Evaluating Teen Farmworker Education:

An Evaluation of a High School ESL Health and Safety Curriculum

Final Performance Report

November 2004

Submitted to the National Institute for Occupational Safety and Health

Grant Number: R01 OH04222-01

Principal Investigator: Robin Baker, MPH
Director, Labor Occupational Health Program,
UC Berkeley

Co-Principal Investigator: James Meyers, Ed.D.
Center for Occupational and Environmental Health,
UC Berkeley

Project Coordinator: Suzanne Teran, MPH
Health Educator, Labor Occupational Health Program
UC Berkeley

Contact Information:
Labor Occupational Health Program, UC Berkeley
2223 Fulton Street, Fourth Floor
Berkeley, CA 94720-5120
(510) 642-5507

Table of Contents

List of tables

Abstract

Children and adolescents working in agriculture face significant health and safety risks and experience work-related injuries and illnesses at a higher rate than youth working in other industries. Most research to date has focused on youth on family farms, and very little data is available on hired teens. There are needs both to better document the characteristics of hired teens and their experience with injury and illness and to pilot and evaluate interventions for educating and protecting these teens.

The *Teens Working in Agriculture* English as a Second Language (ESL) curriculum is designed to provide teen agricultural workers with the knowledge and tools to protect their health and safety in the fields. The six-session curriculum focuses on three outcome areas: *increased knowledge,* about laws protecting teen agricultural workers, health and safety hazards, ways to address those hazards and where youth can report them; *improved attitudes,* including the awareness of the dangers inherent in agricultural labor and the understanding by youth that they can take actions to protect their health and safety; and *new behaviors* that will reduce the risk of work-related injuries and illnesses.

The specific aims of the study were to: 1) assess whether students who participated in the curriculum would demonstrate an increase in knowledge and improved attitudes and behaviors regarding health and safety, as compared to a comparison group; 2) assess whether a community-based intervention, in the form of workshops on health and safety for parents of students receiving the curriculum, would increase outcomes even further; and 3) explore and pilot outreach and education methods that could be successful in reaching hired teen farmworkers.

Approach: The project targeted young farmworkers who were enrolled in high school ESL classes in several counties of California's San Joaquin Valley. Using a quasi-experimental design, the research included three study groups consisting of over 2,000 students. One intervention group consisted of students receiving the school-based curriculum, while the second intervention group included students who received the curriculum and whose parents/guardians attended community-based workshops on health and safety. A comparison group consisted of students who were enrolled in ESL classes but who did not receive any intervention. Changes in knowledge and attitudes were evaluated by means of pre- and post-tests that were administered to students in the intervention and comparison groups. Knowledge retention and behavior change were measured via a follow-up survey conducted with intervention and comparison group students who worked in the fields the summer following the curriculum. The quantitative data were complemented with qualitative data gathered from focus groups with students, as well as from interviews with teachers implementing the curriculum and parents attending the community-based workshops.

Findings: The study found that a school-based ESL curriculum is an effective intervention to reach and educate teen farmworkers. The research findings reveal that the curriculum has had a number of impacts with respect to the three principal outcomes. There was a significant impact in terms of increases in **knowledge** among students who received the curriculum. There were significant increases, for example, in students' awareness of laws that protect workers' health and safety. Students in the intervention group that knew of laws that protect workers increased

from 17% at baseline to 67% at post-test, to 57% at follow-up. (Comparison group went from 13% to 13% to 18%.) The intervention group was also able to identify a greater number of problems and solutions, and to provide more specific examples of these.

A twelve-question section gauged student **attitudes** toward health and safety in the fields at pre- and post-test. The percentage of the intervention group answering *all* questions correctly increased from 37% at pre-test to 53% at post-test, with a more modest increase of 37% to 42% among the comparison group. Students in both groups scored highly on the attitudinal questions at pre-test, such that the increases from pre to post were small.

Nearly half of the intervention group reported implementing new **behaviors** to protect their health and safety, compared with 33% of those in the comparison group. The most notable behavior changes among students in the intervention group were the percentage of youth under the age of 16 who reported working with pesticides, which decreased by 96%, and the percentage of youth under age 16 who reported driving a tractor, a 93% decrease. Other notable impacts included a 49% increase in the percentage of respondents not lifting heavy items without asking for help, and a 20% increase in youth reporting wearing long-sleeved shirts for protection from the sun. However, interpretation of the data on behavior is limited by a low response rate.

With respect to the study's second aim of assessing the **impact of community workshops** for parents, the research findings reveal virtually no associations between parent participation in health and safety workshops and student outcomes. Parents, however, responded to the community workshops with enthusiasm and the majority reported talking to their children about what they had learned.

The curriculum also had spillover effects beyond the students; 73% of follow-up survey respondents in the intervention group reported sharing information learned in the classes with others. Of those, the majority (74%) shared information with parents, followed by friends (32%), relatives (31%) and coworkers (19%). The fact that so many youth shared this information with parents, siblings, other relatives, friends and coworkers indicates the important role youth can play in educating other farmworkers.

Data limitations include the fact that the evaluation was not able to include sufficient numbers of students who had completed all three surveys to meet power calculation criteria, which may have limited our ability to detect subtle differences between groups. Also, all data gathered on attitudes and behaviors is based on self-report.

