Published in final edited form as:

Am J Ind Med. 2019 December ; 62(12): 1091–1102. doi:10.1002/ajim.23045.

“Be Careful!” Perceptions of Work Safety Culture Among Hired Latinx Child Farmworkers in North Carolina

Thomas A. Arcury, PhD¹, Taylor J. Arnold, MA¹, Dana C. Mora, MPH¹, Joanne C. Sandberg, PhD¹, Stephanie S. Daniel, PhD¹, Melinda F. Wiggins, MTS², Sara A. Quandt, PhD³

¹Department of Family and Community Medicine, Wake Forest School of Medicine, Winston-Salem, NC 27157 USA

²Student Action with Farmworkers, Durham, NC 27705 USA

³Department of Epidemiology and Prevention, Division of Public Health Sciences, Wake Forest School of Medicine, Winston-Salem, NC 27157 USA

Abstract

Background: Children as young as 10 years can be hired to work on farms. Many of these hired child farmworkers are Latinx. Although these children experience high rates of injury, little research has addressed work safety perceptions among hired Latinx child farmworkers.

Methods: For this qualitative study, we conducted in-depth interviews in North Carolina in 2016 with 30 Latinx child farmworkers, ages 10–17. Our analysis used the work safety culture conceptual framework to delineate their perceptions of the psychological, behavioral, and situational elements of safety culture.

Results: The child farmworkers describe a weak work safety culture. Psychologically, they understand that their parents want them to be safe, but they observe that safety is important to only a fraction of their supervisors and coworkers. Behaviorally, they recognize many of the hazards they confront while working, but it is not clear how well they use this knowledge to mitigate these hazards or to change their behaviors to avoid these hazards. Situationally, several children note that the only safety training they receive is the imperative to “be careful.” Most receive little formal training, much of the training they receive is informally provided by family members and co-workers rather than supervisors, and their training is geared more toward how to complete a task than how to complete the task safely.

Corresponding Author: 1.336.716.9438; fax: 1.336.716.3206, tarcury@wakehealth.edu.

Author Contributions: TAA participated in all aspects of the study conceptualization and design, analysis, and manuscript writing. TAJ managed and participated in data collection, directed data analysis, and participated in manuscript writing. DCM participated in data collection and analysis, and participated in manuscript writing. JCS participated in the study design, analysis, and manuscript writing. DSS participated in the study design, analysis, and manuscript writing. MTW participated in the study design and manuscript writing. SAQ participated in the study conceptualization and design, analysis, and manuscript writing.

Conflict of Interest Disclosure: The authors report no conflicts of interest.

Ethics: All procedures were approved by the Wake Forest School of Medicine Institutional Review Board. Participants’ parents provided written consent, and child participants provided written assent. The Board approved an exemption to be able to conduct interviews without parental permission among unaccompanied minors, defined as children younger than 18 years of age who had no parent with them in North Carolina.

Disclaimer: None

Institution at which the work was performed: Wake Forest School of Medicine, Winston-Salem, NC.

Conclusions: Child farmworkers perceive that work safety culture is of limited importance in agriculture. Regulations are needed that improve work safety culture in agriculture, especially for those vulnerable due to minority age.

Keywords

Child labor; work safety culture; farmworkers; agriculture; policy

1 INTRODUCTION

Agriculture is an extremely hazardous industry. Those working in agriculture are exposed to extremes of weather, machinery and vehicles, sharp tools, water hazards, chemicals, organic and inorganic dust, large animals and pests, and heights. Those working in agriculture experience high rates of morbidity and mortality, with 5.2 lost work time injuries reported per 100 agricultural crop workers,¹ and 20.9 deaths occurring per 100,000 agricultural crop workers in 2017.² These rates exclude farms with fewer than 11 employees; these farms may have higher injury and mortality rates due to financial pressure, old equipment, and underdeveloped safety protocols. Children also experience high rates of agricultural injury, illness, and death.^{3–5} Every day 33 children are injured in an agriculture-related incident.⁶ The fatality rate for young agricultural workers aged 15–17 years in 2015 was 28.21 per 100,000, compared to 0.63 per 100,000 in all other industries combined.¹¹ Rates for those under age 15 are not available because these data are not collected.

Children as young as 10 years of age are allowed to work as hired farmworkers in the United States.^{7–10} Current federal labor rules state that children aged 16 years or older can hold any farm job, hazardous or not, with unlimited work hours. Children aged 14 or 15 years can hold any nonhazardous farm job outside school hours. Those aged 12 or 13 years can hold any nonhazardous farm job outside school hours with parental permission or on the same farm on which a parent is working. Those aged 10 or 11 years can hold any nonhazardous farm job outside of school hours with parental permission when Fair Labor Standard Act minimum wage requirements do not apply (i.e., on small farms).¹¹ Children of any age can perform any task on farms operated by their parents.

Child development issues are important for understanding the occupational risk of child farmworkers. Childhood and adolescence are periods of transformation that cross multiple levels of individual and contextual influence. Changes at biological, psychological, and social levels contribute to opportunities for growth and positive adjustment, as well as risk for maladaptive outcomes or negative adjustment. While farm work is a hazardous job at any age, farm work is especially hazardous for children and adolescents. It creates special risks due to the demands of the job relative to child age, physical stature, and overall maturity level. Children's physical size differs significantly over the ages 10 to 17 years, placing 10 year olds and children smaller in stature at greater risk for physical harm from heavy loads, machinery intended for adult operation, and chemical exposure. Farm work may differentially affect children by age and gender, and may place developing physical systems (e.g., nervous system, musculoskeletal system, reproductive system) at risk for harm or negative outcomes.^{7,12–13}

As children progress through adolescence, one fundamental challenge is the increasingly independent regulation of affect, behavior, and thought to meet social and academic challenges.^{14–16} Emotional and behavioral disturbances (depression, anxiety, conduct problems) are more likely to emerge during this time than during childhood or adulthood.^{14–15} Child farmworkers may be at increased risk for adverse developmental outcomes given the physical challenges and environmental risks of farm work, additional risks associated with juggling farm work and other responsibilities, and, in some instances, lack of parental supervision, and the potential for harassment and other work-related abuses (e.g., wage theft) by others they encounter in farm work.^{17–18} Besides the physical immaturity of children and adolescents, they lack the education, experience and judgment of adults to deal with supervisors or other work-related pressures or demands, and to work quickly and for long hours. Thus, farm work places physical, cognitive, and emotional demands and expectations on children who are engaged in tasks intended for fully developed adults who are more capable of managing these work demands.

