one case had fines assessed at $61,000that were reduced to $8,250 for good faith and no history of violations, and later reduced (after attorney involvement), to $4,125.Whether due to negligence, financial constraints, or legal barriers, the enforcement environment (and its penalty structures) must be addressed if we are to adequately protect young workers.

While it is important to ensure that people of all ages are provided safe workplaces, youth have unique risks that make them particularly vulnerable to workplace hazards. These include being unfamiliar with dangerous tasks and equipment and lacking safety training as well as lacking the physical and cognitive maturity to assess and handle dangerous work (51). Diligence and tailored, age-appropriate measures in the workplace are necessary. Improving enforcement activities by the respective agencies that oversee youth employment should be one of our highest priorities going forward if we are to ensure the laws are followed to keep young workers from highly dangerous and often lethal forms of work.

## Publications

### Published

- **Rauscher KJ,** Runyan CW, and Radisch D. (2011). Work-related Fatalities among Youth Ages 11-17 in North Carolina, 1990-2008. *American Journal of Industrial Medicine*. Vol. 54, No. 2(Feb): 136-142.

### Under Review

- **Rauscher KJ** and Runyan CW. Adolescent Occupational Fatalities in North Carolina (1990-2008): An Investigation of Child Labor and OSHA Violations and Enforcement. *American Journal of Industrial Medicine*
- **Rauscher KJ,** Runyan CW, and Radisch D. Using Death Certificate and Medical Examiner Data for Adolescent Occupational Fatality Surveillance and Research: A Case Study. *Journal of Occupational and Environmental Hygiene.*

## Inclusion Enrollment Table

Attached

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# Inclusion Enrollment Report

**Study Title:** Young Worker Fatalities and Violations of Labor and Safety Regulations: Moving Toward a Solution

**Total Enrollment:** 5 **Protocol Number:** WVU IRB: CR-1628 (H-22487)

**Grant Number:** 5R03OH009437

**PART A. TOTAL ENROLLMENT REPORT: Number of Subjects Enrolled to Date (Cumulative) by Ethnicity and Race**

| Ethnic Category | Females | Males | Sex/Gender Unknown or Not Reported | Total |
|---|---|---|---|---|
| Hispanic or Latino | 0 | 0 | 0 | 0 ** |
| Not Hispanic or Latino | 1 | 4 | 0 | 5 |
| Unknown (individuals not reporting ethnicity) | 0 | 0 | 0 | 0 |
| **Ethnic Category: Total of All Subjects*** | 1 | 4 | 0 | 5 * |
| **Racial Categories** | | | | |
| American Indian/Alaska Native | | | | |
| Asian | | | | |
| Native Hawaiian or Other Pacific Islander | | | | |
| Black or African American | | | | |
| White | 1 | 4 | 0 | 0 |
| More Than One Race | | | | |
| Unknown or Not Reported | 0 | | | |
| **Racial Categories: Total of All Subjects*** | 1 | 4 | 0 | 5 * |

**PART B. HISPANIC ENROLLMENT REPORT: Number of Hispanics or Latinos Enrolled to Date (Cumulative)**

| Racial Categories | Females | Males | Sex/Gender Unknown or Not Reported | Total |
|---|---|---|---|---|
| American Indian or Alaska Native | | | | |
| Asian | | | | |
| Native Hawaiian or Other Pacific Islander | | | | |
| Black or African American | | | | |
| White | | | | |
| More Than One Race | | | | |
| Unknown or Not Reported | | | | |
| **Racial Categories: Total of Hispanics or Latinos**** | 0 | 0 | 0 | 0 ** |

* These totals must agree.

** These totals must agree.