***Conclusions*:** The research findings demonstrate that the *Teens Working in Agriculture* curriculum is an effective means of teaching adolescent farmworkers in California about agricultural health and safety. The study also shows that school-based ESL classes can serve as a much needed access point for young farmworkers, as over half of the intervention group students reported working in agriculture. Teachers were willing to teach the curriculum, and those who came from farmworker families themselves were particularly enthusiastic about providing teens with this information. The need for this information is also evident. Only one-fourth of all students reported getting information about health and safety through other venues, such as other classes, work or in the community.

Significant Findings

There are few points of easy access to reach hired teen farmworkers. This evaluation study shows that high school ESL classes are a successful mechanism for reaching these young workers. The research findings demonstrate that the *Teens Working in Agriculture* curriculum is an effective means of teaching adolescent farmworkers about agricultural health and safety.

Specific Aim #1: Impact of curriculum on knowledge, attitude and behavior of students

The study found that the curriculum was effective in increasing knowledge about agricultural health and safety hazards and solutions, as well as about laws that protect workers. There were significant differences in these variables between intervention and comparison groups. The study also suggests that the curriculum can result in improved attitudes and new behaviors to prevent injuries and illnesses in the field. However, the findings related to attitude and behavior should be interpreted with caution because of the higher than expected pre-test scores regarding attitude and because of the lower than expected sample size regarding behavior. Qualitative data demonstrates enthusiasm for the curriculum from students, teachers and parents. Those data support the quantitative data findings regarding changes in attitudes and behaviors among participating students.

Key Findings: Knowledge

Intervention group students demonstrated significantly greater increases in knowledge of laws, hazards, solutions and resources to report problems.

- There was a significant increase in the percentage of intervention group students reporting knowledge of laws protecting teen agricultural workers from pre to post-test.
- Significantly more intervention group students responding to the follow-up survey were able to cite at least one law protecting teen farmworkers than those in the comparison group.
- There was an increase from pre- to post-test in the percentage of intervention county students who knew of places to report health and safety problems.
- Intervention group students were able to name a greater number of – and more specific – health and safety hazards and solutions on the post-test than those in the comparison group.

Key Findings: Attitudes

- The was a greater increase in the percentage of intervention group students displaying positive attitudes with respect to all attitudinal questions (i.e. scored "100%) than in the comparison group.

- Attitudes changing the most were the belief that it is dangerous to ride a tractor when someone else is driving, teens' perceptions of their ability to avoid accidents or illness in the fields and attitudes regarding the dangers of pesticides.

- In the follow-up survey, 92% of intervention group students reported being more aware of health and safety problems, compared with 63% of comparison group students. The majority of students attributed greater awareness of health and safety problems to the ESL classes.

Key Findings: Behaviors

- Nearly half of intervention group students reported implementing new behaviors to protect their health and safety in the fields.

- The most notable behavior changes among intervention group students were the percentage of youth under the age of 16 who reported working with pesticides, which decreased by 96%, and the percentage of youth under age 16 who reported driving a tractor, which fell by 93%.

- Other notable impacts on behavior included the percent of respondents who reported not lifting heavy items without asking for help, and the percent who reported wearing long-sleeved shirts for protection from the sun.

- The curriculum had spillover effects beyond the students, with 73% of follow-up survey respondents reporting sharing information with others, including parents, friends, other relatives, and coworkers.

- Student comments that exemplify behavior changes, taken from the focus group, include:
  -- "Because of the classes, I spoke to my dad, and my dad spoke to the foreman and they improved the conditions of the bathrooms."
  -- "Now we wash our clothes separately. When I get home, the first thing I do is take off my clothes. Before we used to go straight to bed and lay down, but now we take off our clothes and take a shower when we get home."
  -- "I used to get on the tractors for fun, but now I don't anymore, because it's dangerous."
  -- "Now I wear long sleeves in the fields. Before I used to take my shirt off, but now I don't."

Specific Aim #2: Impacts of parent workshops on student outcomes.

This study suggests that workshops for parents did not have any additional impacts on student knowledge, attitude and behavior outcomes. Parents who attended the workshops were, however, very enthusiastic about the information they learned, and reported sharing that information with their children. Nonetheless, recruitment for parent workshops had many challenges and proved to be very labor and resource intensive.

Specific Aim #3: To explore and pilot outreach and education methods that could be successful for reaching youth in the fields

In the final year of the project, CRLA carried out a number of community activities to reach teenagers or their parents with health and safety information drawn from the *Teens Working in Agriculture* curriculum. CRLA also developed a campaign to distribute water bottles to teens, together with a wallet-sized card that listed key rights and contact information for CRLA. Of all the activities, the collaborations that were seen as most successful were with the Migrant Education Programs and with Radio Bilingue and Radio Campesina. The instructors from Migrant Education were very interested in the curriculum and the information it conveyed, and enthusiastically supported these efforts. Both radio stations were interested in interviews or special programming about the legal rights of teen agricultural workers as well as health and safety issues related to this work. Health festivals were also very useful, as workers and others were there already looking for help and information on health issues. One of the most critical aspects of successful outreach was having an outreach worker who used to work in the fields and was a parent herself.

Outreach through youth camps (albergues) on the border in Mexico, where youth congregate before entering the U.S. to work, and through field inspections was found to be less successful.

Successful Model

As an educational intervention, this study found that the *Teens Working in Agriculture* curriculum is a successful model for reaching and teaching teen farmworkers about agricultural health and safety. ESL classes can provide a key access point because the students are working in the fields (54% of students in the intervention group worked in the fields). In addition, most teachers are willing to teach the curriculum and are enthusiastic about it.

Reaching Broader Community

The curriculum had spill-over effects in the broader community, as the majority of students reported that they had shared the information taught in the curriculum with parents, family members and co-workers.