Little research has documented the conditions in which hired child farmworkers labor or their perspectives of their workplace safety. Work safety culture¹⁹ provides a framework for delineating the perspectives of child farmworkers on their workplace safety. Work safety culture is a component of organizational culture that reflects the degree to which safety is valued over production by all members of the organization (supervisors as well as employees).^{19–20} It differs from work safety climate, which is the degree to which individual workers perceive how their supervisors value safety over production.^{21–22} Based on the theory of reciprocal determinism,^{23–24} Cooper¹⁹ delineates three elements of work safety culture – psychological, behavioral, and situational – that encompass the different aspects of the work environment. Psychological elements include subjective assessments of safety. Behavioral elements include observable safety and risk behaviors. Situational elements include safety management programs and actions. These elements are not independent, but reciprocal, with aspects of each element reflecting and influencing aspects of the other elements.

Westaby and Lee²⁵ examined work safety culture in a longitudinal analysis of injuries among Future Farmers of America members. They found that dangerous risk taking, a behavioral measure, was associated with a greater risk of injury, and that safety consciousness, a psychological measure, was associated with a lesser risk of injury. Counter intuitively, safety knowledge, a situational measure, was also associated with a greater risk of injury; they suggest this might result from children being placed in more dangerous environments for which they are provided greater safety information (training).

Arcury and colleagues¹⁸ applied the work safety culture model in a cross sectional analysis of North Carolina hired Latinx child farmworkers and found a negative work safety culture. Most engaged in unsafe general behaviors and unsafe work behaviors (e.g., 44% rode in the back of uncovered trucks; 8% wore safety goggles and 1% wore hearing protection; none always wore safety helmets when riding motorcycles or all-terrain vehicles). Over 10% experienced sexual harassment at work. Their responses indicated they had mixed safety attitudes and knew that their employment was precarious. For example, 48% responded that no matter how hard one tries, serious injuries will occur on a farm; and 41% indicated that

they were made to feel that their supervisors could be easily replaced them with another worker. They reported a poor work safety climate characterized by the perception that their supervisors “are only interested in doing the job fast and cheaply.”

Focusing on the situational element of training, Arcury et al.¹⁸ found that child farmworkers in North Carolina reported seldom receiving safety training, with only 6% indicating that they had received pesticide safety training in the past 12 months and 8% reporting that they ever received this training; 14% indicated they received training in tool use in the past 12 months and 22% reported they ever received this training; and 7% indicated they received machinery training in the past 12 months and 8% reported they ever received this training. Similarly, Shipp and colleagues²⁶ reported that few (19%) adolescent farmworkers in Texas received pesticide safety training. This contrasts with the reports by McCauley and colleagues²⁷ who found that one-third of the 108 adolescent farmworkers they interviewed in Oregon received pesticide training, and by Perla and colleagues²⁸ who found that 52% of the 140 youth interviewed in Washington’s Yakima Valley reported receiving general safety training, although few could correctly identify legally restricted tasks considered hazardous for youth workers. Using focus groups, Salazar and colleagues²⁹ found that Oregon adolescent migrant farmworkers were aware of the risks from pesticide exposure, but varied in their perceptions of their personal vulnerability. McCurdy and colleagues³⁰ found no associations between one year injury incidence and (1) taking agricultural courses, (2) length of membership in Future Farmers of America (FFA), and Head, Heart, Hands, Health (4-H), or (3) those who were “very important” sources of agricultural safety information for rural Latinx and white California high school students.

Delineating how hired child farmworkers perceive the elements of work safety culture at their workplace will provide insight needed in developing processes to improve their safety. We use qualitative data from in-depth interviews with North Carolina hired Latinx child farmworkers to delineate their perceptions of the work safety culture for the farms on which they work.

2 METHODS

This qualitative analysis uses data collected from semi-structured, in-depth interviews conducted in North Carolina with hired Latinx child farmworkers in 2016.³¹ The interviews were conducted as part of a multi-year community-based participatory research collaboration between investigators at Wake Forest School of Medicine and Student Action with Farmworkers.³²

2.1 Participants

We completed interviews with 30 hired child farmworkers. The children needed to meet several inclusion criteria: be 10 to 17 years of age, self-identify as being Latinx or Hispanic, have done farm work for pay in the past 12 months, and speak either English or Spanish fluently. We designed recruitment to include equal numbers of child farmworkers by gender, region of the state (eastern and western), and farmworker status (seasonal and migrant). A pilot study¹⁸ indicated that child farmworkers’ work experience might vary by these dimensions. We defined the western region to include those counties in the mountain region

and western piedmont, while the eastern region consisted of counties on the coastal plain and adjacent piedmont with lower elevations. We considered children to be migrant workers who changed the state in which they lived in order to work. We considered those who did not change residence and worked locally in agriculture to be seasonal workers. We recruited children from May through September 2016, to achieve a broad sample of experience in different crops.

We used a community-based recruitment strategy in which the study team contacted community organizations throughout the state that served farmworkers and rural children to help us find and recruit child farmworkers. These organizations included the migrant education program, community health clinics, and other farmworker service organizations (e.g., North Carolina Justice Center, East Coast Migrant Head Start Project, NC FIELD, and Farm Labor Organizing Committee). We also participated in community events for Latinx farmworkers where we approached parents and children who could potentially qualify, and recruited those willing to participate. Because interviewers worked through community partners, we do not know the number of potential participants or their parents who refused to participate.

The consent process started with our speaking with parents to ask if they would allow their children to participate, and the children being asked if they agreed to participate. If both said yes, we scheduled an appointment for the interview. At the time of the interview, the interviewer reminded the child and the parent(s) about the purpose of the research and that the child's participation was voluntary. After the interviewer answered questions from potential participants, one parent signed a permission form and the child signed an assent form. The assent forms varied by age, for children aged 10 years, 11 to 15 years, and 16 and 17 years to provide the appropriate vocabulary for each age group. The interviewer gave each child a \$25 cash incentive at the completion of the interview. The Wake Forest School of Medicine Institutional Review Board approved all procedures. The Board approved an exemption that allowed interviews without parental permission among unaccompanied minors, defined as children younger than 18 years of age who had no parent or adult guardian with them in North Carolina.^{8,33}

2.2 Data Collection

We conducted interviews from June through September 2016. Experienced and trained interviewers conducted the interviews in English or Spanish, at the choice of the participant (they conducted 23 in English and 7 in Spanish). Interviewers included native-Spanish and native-English speakers. The audio recorded interviews took approximately 60 minutes to complete and focused on: (1) the child worker's background, family, housing, and community; (2) type of farm work performed and how the work was organized; (3) characteristics of their job and what they liked and disliked about their job; (4) precautions they took in farm work; and (5) any occupational injuries and illnesses they had experienced. Interviewers used probes to elicit the children's descriptions and perceptions of their working conditions. We based the topics included in the interview guide on pilot research and suggestions from our community partners. We pre-tested the interview guide with two English speaking and two Spanish speaking Latinx children who had worked in agriculture.

2.3 Data Management and Analysis

A professional translation service company transcribed the audio-recorded interviews, translating and transcribing from Spanish interviews to English. A bilingual team member verified the Spanish transcripts to ensure proper translation. Other team members verified the English transcripts to ensure proper transcription.

The team met frequently during data collection to review findings from the interviews. This included reading notes and transcripts as they became available. We identified emergent issues to be pursued and clarified in subsequent interviews with other children. We constructed a codebook for topics of interest, with mutually exclusive definitions established when data collection was completed. Based on the analysis of the interviews, we created codes for demographics, housing, social context, farm work experience, farm work tasks, work-related risk behavior, occupational injury, work organization, wages, and safety culture.

We entered transcripts and notes into Atlas.ti (Version 7.2) text analysis software. One team member applied the codes to segments of text, and two other team members reviewed this coding. We discussed any coding disagreements and made changes through consensus. We used a variable-based, “cross-sectional” analysis,³⁴ such that all segments associated with the safety culture code were extracted, reviewed, and summarized by team members. The lead author reviewed the summaries for consistency with the code. We made revisions of these summaries until they adequately reflected the interview content. We subjected the summaries to saliency analysis.^{35–36} Saliency analysis explores patterns of shared meaning by evaluating recurrent themes based on their frequency of recurrence, participants’ emphasis on the theme, and the explanatory capacity of the theme. Salient themes do not need to be discussed by every participant, but they must be discussed in detail and with emphasis throughout the set of interviews. Salient themes provide insight or explanation of the topic being studied. The salient work safety culture themes that emerged were perceived support for safety (a psychological element of work safety culture), hazard recognition and mitigation (psychological and behavioral elements of work safety culture), and training for safety (a situational element of work safety culture). We considered threats to validity (e.g., focus on extreme cases) in constructing and revising the themes.³⁷ We present exemplary quotations that illustrate each theme to support findings. We note participant identification numbers, gender, and age for each quotation.

3 RESULTS

3.1 Participants

Participants included girls (n=13) and boys (n=17) in eastern (n=14) and western (n=16) North Carolina (Table 1). Participants ranged in age from 10 to 17, with most aged 15 (n = 7), 16 (n=5), and 17 (n=5) years. Eight of the participants were working their first season for pay in agriculture. Although all of the participants spoke Spanish, 23 of the 30 preferred being interviewed in English. Sixteen of these child farmworkers were seasonal workers, those who did not change residence from state to state for seasonal agricultural work, 11 were migrant workers who accompanied a parent, and three were unaccompanied migrants.

The participants worked in the crops common to North Carolina agriculture that require hand cultivation and harvesting with most working in tomatoes, tobacco, and berries.

3.2 Work Safety Culture

The child farmworkers' discussions reflected each of the three work safety culture elements. Their attitudes about the importance of safety, and their perceptions of how their parents, co-workers, and supervisors and employers valued safety reflected the psychological elements of work safety culture. Their perceptions of work hazards also reflected the psychological elements. The ways in which they mitigated hazards and their use of personal protective equipment (PPE) reflected behavioral elements of work safety culture. The child farmworkers' experience of safety training reflected the situational elements of work safety culture.

3.2.1 Valuing Safety.—These child farmworkers received mixed messages about the value of work safety. The children indicated that safety was generally important to them, but they were reserved in their discussions of valuing safety. They portrayed the attitude that it was common sense for them to value safety. For example, Participant 16 (girl aged 13) stated, “Well, I try to not get hurt or make sure anybody else doesn’t get hurt,” while Participant 17 (boy aged 17) noted that he thought safety was important because, “Yeah, ‘cause if someone was to get hurt, you know, that sucks.” Their general discussions of what they did to work safely, for example, wearing sunscreen, hats, long-sleeved shirts, also indicated they valued safety.

And blueberry and tobacco are different ‘cause what you gotta wear. On blueberry what you gotta wear... just like long-sleeved shirts and hoodies, and just something to cover you from the sun,... and you can wear shorts if you want to. And on the tobacco, you have to have long sleeves sometimes, if you want to, and you can’t wear shorts ‘cause the chemicals can hit you and it can – if you’re not used to it, it will leave you like rashes or like little stuff. And sometimes you do have to wear like a bandanna over your mouth ‘cause they probably just sprayed like chemicals into it. Probably like overnight, the people sprayed the chemicals and the next day you have to wear a bandanna over you and something to cover your face

(Participant 21, boy aged 15).

The manner in which the child farmworkers discussed the actions of their parents to help keep them safe indicated they perceived their parents (and other relatives) valued safety. Much of the safety instruction that these children received was from their parents. Their parents ensured that they had any necessary PPE and that they used this PPE. Participant 1 (boy aged 15) reported that his father made him wear a hat made out of a tomato box lid when he forgot his regular hat at home; “Yeah, there was a day. I forgot my hat at home. I had to make me a tomato box, the lid on the top. I had to make me one of them.”

On the other hand, they noted that other adults and children with whom they worked diverged in their attitudes toward safety. They noted that safety was important to some of the adult workers with whom they worked. Participant 6 (girl aged 15) stated that safety was very important for the people she worked with, “Because they don’t want you to be, like,

sick or, like, to get hurt or anything. They try making you feel good and not for you to be injured, and if you get injured, they help you out.” Similarly, Participant 16 (girl aged 13) stated that she felt that safety was important for the people she worked with, “Because we try to take care of each other, like, look out for each other, make sure we don’t get hurt or anything.”

These adults, particularly their parents and other relatives, would tell them what they needed to do to be safe while working. Participant 2 (boy aged 13) noted, “My, my dad, or sometimes like the one, the workers that are beside me, they just be telling me like, watch out with the shirt or watch out with the boxes that might just like fall or something. Stuff like that.”

Many more of the child farmworkers saw that their co-workers varied in their attention to safety. Participant 7 (boy aged 15) noted,

Some people do follow instructions and some don’t. There are some people who just say, “No, I don’t want to wear that and I don’t want to use anything.” They are like that and sometimes they get sick and then they say the company is at fault because they didn’t give them anything. And we’re the ones to blame because we’re the ones not following instructions.

Similarly, Participant 22 (girl aged 17) stated,

Well, sometimes I think some persons do like to protect theirself from all those chemicals, but sometimes, when I see people not wearing gloves or a hat I guess they don’t, they don’t really care. It’s like – I guess they don’t care or, like they don’t care about them self about getting sick or something.

Finally, a few of the participants indicated that other farmworkers seldom cared about safety. As Participant 24 (boy aged 16) noted, “Not really. I don’t really think they care [about safety].... Well, none of them talk about that stuff. Well, probably a few people would care but I doubt it. It would be like rarely.”

These child farmworkers also varied in their perceptions of how their supervisors valued work safety. Some believed that work safety is important to their supervisors. Participant 15 (girl aged 13), stated, “I mean, he [boss] cares about it [safety]. It’s, if he realizes it’s too hot, he’s like, and ‘You should probably go home, ‘cause it’s getting too hot.’ So I’m pretty sure he does care about the safety.” Several noted that their supervisors provided them with water or Gatorade and snacks when it was hot. Several also noted that their supervisors removed them from fields in which they were being exposed to pesticides as examples of how their supervisors valued safety. Participant 30 (girl aged 16) stated, “Well the good thing about the *contratista* [contractor], whenever he saw that they were spraying while we were working, he used to take us out, like, because he knows it’s bad. So he told the owner of the farm that he’s not going to work while they spray chemicals and stuff like that.”