Usefulness of Findings

This study is unique in that it targeted *hired* teen farmworkers, rather than youth working on family farms. While childhood agricultural injury prevention has long been recognized as an important public health issue, most research has focused on family farms and there have not been many interventions or epidemiological studies targeting hired youth. Hired teen farmworkers form a group of workers that is difficult to identify and reach in sizeable numbers. This study found that a school-based ESL curriculum is a successful intervention for reaching these workers and teaching them about occupational safety and health. The demographic findings of this study will also contribute to creating a picture of hired youth in the fields.

Teaching the *Teens Working in Agriculture* curriculum in high school ESL classes is useful in the prevention of occupational injury and illness in that it provides a means to teach young workers about hazards and possible steps they can take to reduce their risk, as well as about the laws that protect them. The findings show it is an effective means of teaching adolescent farmworkers about these issues, and that this information is much needed. In this study, only 22.0% of intervention and 14.9% of comparison group students reported receiving other classes or training on agricultural health and safety prior to the pre-test.[1] The fact that teachers are willing to teach it and received it enthusiastically indicates the model could be broadly disseminated. This study's findings will help encourage teachers to incorporate the curriculum into their teaching. Presentations of the evaluation findings have also met with enthusiastic responses among farmworker advocates, who have expressed interest in adopting this curriculum in schools in their regions.

The youth in this study are representative of one group of hired teens; those who live in agricultural communities and are enrolled in school. More extensive evaluation of other community-based outreach methods are needed, especially to reach youth who are not enrolled in school and are likely to be "emancipated" youth – i.e., those who come to the U.S. without their families. This is an increasingly important population. Data from the National Agricultural Workers Survey (NAWS) indicate that the percentage of emancipated youth (ages 14-17) rose dramatically during the period 1989-1990 to 2000-2002.

Although the parent workshops did not significantly improve the outcomes for youth in this study, it would be interesting to explore other methods for reaching youth through people who play a significant role in their lives. Finally, there is a continued need for a greater focus on *hired* teen farmworkers, to develop a better understanding of the characteristics of youth working in the fields, their experience with occupational injury and illness and successful interventions to protect their health and safety.

[1] Due to time limitations in the survey, we do not know if students were referring to classes at work or at school.

Scientific Report

Background

While childhood agricultural injury prevention has long been recognized as an important public health issue, most research has focused on family farms and there have not been many interventions or epidemiological studies targeting hired youth. This project sought to evaluate an intervention targeting hired youth, mostly Latino immigrants, through high school English as a Second Language (ESL) classes. Over a two-year period, 1,669 youth in high school ESL classes in California's key agricultural regions received a six-lesson curriculum with information on occupational health and safety in the fields.

This research project involved a collaborative that included a university-based health and safety program (the Labor Occupational Health Program –LOHP– at UC Berkeley), a community organization (California Rural Legal Assistance – CRLA) and independent evaluators (Harder+Company Community Research and the California Institute for Rural Studies).

There are few points of easy access to young farmworkers in California. Based on a needs assessment carried out several years ago, LOHP decided to develop an ESL curriculum as a means to reach and teach teens who work in the field. A 1997 survey of ESL students in California's San Joaquin Valley found that an average of 71% of these students worked in agriculture. Farmworker youth enrolled in ESL classes are presumably at even greater risk than youth who speak fluent English, due to issues including legal documentation status and linguistic barriers to information and resources for taking action. Since this represents a potentially significant concentration of farmworker youth, these classes could prove to be a key access point. Schools in general may be one of the few sources of information available to young agricultural workers.

In addition to assessing the effectiveness of the curriculum on its own, this study design incorporates an "enriched program" to evaluate whether the effectiveness of the curriculum is significantly increased when parents and other family members of the students also receive and pass on health and safety information. Studies have shown that change is more likely to occur in a community where there are multiple strategies addressing the same issue (Gielen 1992, Green et al. 1990). Therefore, in some communities, parent workshops were offered in addition to the school-based curriculum.

The Curriculum

The curriculum consists of six 50-minute sessions and is appropriate for intermediate level high school ESL classes. It was designed to meet the required English language standards for ESL classes, while also providing youth with information and skills that they can use to improve their health and safety in the fields. The activities are designed to support curriculum objectives in the *English-Language Arts Curriculum Framework for California Public Schools*, which provides an incentive to ESL instructors to adopt the curriculum. Topics covered include safety procedures in the workplace, health and safety laws and child labor laws that protect teens, identification of special legal rights for teens, and behavioral actions that teens can take to stay

safe at work. Teaching methods are based on well-recognized principles of adult education. Interactive, "hands-on" activities are emphasized, to draw on the teens' own experiences. The Labor Occupational Health Program had previously developed this curriculum in partnership with Proteus, Inc., a nonprofit farmworker service provider in California. The curriculum was developed and pilot tested in 1998 and 1999, and was enthusiastically received by teachers and students.

Specific Aims

The evaluation was designed to measure the effectiveness of the *Teens Working in Agriculture* curriculum on students enrolled in English as a Second Language (ESL) classes in grades 9 through 12 in three counties of California's San Joaquin Valley. The evaluation measured and compared changes in knowledge, attitudes and behaviors among students receiving the curriculum with students in five comparison counties who did not receive the curriculum.

The specific aims of the study were to assess:

1) whether students who participated in at least four of the curriculum's six sessions would demonstrate an increase in knowledge and improved attitudes and behaviors regarding agricultural health and safety, as compared with a comparison group; and,

2) whether a community-based intervention, in the form of workshops on health and safety for parents of students receiving the curriculum, would increase outcomes even further.