Although some of the participants attributed altruism as the basis of their supervisors’ work safety attitudes, others saw these attitudes as more pragmatic. Participant 2 (boy age 13) stated, “Oh, for them [people he works for], it’s important because then, they don’t want to

get in trouble. Like they don't want to get in trouble with the law and they take it seriously. Anytime an inspection could come and they could get in lots of trouble if they don't have the right equipment. That's about it."

Participant 10 (boy aged 14) saw both the pragmatic and altruistic basis of his supervisor's work safety attitudes. He stated that although he felt his supervisor was concerned about safety because, "in case somebody injures, they don't wanna get sued." He also stated,

Well, they say if it's really hot out, they, themselves, they buy Gatorade for people, or whatever. Or, sometimes he gives you a ride in your own truck. Or if he sees that you're really tired, he's, like, "Oh, take a break," you know, whatever. Or sometimes they bring food for us, or snacks, or whatever. You know, they try to make sure that we're okay, that everything is, that we have everything we need.

Similarly, Participant 23 (boy aged 17) understood that supervisors differed in their safety behavior.

I'd say, for example, the first supervisor, the one at the blackberry fields, he cared a lot about making sure that the workers didn't get overheated, and nobody passed out in the fields. 'Cause he would, he would say, "Okay, everybody out," like, he would make sure that everybody got out of the field. And then, he, he would let them go back to work, but once the heat had gone down again. So, yeah, he cared about that. And then the second supervisor, he would just let the people work till, till whenever they wanted kind of thing. Like, he would let them pick as much as they wanted, but he said, "It's up to you all – if you all feel like you all can handle it, you all keep going; if not, it's okay, you all can stop and, and then take break," kind of thing. That's how he was about it.

Finally, several of the child farmworkers believed that safety was unimportant to their supervisors. They indicated that their supervisors only cared about getting the work done. Participant 16 (girl aged 17) noted, "I don't think they care [about safety]. I think they just care that the work gets done." Participant 22 (girl age 17) stated, "I don't think so [supervisors care about safety]. I think they just care for, like, I think they just want us to work. They don't – I don't think they care about, like, what happens to us." Participant 24 (boy aged 16) stated "not really" when asked if the farm owners care about safety, "I just feel like that 'cause they're not really on the field. They just take you to the field and as long as you do it, it doesn't really matter."

3.2.2 Recognizing and Mitigating Hazards.—These child farmworkers recognized many of the hazards to which farm labor exposed them, such as sun and heat, pesticides, plants (tobacco, tomatoes), work materials (e.g., string and sticks used with tomatoes), and machinery and equipment. They also knew of ways to mitigate these work hazards, such as specific behaviors (e.g., consuming fluids, wearing sunscreen), dressing appropriately for work, and using PPE. Their knowledge of the hazards and their mitigation was largely provided informally, when they were involved with specific tasks. At times, information regarding hazards and prevention was provided by their supervisors, but more often it was provided by older co-workers who were frequently their family members (particularly parents, aunts, and uncles).

Sun and heat were the hazards that were most widely noted by the child farmworkers. They discussed how these hazards could result in sunburn and heat stress. Participant 20 (boy aged 11) noted that, “The sun can burn you...and you have to drink plenty of water, plenty,” while Participant 6 (girl aged 15) remembered,

It was usually because I didn’t want to put anything on. Because my dad always bought us sprays, the sunscreen sprays, and he’d tell us, “Put it on, put it on,” and I was like, “No, I’m fine.” Like, I was being the brave one there. And I got all burned. Last year, I got home and it was, like, all burned, burned, burned. All my hands were burned.

Several had also learned about skin cancer. For example, Participant 13 (boy aged 12) stated, “I mean I saw on TV there was all that skin cancer and then after I saw that I was like, ‘I’m going to start wearing long sleeve shirts instead of short sleeve shirts,’ and that’s basically it.”

The participants generally acknowledged chemical exposure, particularly pesticide exposure. Many discussed working around pesticides.

The manager, then the manager would tell the boss. There was this one time where my mom was telling them that there was a lot of pesticides, and he went and told them, and he was like, “Oh, well I didn’t know that you guys were working there,” and he talked to us and he was like, “I’m sorry,” and this and that. He was like, “Go wash your hands, do this, clean yourself”

(Participant 6, girl aged 15).

They indicated that they could tell they were exposed to pesticides by the odor and the taste.

Well they tell us to move or to not be near there, because the chemical does – it harms you from the smell. I don’t really like smelling it when I smell it. I put a bandana on my head, so I just take it off and just put it right here, not to smell it because it gets me like wanting to throw up

(Participant 3, girl aged 14).

I don’t know. Sometimes you – because of the air, you – you breathe it in, so that’s where – where you breathe those chemicals in and that’s how you can get sick

(Participant 7, boy aged 15).

When I was holding it – I was eating a taco, because my mom had made lunch, and I was holding it. And then when I bit – when I bit the part I was holding, it kind of tasted weird. And then I, I told my dad, like, it tasted weird, and he told me to wash my hands. And so I did

(Participant 11, boy aged 15).

Participants who worked in tobacco noted the hazards of nicotine as well as chemicals.

Well the smell stays there until like a week after, and when we used to go work, it was the day after or two days after and you could still smell it. So the *contratista*

[contractor] used to tell us, “Wear a mask or something so you won’t get dizzy, you won’t get sick.” The same smell can make you sick and it can make you, throw up like the tobacco sickness. It can make you throw up, you’re dizzy, have a headache because you be smelling that too much. That’s the only basic thing. You get weak

(Participant 30, girl aged 16).

Participant 28 (boy aged 16) also noted that he had to protect himself from the sap of the tobacco plant. “We had to [pick] it by hand, but we had to get gloves because if you don’t, your hands get really sticky. And if you try to touch your face or anything it will burn, so we had to be careful.”

Only a few of the participants worked around machinery. Participant 23 (boy aged 17) stated, “I think since most of the workers never had to deal with machinery, or anything, they really don’t care much about safety, they only worry about the sun and the heat.” Participant 2 (boy aged 13) worked at times in the packing house; he noted that “...I heard some stories that they be getting their hands caught in the machine and their – or their hair; like girls be going in there too and their hair – they won’t, they don’t wear them and their hair be getting stuck. That’s all I heard.” Others mentioned safety around tractors, such as not getting too close to the wheels when they were moving (Participant 3, girl aged 14), or not hanging off the side of a truck (Participant 27, boy aged 17).