In addition to evaluating the curriculum, another specific aim developed in the final year of the project was:

3) to explore and pilot outreach and education methods that could be successful for reaching youth in the fields. Community outreach and education efforts carried out by CRLA in the final year of this project are described in this report.

Procedures and Methodology

The research consisted of a quasi-experimental pre-test-post-test-follow-up nonequivalent comparison group design.

There were two levels of intervention in the study, carried out in counties that lead the state in agricultural production:

1) School-based intervention – students received the curriculum in high schools in Fresno County

2) Enriched program – students received the curriculum in high schools and, for a subset of students, their parents attended community workshops. This program was implemented in Kern and Tulare Counties.

The comparison group consisted of students from three (increased to five in year 2) neighboring counties that had similar demographic and economic patterns. These students completed the pre- and post-tests but did not receive the curriculum.

School-based intervention

The six-session curriculum was administered to students in the intervention group in the spring of 2001 and 2002. Over two years, the project involved teachers and students from 22 schools in three intervention counties and nine schools in five comparison counties. In order to recruit teachers, project partners conducted outreach to schools in the agricultural counties included in the intervention, targeting schools that were most likely to have large numbers of farmworker families. Letters were sent to each ESL teacher as well as the school principals. In the project's first year, 17 teachers were recruited to implement the curriculum. In the second year, eight of these teachers agreed to participate in this study once again, in addition to 16 new teachers. Teachers were offered a $200 stipend for attending a one-day training on the curriculum, implementing the curriculum and then completing related evaluation activities.
In the two spring semesters when the curriculum was implemented, the teachers involved in the program taught the curriculum to 1,669 students.

Community Workshops

California Rural Legal Assistance, Inc. (CRLA) was responsible for organizing the workshops for parents of the ESL students. Workshops were held at each of the schools that participated in the project, and 240 parents and other relatives attended these 1 to 1.5 hour sessions (115 in Year 1 and 125 in Year 2). During the workshop, parents received information about hazards in the fields, child labor laws, and ways they could help their children think about and protect their health and safety. Outreach efforts to recruit parents to the workshops were extensive and included: mailing flyers to parents, sending flyers home with students, radio announcements, posting community flyers, personal telephone calls, personal home visits, offering incentives to students (extra credit in their ESL class, movie theater tickets) as well as to parents ($20 stipend). In addition, there was a raffle at each workshop, and CRLA provided transportation to the site if needed, as well as food and childcare. While recruiting parents to the workshops was labor intensive both years, it should be noted that in the second year outreach workers were more successful and did not have to carry out all the different outreach activities. In the second year, CRLA's two new outreach workers focused on mailing flyers, personal phone calls, student incentives (pizza party at the school if a majority of parents came to the session) and raffles at each workshop.

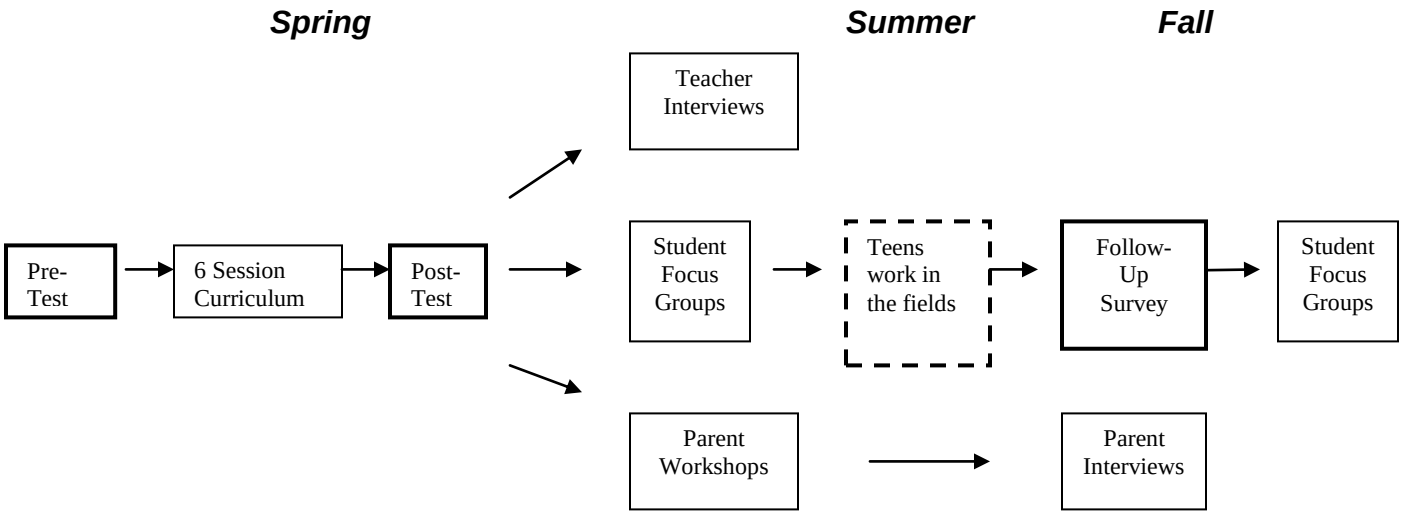
Evaluation Methodology

A pre-test post-test design was used to measure changes in knowledge and attitudes. A pre-test was administered to participating students the week before they received the curriculum, and the post-test was administered within a week of completion of the curriculum. A follow-up telephone survey, administered the following fall, was designed to measure knowledge retention and changes in attitudes and behaviors among students working in agriculture the summer after receiving the curriculum.

The evaluation included a qualitative component, to supplement quantitative findings and obtain more in-depth information on student, teacher and parent perceptions of the intervention. Four focus groups were conducted with students who received the curriculum in the spring of 2001 and 2002, to assess their perceptions of the curriculum and its relevance to them as agricultural workers. Two additional focus groups were conducted in the fall of 2002, with students who had worked in the fields the previous summer, to identify knowledge retention and behavior change associated with the curriculum. Interviews were conducted with a sample of teachers implementing the curriculum, in order to assess their perceptions of the curriculum. Finally, interviews were conducted with a sample of parents who attended the parent workshops *and* whose children worked in the fields the previous summer, to assess their perceptions of the workshops as well as outcomes, such as whether they discussed agricultural health and safety with their children or implemented any changes to protect their children's health and safety in the fields. All focus group and interview participants received stipends.

Figure 1: Intervention and Evaluation: Years 1 and 2

(Boxes in bold represent activities that involved both the intervention and comparison groups.)



The quantitative and qualitative components of the evaluation are described in greater detail below.

Quantitative Evaluation Component

A self-administered pre-test was administered to students in the classroom in the week prior to receiving the curriculum. The pre-test included structured and open-ended questions measuring students' *knowledge* of agricultural workers' rights, laws protecting agricultural workers in general and teen agricultural workers in particular, knowledge of hazards and protective behaviors and knowledge of where and how to report health and safety problems. The pre-test also measured students' *attitudes* regarding health and safety in the fields, for example, that health and safety in the fields are important issues and that youth feel they can take steps to reduce the incidence of work-related illness and injuries. A third set of questions on the pre-test focused on reported *behaviors* in the fields among students who had worked in agriculture during the summer prior to receiving the curriculum. Their responses were compared with findings from the follow-up survey in order to identify behavior changes. This section of the survey also gathered data about prior accidents and illnesses, the extent to which students noticed health and safety problems in the fields, and actions that students took when problems were observed. Finally, the pre-test gathered student *demographic* information, including age, gender and race/ethnicity, as well as data on the students' experiences working in the fields, for example, when they first started working in the fields and the number of hours worked during the school year and vacations. The pre-test was field tested for reliability and validity with a class of 20 students from an agricultural area similar to the intervention/comparison counties.

A post-test, consisting of a sub-set of the knowledge and attitude questions asked in the pre-test, was administered within one week of completion of the curriculum.

A follow-up survey was administered to students who had worked in the fields the summer after they received the curriculum. All students indicating that they had ever worked in the fields, or planned to in the summer following the curriculum, were contacted for inclusion in the follow-up survey. The follow-up survey was administered via telephone rather than in-class, because only a subset of students had worked in the fields during the summer and they were not all necessarily in the same ESL class the following fall. That necessitated modification to several questions as they appeared on the pre- and post-tests.

The pre-test, post-test and follow-up survey were administered to students in the comparison counties on a schedule similar to that of the intervention counties. A self-administered pre-test was administered at the same time as intervention county students and was followed by post-test administration within a week of what would normally have been the completion of the curriculum.

The surveys were available in both English and Spanish. Students were given the option of completing the survey in the language with which they felt most comfortable. Over 60% of the students in both the intervention and comparison groups completed the pre-/post- tests in Spanish. The pre- and post-tests were self-administered in the classroom during the regular ESL class period. Staff from California Rural Legal Assistance, Inc. (CRLA) facilitated the survey administration, explaining the purpose of the research to the students, and showing them how to

complete the surveys. CRLA staff stressed that the survey was not a test and asked students to answer all questions as honestly as possible. The students were also informed that their responses were completely confidential, and would only be seen by members of the research team.

Sample calculations required complete pre, post and follow-up surveys from a minimum of 186 students in each of the intervention groups, as well as from 157 comparison county students (90% power). The sample size as calculated based on California Department of Education data on the targeted counties' Latino student population size, student drop-out rates and the proportion of Latino students in ESL classes.

The data were analyzed using the Statistical Package for Social Sciences (SPSS). Cross tabulations were conducted in order to compare differences in outcomes between the intervention and comparison groups at pre-test, post-test and follow-up. Significant differences between the two groups at each data point are reported at the .05 level. Chi-square analyses were conducted to test for differences between expected and actual values among intervention and comparison county respondents. Analysis of variance was conducted to test for differences in means between the two groups.

A General Linear Model (GLM) analysis of variance was used to examine several key variables to assess the significance in change between pre-test, post-test and follow-up scores in the intervention and comparison groups. In the GLM analysis the post-test score is considered the dependent variable and the pre-test score is a covariate. The fixed factor was comparison or intervention group assignment. Significant differences in the change of mean scores are reported at the .05 level.

Qualitative Evaluation Component

Six focus groups were conducted with 60 students who had received the curriculum. The focus groups were conducted in English and Spanish. Four focus group discussions were conducted with intervention group students several weeks after completing the curriculum (two in the spring of 2001 and two in the spring of 2002). The purpose of those focus groups was to assess student perceptions of the curriculum, to identify aspects of the curriculum that most resonated with students, to gauge changes in attitudes towards health and safety in the fields, to assess spillover impacts of the curriculum beyond the classroom and to elicit recommendations for improving the curriculum. Two additional focus groups were conducted in the fall of 2002, with intervention group students who had worked in agriculture the summer following the curriculum. The purpose of those focus groups was to assess knowledge retention and the curriculum's impacts on student attitudes and behaviors in the fields.