Most of the child farmworker knew how to mitigate these hazards. Mitigation strategies included wearing sunscreen, drinking water, and taking breaks to reduce the effects of sun and heat. Mitigation strategies also included dressing appropriately, in long sleeved shirts, long pants, and hats, as well as wearing gloves. Participant 7 (boy aged 15) noted,

That we have to wear gloves or – or something on our head so that we don’t – we don’t get any diseases or so that we don’t – so there’s no – no – so that we don’t get injured. Because sometimes when we don’t want to wear protection, we – we get blisters in our hands or – or else you may get injured or something may fall on our on top of your fingers.

3.2.3 Training for Safety.—The child farmworkers’ discussions of safety training reflected their perceptions of the value of safety and hazard recognition. Several of the participants stated that they received no safety training. For example, Participant 6 (girl aged 15) noted when asked about safety training, “No. We’ve never had that, no. But they did give us a paper for the blackberry – like if you have diarrhea, you can’t work. If you’re sick, you catch a cold, you can’t work.” She further noted when asked about having received training at other places she had worked, “No, I don’t think so.” Similarly, Participant 9 (boy aged 14) simply said “No” when asked if he had received safety training when he began work. Several noted that much of the safety training they received was based on the admonition, “Be careful.”

Not for working, not really much. They just tell you, “Oh, be careful,” like, when you’re chopping with the machete, they say, “Oh, be careful, like, to not hurt yourself,” but that’s basically it. Or unless when I was barely learning, my first time

I was working, they would talk, they, my mom taught me how to, she was guiding me step by step. But then after a while, I learned on my own

(Participant 10, boy aged 14).

Similarly, Participant 18 (girl aged 17) noted that, “No. I just gotta learn it myself.... just by watching or something. Just by watching.” She did note that her supervisor did tell her not to let the tobacco leaves touch her face, but that “it was just that one time” that she was given any safety instruction.

Of those who noted receiving safety training, their discussions of this training indicated three major dimensions. The first dimension was whether the training they received was directed primarily at safety or primarily at how to complete a task. Generally, if safety information was provided, it was in the context of how to complete a task. Participant 13 (boy aged 12) stated, “I mean like when I first started working there I didn’t know what to do but after that the boss he told me like how to like weed the plants or that and like stack the plants up and that. And that’s all and plant plants. [*But did he ever talk about doing it in a safe way?*] No.” In response to a question about having received safety training, Participant 24 (boy aged 16) replied,

No. Just, well, some things my parents teach me like when I’m doing something new, they would just teach me do this or do this, and less than 30 minutes, I would know what I’m doing,... Oh, well, something that’s safe? Probably when we were on the breaks, he would just say, “Try not to do this or do – ‘cause you might get hurt, or don’t grab it from here.” Stuff like that, but it’s really rare.”

Similarly, Participant 23 (boy aged 17) stated,

Safety training? The only safety training I’ve received is when I had to spray the cornfield, and the owner taught me how to use a backpack spray, and how to spray properly, so that way none of the stuff came back, back onto me.... Make sure the nozzle’s always pointing away, and walk backwards – that’s the most basic thing, because in cornfield, the wind doesn’t really get in, into it that much, so it’s not gonna spray back onto you, even with the wind.

A few participants did note that they received safety information separately from task information. This was always related to pesticide safety. For example, Participant 27 (boy aged 17) noted that his supervisor showed a safety video at the beginning of the season.

Yeah, I mean, just wear gloves. They show you a movie, too, you know, and, you need to use the restroom,... when you’re gonna go eat, you need to get out the fields to where they have their, the tables and stuff for them to eat... we get all the workers, we put ‘em in one place, and just, watch the movie.... [*The video covers*] the chemicals and everything, not goof off, with the hat – they show you what’s dangerous, there, like, the stuff you can’t touch, stuff you can’t do, stuff like that.... I don’t remember, but it’s pretty long, like, 30 minutes, an hour.

The second dimension was whether the training was provided in a formal setting, or if it was provided informally in the course of completing a task. As noted by

Participant 27, some do get some safety training in a formal setting, but this is rare. Participant 2 (boy aged 13) noted that he was required to sign a form after watching a safety video.

They, they made me sign a paper... It was a paper that we always had to wear gloves and hairnets and they, they just showed me all the safety hazards of what happens if like I get caught in the net and stuff and they just – they make you sign a paper. I forgot what it said. Yeah, that's about it. [*Who makes you sign that paper?*] The manager.

In a semblance of formal safety training, several participants noted that they received pesticide safety training during parent-child meetings at a younger sibling's Head Start program.

No. No [I have not received training about how to work safely]. At the daycare that my sister goes to, we go there for parent meetings, and then they just tell – they just tell us what we've got to wear and how to – and be aware of pesticide and all that. Besides that, no, not really....Like, the daycare she goes to, it's like Telamon Corporation

(Participant 15, girl aged 13).

Where my little sister goes in daycare, they would tell us about how to do when there's a baby home. If you worked in the fields you have to be careful 'cause you have a lot of chemicals on you (Participant 22, girl aged 17).

The third dimension was who provided the training, co-workers (often family members) or their supervisors. Many of the child farmworkers discussed the training they received from co-workers. Participant 14 (girl aged 16) stated that, "I just went to work and my mom told me how to do it or the ladies there would tell me how to do it, but no [safety training]." When her mother stopped working due to pregnancy, she noted, "One of them was like really good friends with my mom so they would tell me." Similarly, Participant 10 (boy aged 14) stated,

Last year, since my mom was here, she's like, "Oh do this, do that." She's, you know how moms are. And since there was some [gloves] laying around, well, you know, just put them on....Well, she told me that, hold the [tomato stake] tighter, so blisters don't come out. But, like, I forget, and they came out. And then she tells me to put tapes on my fingers, and everything, that you can make sure that the twine rope's tight, and everything. And, well, basically just to do the work right, how it's supposed to be – not perfect-perfect, but not really messed up; just try to make it right. [*Does your dad ever tell you anything like that?*] Yeah, when he's around, but he's mainly doing other stuff, 'cause he has a separate job that he has to do, so he's, like, in a different place.

This interchange with Participant 11 (boy aged 15) indicates the importance of parents in providing safety training.

Interviewer: Tell me about the safety training that you have received?

Participant 11: Just mostly wash your hands.

Interviewer: Just wash your hands?

Participant 11: Be careful and wear a hat. That's kind of all.

Interviewer: Has anyone told you how to do things in a safe way?

Participant 11: I guess when I was a little bit smaller, my dad would tell me put the – put the bucket on top of a stick and then put it on your shoulders. So don't carry it all, like, at the same – like, don't throw it up on your shoulders right away 'cause it can go fall. So you would go one step at a time.

Interviewer: Anything else?

Participant 11: Um, look – like, watch out for tomatoes. Or, if I'm on top, watch out where I throw them. That's kind of it.

Interviewer: Yeah. What about any sort of like training about pesticides or anything?

Participant 11: Just wash your hands.

Some of the safety training (informal as well as formal) was presented to these child farmworkers by their supervisors (employers, crew leaders, *contratistas*). Participant 6 (girl aged 15) noted what her supervisor said.

They tell us not to work with our bare hands, because we might get stabbed. And they help us out, they give you pads or they give you, not what to do, what to do. Like when you're on a tractor. You can't just leave it alone or just be zoning off the whole time. They tell us – when you're working, and they make sure – there's this one section where it has a lot of rocks, so they make sure you know there's a lot of rocks there.... He tells you, "Be careful here. You have to – whenever you're planting, you have to be careful because there's big rocks." And they let us know, so whenever you encounter a big rock, you just take it out of the plastic and put it aside."

This interchange with Participant 7 (boy aged 15) illustrates that informal training was provided by both his co-workers and his supervisor.

Interviewer: Who told you that?

Participant 7: Um, the people that work there.

Interviewer: The people that work with you?

Participant 7: Yes, they told me that you have to take care of yourself, protect yourself and put something over your head or – or to wear, I don't know, long sleeves so that you don't get cancer. Or else you get sick.

Interviewer: Okay. And did – did the contractor talk to you about safety? Like how to do the job right so that nothing happened to you?

Participant 7: Yes.

Interviewer: Yes? Tell me a little about that.

Participant 7: Uh, he says that we should go slowly [when hammering in tomato stakes] and not too fast because sometimes the stake can break and sometimes the hammer can hit you on the head or – or on the foot sometimes.

Interviewer: Okay. And aside from the training on the hammer, for your safety, has there been any other training?

Participant 7: No.

4 DISCUSSION

The work safety culture described by these North Carolina hired Latinx child farmworkers is severely limited. They are restrained in stating how they value safety, although they understand that their parents want them to be safe. They observe that safety is important only to some of those with whom they work. Some believe that their employers and supervisors want them to work safely, but others observe that their employers and supervisors care little about safety and more about production. They recognize many of the hazards they confront while working, but it is not clear that they know how to mitigate these hazards or how to use the knowledge they do have in mitigating these hazards. They receive almost no safety training, and much of the training they receive is informally provided by family members and co-workers. In cases when formal work-safety training is provided, it is not clear that training developed for adults has been adapted for children and adolescents. Without adaptation, children and adolescents may not fully understand the work safety training content, and may be less clear on the work-safety demands and risks or consequences relative to adults. Additional research is needed to delineate the effects of the demands and hazards of youth farm work and work safety culture and training on youth emotional, behavioral, and physical development.

The high rates of injury and death for children working in agriculture reflect the safety values experienced by these child farmworkers.^{3–6} The situation portrayed by these child farmworkers also substantiates the results of statistical analysis of the occupational health of children working in agriculture, which show that risk taking is common, many engage in unsafe work behaviors, and few receive formal safety training.^{18,25,27,38–40} Most importantly, it reinforces what has been shown in other research on hired Latinx child farmworkers in the United States that indicates that they are ill prepared to work safely.^{18,26–29,41} Their age contributes to this lack of preparedness and contributes to the significant injuries they experience.^{17,42–44}

Work safety culture¹⁹ provides a useful framework for examining safety for Latinx child farmworkers. The only analyses of safety culture and work safety climate for Latinx child

farmworkers are based on pilot structured interview data for this study.^{18,41} Kearney et al.⁴¹ report that the responses of most child farmworkers indicate a poor work safety climate; for example, in response to a question asking the participants how much their supervisors cared about safety, 38% responded that their supervisors were only interested in doing the job fast and cheaply, and 41% responded that their supervisors could do more to make the job safe. Arcury et al.¹⁸ reports that the work culture on farms employing child farmworkers did not support safety, with few of the child farmworkers receiving safety training, many of the child farmworkers allowed to engage in unsafe work behaviors, and a substantial number being sexually harassed.

Comparative data for elements of the work safety culture of child farmworkers, particularly safety training, are available in a few studies. For example, McCurdy and Kwan³⁹ found that, while they engaged in hazardous work, Latinx children working on farms, similar to non-Hispanic white children working on farms, often do not use safety goggles, hearing protection, respirators, safety helmets or seatbelts to mitigate hazards. Analyses of safety training among child farmworkers underscore the limitations of this work safety culture situational element. McCurdy et al.³⁰ found among rural California high school students, parents were more frequently reported as “very important” sources of agricultural safety information than were any other source, including high school agricultural course teachers, FFA and 4-H. Arcury et al.¹⁸ found that 8% of Latinx child farmworkers reported that they had ever received pesticide training, 22% reported that they had ever received training in using tools, and 8% reported that they ever received training in using machinery. Shipp et al.²⁶ reported that 19% of the adolescent farmworkers they interviewed received pesticide safety training, while McCauley et al.²⁷ found that one-third of the adolescent farmworkers they interviewed received pesticide safety training.

The near universal lack of pesticide safety training among the North Carolina child farmworkers interviewed for this analysis and those who participated in other studies is particularly troubling. Pesticide exposure has been linked to numerous immediate and long-term health problems.^{45–46} Importantly, the US EPA Worker Protection Standard (WPS)⁴⁷ is the only safety training that is required for agricultural workers. In its current form (implemented in 2018), the WPS requires annual pesticide safety training; it also mandates that those under age 18 cannot handle or apply pesticides. In their previous form, these regulations required that workers be trained by the time they accumulated 5 days of exposure (across their lifetime) to places in which restricted use pesticides had been applied in the previous 30 days; those under age 18 could handle and apply pesticides. This training was to be repeated every 5 years. All of the children interviewed for this study should have received pesticide safety training from a WPS certified instructor; none of the children interviewed for this study could now handle or apply pesticides. It appears only one or two may have received this training; none of the participants mentioned the WPS or EPA by name.

Three of the children interviewed for this study did mention receiving pesticide information at the “daycare” centers which their younger siblings attended. These are Migrant Head Start program centers operated by Telemon Corporation (<http://www.telamon.org/>) or East Coast Migrant Head Start Project (<http://www.ecmhsp.org/>). It is encouraging that these programs

are providing this important information to parents and older siblings of their young children, but it is not a substitute for the required WPS training by employers. Engaging existing educational programs (e.g., Migrant Education), and health outreach programs could provide a foundation for improving how child farmworkers value safety.

Delineating the work safety culture of Latinx child farmworkers provides suggestions on developing processes to improve their safety. The first of these is that efforts to improve safety for child farmworkers needs to go beyond these children by addressing the attitudes and practices of their employers and supervisors, and their adult co-workers. While providing safety training to child farmworkers is important, it is not sufficient for providing a safe work environment. Employers and supervisors generally are only sometimes perceived by child farmworkers to value safety, and required safety training should be directed toward those who supervise farmworkers.

“Safety training” is touted as the key to improving occupational safety in agriculture, yet these child farmworkers report receiving almost no formal training. Most safety training is directed at a task, and it appears to more often be presented informally by family members and co-workers than by supervisors. It is important that safety training be incorporated into the hiring process and revisited as tasks changes across the season. Materials for such ongoing training is available in many forms, including “tailgate safety” meetings (e.g., Gempler’s Tailgate Training Safety Series; <http://linux.geodatapub.com/shipwebpages/gemplers.html>).