Given the relative homogeneity of the students receiving the curriculum, focus group participants were recruited based on the availability of teachers willing to assist the evaluation team in that effort. A facilitator and a note taker, both of whom were bilingual in English and Spanish, convened each focus group. The focus groups were recorded (with the participants' permission), and the proceedings were transcribed into English and Spanish, as appropriate. Content analysis was subsequently conducted in order to extract key points, identify patterns and systematize findings.

Interviews were conducted with sixteen teachers that implemented the curriculum in 2001 and 2002. The interviews gauged teacher perceptions of the curriculum's effectiveness as a means of imparting information about health and safety in the fields, impressions of the curriculum from an ESL perspective, and recommendations for improving the curriculum.

Interviews were also conducted with nineteen parents attending health and safety workshops and whose children worked in agriculture the summer after receiving the curriculum. The purpose of those interviews was to assess parent perceptions of the workshops, whether they discussed agricultural health and safety with their children as a result of the workshops and whether they implemented any behavior changes to protect their children's health and safety in the fields as a result of the workshop.

Results

Students included in analysis

The evaluation included students from 22 schools in the intervention group and nine schools in the comparison group. A total of 1,669 students in the intervention group and 392 students in the comparison group completed pre-tests or post-tests.[2] After removing students who did not complete four of the six curriculum sessions[3] and those who did not complete both a pre- and a post-test, the analysis included 1,549 students: 1259 in the two intervention groups (562 in school-based program Fresno County, 697 in the enriched program Tulare/Kern Counties) and 290 in the comparison group). Pre-, post- and follow-up surveys, however, were completed by only 245 students[4] (67 in Fresno County, 142 in Tulare/Kern Counties and 36 in the comparison group).[5]

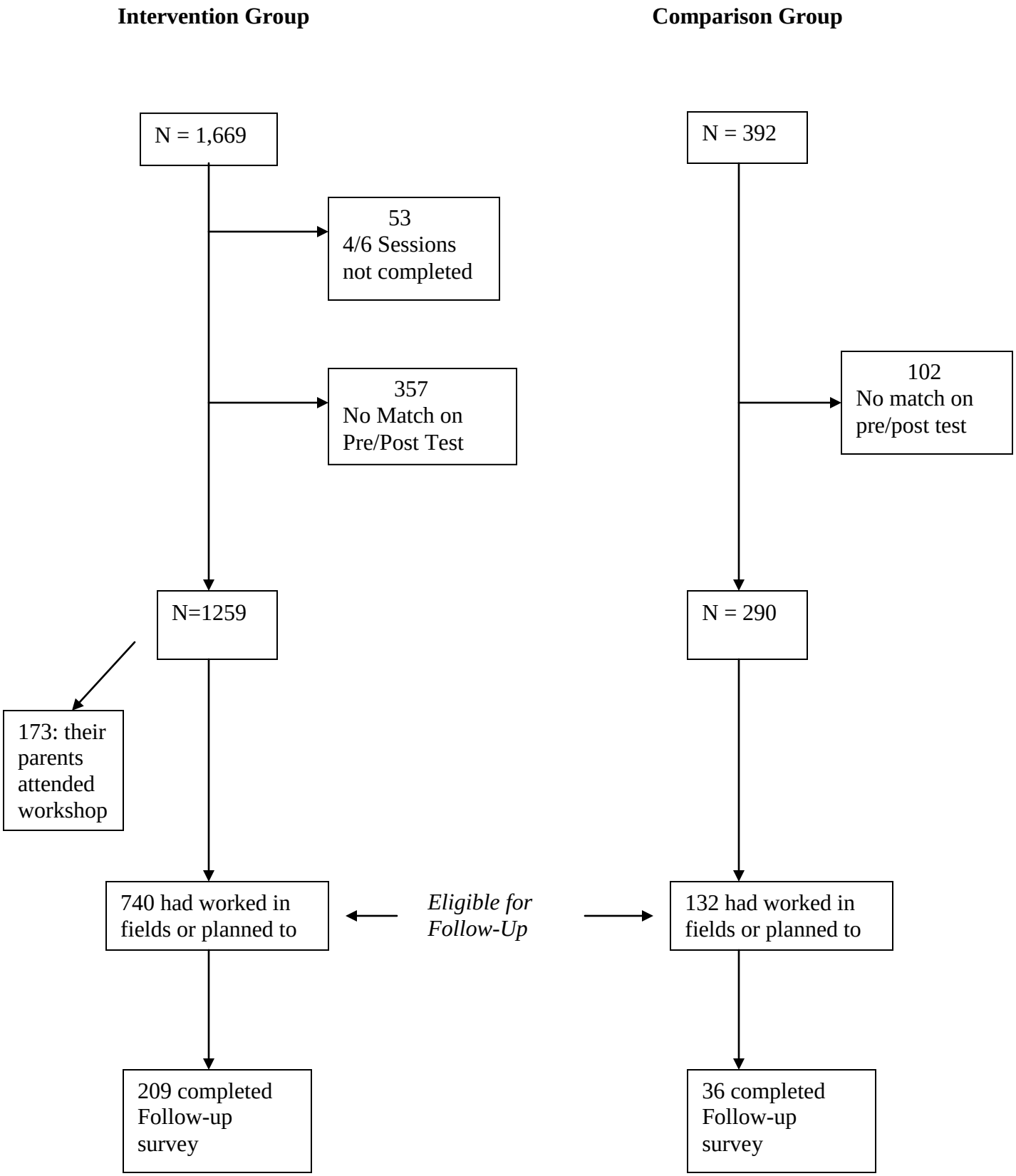
[2] The aim was to have 400 students in each of the intervention groups receive the curriculum each year (1600 total) and to recruit 200 students/year for the comparison group (400 total), which was achieved.