These findings should be interpreted in light of this study’s limitations. The study was conducted in a single state in the southeastern US, so results may not apply to other areas of the country. It recruited a purposive, nonrandom sample and so the results cannot be used to establish statistical associations between child characteristics and health outcomes. However, this study used a sampling strategy designed to draw upon major dimensions of variability within the Latinx child farmworker population (gender, age, migrant status, agricultural crops). It is one of the first systematic studies to explore the safety experiences of child farmworkers in their own words.

5 CONCLUSION

The results of this analysis document that child agricultural workers do not perceive that their work environments are safe. They perceive that many of the people they work for and work with do not value safety, and do not behave safely in the face of recognized hazards. They are provided with little formal training that addresses the hazards of the agricultural work place. Being told to “be careful” is insufficient. The result is limited work safety culture. These results do not differ from other research with farmworkers employed in the United States or elsewhere. The participants in this study who work in the face of this unsafe work culture are a great concern because they are children as young as 10 years of age, and are therefore far more vulnerable to workplace hazards and have less power to ensure their own safety. Other research has shown that farmers believe risk is just part of agriculture and do little to ameliorate it for themselves^{48–49} or for their children.^{50–52} Greater effort is needed to develop and enforce regulations that change the organization of agricultural work

to improve work safety culture for everyone who works in agriculture, but especially for children and adolescents, given their increased risk resulting from developmental issues. A first step is to limit the ages at which any child can engage in farm work, and have a higher age for performing hazardous agricultural tasks.

Acknowledgements:

The authors appreciate the support of numerous community organizations who helped facilitate participant recruitment. We especially thank the children who were interviewed for this study.

Funding: This research was supported by a grant from the Eunice Kennedy Shriver National Institute for Child Health and Human Development (R01 HD084420). The Institute had no involvement in the study conduct, in writing the paper, or in the decision to submit it for publication.

REFERENCES

1. Bureau of Labor Statistics (BLS), US Department of Labor. Injuries, Illnesses, and Fatalities. Industry Injury and Illness Data – 2017. https://www.bls.gov/iif/oshsum.htm#94Quartile_Data Accessed April 11, 2019.
2. Bureau of Labor Statistics. National Census of Fatal Occupational Injuries in 2017. <https://www.bls.gov/news.release/pdf/foi.pdf> Accessed April 11, 2019.
3. Goldcamp M, Hendricks KJ, Myers JR. Farm fatalities to youth 1995–2000: A comparison by age groups. *J Safety Res.* 2004;35:151–157. [PubMed: 15178233]
4. Hard DL, Myers JR. Fatal work-related injuries in the agriculture production sector among youth in the United States, 1992–2002. *J Agromedicine.* 2006;11:57–65. [PubMed: 17135143]
5. Zaloshnja E, Miller TR, Lawrence B. Incidence and cost of injury among youth in agricultural settings, United States, 2001–2006. *Pediatrics.* 2012;129:728–734. [PubMed: 22412022]
6. National Children’s Center for Rural and Agricultural Health and Safety. 2018 Fact Sheet: Childhood Agricultural Injuries in the U.S <http://www.marshfieldresearch.org/nccrahs>. Accessed March 20, 2019.
7. Lee BC, Gallagher SS, Liebman AK, Miller ME, Marlenga B. Developing the 2012 national action plan for protecting children in agriculture. *J Agromedicine.* 2012;17:88–93. [PubMed: 22490023]
8. McLaurin JA, Liebman AK. Unique agricultural safety and health issues of migrant and immigrant children. *J Agromedicine.* 2012;17:86–196.
9. Miller ME. Historical background of the child labor regulations: strengths and limitations of the agricultural hazardous occupations orders. *J Agromedicine.* 2012;17:163–185. [PubMed: 22490029]
10. Wiggins M Farm labor and the struggle for justice in the eastern United States In: Arcury TA, Quandt SA, eds. *Latino Farmworkers in the Eastern United States: Health, Safety, and*
11. US Department of Labor, Wage and Hour Division. Child Labor Bulletin 102 Child labor requirements in agricultural occupations under the Fair Labor Standards Act. WH1295. Washington, DC: US Department of Labor, 2016 <https://www.dol.gov/whd/regs/compliance/childlabor102.pdf>. Accessed March 18, 2019.
12. Marlenga B, Lee BC, Pickett W. Guidelines for children’s work in agriculture: Implications for the future. *J Agromedicine.* 2012;17(2):140–148. [PubMed: 22490027]
13. Gonzalez-Alzaga B, Lacasana M, Aguilar-Garduno C, Rodriguez-Barranco M, Ballester F, Rebagliato M, Hernandez AF. A systematic review of neurodevelopmental effects of prenatal and postnatal organophosphate pesticide exposure. *Toxicol Lett.* 2014;230(2):104–121 [PubMed: 24291036]
14. Calkins SD. Conceptual and methodological challenges to the study of emotion regulation and psychopathology. *J Psychopath Behav Assess.* 2010;32:92–95.
15. Steinberg L, Dahl R, Keating D, Kupfer D, Masten A, Pine D. Psychopathology in adolescence: Integrating affective neuroscience with the study of context In Cicchetti D & Cohen D, eds. *Developmental psychopathology, Vol. 2: Developmental neuroscience.* New York: Wiley 2006: 710–741.