[3] For purposes of this analysis, four was considered the minimum number of sessions required for the curriculum to have the desired impacts on student knowledge, attitudes and behaviors.

[4] Sample calculations required complete pre-, post- and follow-up surveys from a minimum of 186 students in each of the two intervention groups, and from 157 students in the comparison group.

[5] Although the study design specified three groups of study – two intervention and one comparison – the results for the two intervention groups are combined. This is because the parent workshops in the enriched intervention groups were not carried out until after the post-test. Therefore, there is no difference between the groups that would impact the pre/post test analysis. Further, because there was no significant difference in the results from the follow-up survey between the two groups, these results are also presented jointly.

Figure 2: Respondents included in Analysis



Respondent Demographics

Age and Grade

The survey respondents ranged from 13 to 20 years of age (with one 20 year old). The respondents' mean age was 15.5 years in both the intervention and comparison groups. The majority of students in the intervention and comparison group were in the 9th and 10th grades. (See Appendix A for detailed demographic information.)

ESL Level

Approximately two thirds of respondents in both the intervention and comparison groups were in ESL levels three and four, while one-third were in levels one and two. However, while the intervention group students were split equally between levels three and four (32.5% and 32.9% respectively), comparison group students were more skewed, with 59.3% in level three and only 5.5% in level four.

Gender

There was a slight preponderance of male to female respondents, with approximately 55% males and 45% females in both the comparison and intervention groups.

Race/Ethnicity

Efforts were made to match the comparison and intervention groups as closely as possible. Nevertheless, Latinos represented 92% of students in the intervention group, compared with 78% of the comparison group. Conversely, the comparison counties showed a higher percentage of Asian/Pacific Islander respondents (predominantly Indian) than the intervention group.

Language

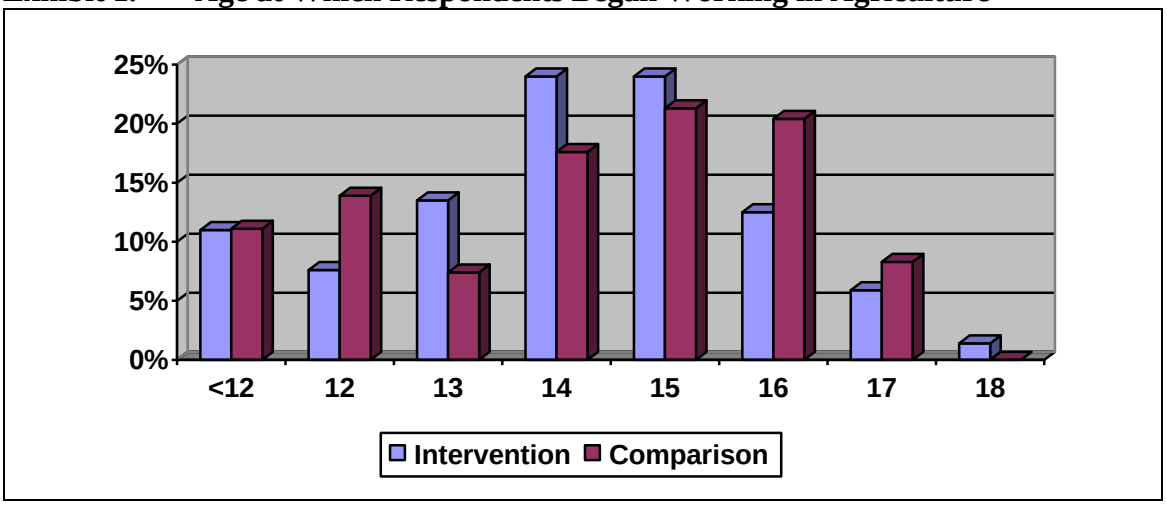
In keeping with patterns for ethnicity, 91% of intervention group students reported speaking Spanish, compared with 79% of comparison group respondents. The second most commonly reported language among intervention group respondents was Hmong (6%), while Punjabi (11%) was the second most common language among comparison group students.

Experience with Agricultural Labor

Over half (54%) of intervention and 39% of comparison group students reported previous experience working in agriculture. Nearly 95% of intervention and virtually all comparison group students reported working as hired laborers, as opposed to working on their parents'

farms.[6] The students reported beginning to work in agriculture at between one[7] and eighteen years of age, with a mean of slightly under 14 for both groups.[8]

Exhibit 1. Age at Which Respondents Began Working in Agriculture



Approximately two-thirds of both intervention and comparison group students who reported working in agriculture did not do so at all when school was in session. Of those who did work while school was in session, approximately 25% worked between one and ten hours a week, while roughly 10% worked over eleven hours per week.

Not surprisingly, considerably more students worked in the fields during holidays and summer vacations. That was the case for 97% of intervention and 93% of comparison group students working in agriculture. Students in both groups reported working similar amounts: approximately one-third worked one to ten hours per week, another third worked between eleven and thirty hours per week, and an additional third worked over 30 hours per week.