16. Steinberg L Risk-taking in adolescence: New perspectives from brain and behavioral science. *Cur Dir Psychol Sci* 2007;16:55–59.
17. Arcury TA, Rodriguez G, Kearney GD, Arcury JT, Quandt SA. Safety and injury characteristics of youth farmworkers in North Carolina: a pilot study. *J Agromedicine*. 2014;19(4):354–363. [PubMed: 25275401]
18. Arcury TA, Kearney GD, Rodriguez G, Arcury JT, Quandt SA. Work safety culture of youth farmworkers in North Carolina: A pilot study. *Am J Public Health*. 2015;105(2):344–350. [PubMed: 25521896]
19. Cooper MD. Towards a model of safety culture. *Saf Sci*. 2000;36(2):111–136.
20. Cullen WD. The Public Inquiry into the Piper Alpha Disaster. HMSO, London 1990.
21. Zohar D Safety climate in industrial organizations: theoretical and applied implications. *J Appl Psychol*. 1980;65(1):96–102. [PubMed: 7364709]
22. Zohar D Thirty years of safety climate research: reflections and future directions. *Accid Anal Prev*. 2010;42(5):1517–1522. [PubMed: 20538108]
23. Bandura A Social Learning Theory. Englewood Cliffs, NJ: Prentice-Hall 1976.
24. Bandura A Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice-Hall 1986.
25. Westaby JD, Lee BC. Antecedents of injury among youth in agricultural settings: a longitudinal examination of safety consciousness, dangerous risk taking, and safety knowledge. *J Safety Res*. 2003;34(3): 227–240. [PubMed: 12963069]
26. Shipp EM, Cooper SP, del Junco DJ, Bolin JN, Whitworth RE, Cooper CJ. Pesticide safety training among farmworker adolescents from Starr County, Texas. *J Agric Saf Health*. 2007;13(3):311–321. [PubMed: 17892073]
27. McCauley LA, Sticker D, Bryan C, Lasarev MR, Scherer JA. Pesticide knowledge and risk perception among adolescent Latino farmworkers. *J Agric Saf Health*. 2002;8:397–409. [PubMed: 12549244]
28. Perla ME, Iman E, Campos L, et al. Agricultural occupational health and safety perspectives among Latino-American youth. *J Agromedicine*. 2015;20(2):167–77. [PubMed: 25906275]
29. Salazar MK, Napolitano M, Scherer JA, McCauley LA. Hispanic adolescent farmworkers' perceptions associated with pesticide exposure. *West J Nurs Res*. 2004;26:146–166. [PubMed: 15005979]
30. McCurdy SA, Xiao H, Kwan JA. Agricultural injury among rural California public high school students. *Am J Ind Med*. 2012;55(1):63–75. [PubMed: 21882215]
31. Quandt SA, Arnold TJ, Mora DC, Sandberg JC, Daniel SS, Arcury TA. Hired Latinx child farm labor: The Demand-support-control model applied to a vulnerable worker population. *Amer J Ind Med*. In press 2 8 2019
32. Arcury TA, Rodriguez G, Kearney GD, Arcury JT, Quandt SA. Safety and injury characteristics of youth farmworkers in North Carolina: a pilot study. *J Agromedicine*. 2014;19(4):354–363. [PubMed: 25275401]
33. Peoples JD, Bishop J, Barrera B, et al. Health, occupational and environmental risks of emancipated migrant farmworker youth. *J Health Care Poor Underserved*. 2010;21:1215–1226. [PubMed: 21099073]
34. Ragin C The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies. Berkeley, CA: University of California Press 1989.
35. Arcury TA, Quandt SA, Bell RA. Staying healthy: the salience and meaning of health maintenance behaviors among rural older adults in North Carolina. *Soc Sci Med*. 2001;53:1541–1556. [PubMed: 11710428]
36. Buetow S Thematic analysis and its reconceptualization as 'saliency analysis'. *J Health Serv Res Policy*. 2010;15(2):123–125. [PubMed: 19762883]
37. Miles MB, Huberman MA. Qualitative Data Analysis. 2nd ed Thousand Oaks CA: Sage 1994.
38. McCurdy SA, Kwan JA. Agricultural injury risk among rural California public high school students: prospective results. *Am J Ind Med*. 2012;55(7):631–642. [PubMed: 22069123]

39. McCurdy SA, Kwan JA. Ethnic and gender differences in farm tasks and safety practices among rural California farm youth. *J Occup Environ Hyg*. 2012;9(6):362–370. [PubMed: 22554116]
40. Schulman MD, Evensen CT, Runyan CW, Cohen LR, Dunn KA. Farm work is dangerous for teens: Agricultural hazards and injuries among North Carolina teens. *J Rural Health*. 1997;13:295–305. [PubMed: 10177151]
41. Kearney GD, Rodriguez G, Quandt SA, Arcury JT, Arcury TA. Work safety climate, safety behaviors, and occupational injuries of youth farmworkers in North Carolina. *Am J Public Health*. 2015;105(7):1336–1343. [PubMed: 25973817]
42. Shipp EM, Cooper SP, Del Junco DJ, Delclos GL, Burau KD, Tortolero SR. Severe back pain among farmworker high school students from Starr County, Texas: Baseline results. *Ann Epidemiol*. 2007;17:132–141. [PubMed: 17027295]
43. Shipp EM, Cooper SP, del Junco DJ, Cooper CJ, Whitworth RE. Acute occupational injury among adolescent farmworkers from South Texas. *Inj Prev*. 2013;19:264–270. [PubMed: 23143346]
44. Whitworth KW, Shipp EM, Cooper SP, Del Junco DJ. A pilot study of symptoms of neurotoxicity and injury among adolescent farmworkers in Starr County, Texas. *Int J Occup Environ Health*. 2010;16:138–144. [PubMed: 20465058]
45. Quandt SA, Hernández-Valero MA, Grzywacz JG, Hovey JD, Gonzales M, Arcury TA. Workplace, household, and personal predictors of pesticide exposure and health outcomes for farmworkers. *Environ Health Perspect*. 2006;114: 943–952. [PubMed: 16759999]
46. Arcury TA, Quandt SA. Pesticide Exposure among farmworkers and their families in the eastern United States: Matters of social and environmental justice In: Arcury TA, Quandt SA, eds. *Latino Farmworkers in the Eastern United States: Health, Safety, and Justice*. New York: Springer 2009: 103–129.
47. US Environmental Protection Agency. Agricultural Worker Protection Standard (WPS) (<https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps>) Accessed March 18, 2019.
48. Pratt DS, Marvel LH, Darrow D et al. The dangers of dairy farming: the injury experience of 600 workers followed for two years. *Am J Ind Med* 1992;21:637–650 [PubMed: 1609811]
49. Sorensen JA, May JJ, Paap K et al. Encouraging farmers to retrofit tractors: a qualitative analysis of risk perceptions among a group of high-risk farmers in New York. *J Agric Saf Health* 2008;14:105–117 [PubMed: 18376539]
50. Darragh AR, Stallones L, Sample PL, Sweitzer K. Perceptions of farm hazards and personal safety behavior among adolescent farmworkers. *J Agric Saf Health*. 1998; Special Issue (1): 159–169.
51. Neufeld S, Wright SM, Gaut J. Not raising a “bubble kid”: farm parents’ attitudes and practices regarding the employment, training and supervision of their children. *J Rural Health*. 2002;18:57–66. [PubMed: 12043756]
52. Summers P, Quandt SA, Spears Johnson CR, Arcury TA. Child work safety on the farms of local agricultural market producers: Parent and child perspectives. *J Agromedicine*. 2018;23:52–59. [PubMed: 28976287]

Table 1:

Personal Characteristics of Study Participants (N=30)

Personal Characteristics	N	%
Gender		
Female	13	43
Male	17	57
North Carolina Region		
Eastern	14	47
Western	16	53
Age (years)		
10	1	3
11	1	3
12	3	10
13	4	13
14	4	13
15	7	23
16	5	17
17	5	17
First season working for pay in agriculture	8	27
Interview Language		
English	23	77
Spanish	7	23
Farmworker Status		
Seasonal	16	53
Migrant (accompanied by parent)	11	37
Unaccompanied migrant	3	10
Most Recent Crop Experience		
Tomato	11	37
Tobacco	6	20
Blueberry	5	17
Nursery	2	7
Bean	1	3
Bell pepper	1	3
Chile pepper	1	3
Grapes	1	3
Peas	1	3
Squash	1	3