Exhibit 2: Number of Hours Worked In Agriculture

	When school is in session		**During summers and holidays**	
	Intervention (n=547) %	Comparison (n=76) %	Intervention (n=630) %	Comparison (n=107) %
Not at all	64.9	68.4	2.7	6.5
1-10 hours/week	23.9	21.1	28.9	32.7
11-20 hours/week	7.3	5.3	13.8	12.1
21-30 hours/week	1.6	2.6	16.2	13.1
Over 30 hours/week	2.2	2.6	38.4	35.5

[6] This is significant because child labor laws do not apply to youth working on their parents' farms.
[7] Students reporting very young ages such as one or two are presumably referring to being brought to the fields with their parents as babies and toddlers.
[8] When students who reported beginning fieldwork under the age of 12 were excluded from the analysis, the mean age increased to 14.5 and 14.6 for intervention and comparison county students respectively.

Exposure to Health and Safety Messages

The students reported varying degrees of exposure to health and safety messages. Three-fourths (74.1%) of intervention and 67.4% of comparison group students reported on the pre-test that their parents had spoken to them about health and safety in the fields. However, only 22.0% of intervention and 14.9% of comparison group students reported receiving other classes or training on agricultural health and safety at the time of or prior to the pre-test.[9]

Approximately one fourth of students working in the fields during the summer following the curriculum reported other exposures to health and safety messages. That was the case for 27.1% (n=56) of intervention and 25.7% (n=9) of comparison group students. Exhibit 3 indicates that employers were the main source of health and safety information for students in the intervention group, followed by parents.

Exhibit 3: Sources of Information on Health and Safety, Teens Reporting Exposure to Health and Safety Messages: Follow-up Survey

	Intervention (n= 56) %	**Comparison** (n = 9) %
Employer	48.2	37.5
Parents	41.1	50.0
Relatives, friends or co-workers	16.1	37.5
Community event	8.9	25.0
Flyer	3.6	12.5
Radio	1.8	12.5
Television	1.8	12.5

Accidents and Illnesses

Of students working in agriculture prior to receiving the curriculum, 14.8% of intervention and 20.3% of those in comparison group reported being in an accident or having an illness on the pre-test. The types of mishaps most commonly reported among intervention group students were accidents with vehicles, machinery or ladders, illnesses related to heat, sun or not drinking sufficient water and pesticide poisoning. Other health problems cited included colds (n=5) allergies (n=2), headaches and dizziness (n=2) and stomachaches (n=1). An additional 18.8% of intervention and 10.6% of comparison group students reported "near misses," i.e., narrowly avoiding accidents or injuries.

[9] Due to space limitations in the survey, we do not know if students were referring to classes at work or at school.

Exhibit 4: Accidents, Illnesses and Injuries: Summer Prior to the Curriculum

	Intervention (n = 73) **%**	**Comparison** (n = 14) **%**
Accident associated with a vehicle, machinery or ladder	39.7	7.1
Illness due to heat, sun or not drinking sufficient water	31.5	35.7
Pesticide-related illness	20.5	14.3
Cuts	19.2	7.1
Musculoskeletal injuries	8.5	14.3
Rashes and other skin problems	4.1	7.1
Other	16.4	21.4

Specific Aim # 1: Impacts of Curriculum on Knowledge, Attitudes and Behaviors

The *Teens Working in Agriculture* curriculum focuses on three main areas: knowledge, attitudes and behaviors regarding agricultural health and safety. Specific objectives are to:

- Increase knowledge of laws protecting agricultural workers, and child labor laws in particular;
- Increase knowledge of health and safety hazards and solutions (i.e., steps that teens can take to protect their health and safety in the fields) as well as knowledge of how to report health and safety problems;
- Instill awareness that health and safety are important issues, and that students can take measures to contribute to improved health and safety outcomes;
- Contribute to behavioral changes as a result of increased knowledge and improved attitudes.

Impacts on Knowledge

Key Findings

- ***Intervention county students demonstrated significantly greater increases in knowledge of laws, hazards, solutions and resources to report problems.***
- ***The percentage of intervention county students who reported knowledge of laws protecting teen agricultural workers increased from 17% at baseline, to 67% at post-test (57% at follow-up). Comparison county students went from 13% to 13% to 18%.***
- ***87% of intervention group students responding to the follow-up survey were able to cite at least one law protecting teen farmworkers, compared with 37% of the comparison group.***
- ***The percentage of intervention county students who knew of places to report health and safety problems increased from 20% at baseline, to 69% at post-test (51% at follow-up). Comparison county students went from 11% to 19% to 28%.***
- ***Intervention county students were able to name a greater number of – and more specific – health and safety hazards and solutions on the post-test than those in the comparison group.***

Knowledge of Laws Protecting Agricultural Workers

The evaluation findings reveal a significant increase in awareness of laws protecting agricultural workers among students receiving the curriculum. The percentage of intervention group students aware of such laws increased from 17% at pre-test to 67% at post-test, with a slight dip to 57% at follow-up. Conversely, comparison county students reported little increase in awareness of laws affecting agricultural workers. (The report's Appendix includes additional tables with data on all outcomes measured in this study.)

Exhibit 5: Percent of Respondents Familiar With Laws Protecting Teens Who Work In The Fields

	Intervention % (n)	**Comparison** % (n)	**P value**
Pre-test	16.9 (212)	12.8 (37)	NS
Post-test	66.9 (842)	12.5 (36)	$p < .01$
Follow-up	57.3 (218)	18.4 (38)	$p < .01$

NS = Not Significant

In addition, a GLM analysis indicates that differences in scores between pre-test and post-test are significant at the $p<.01$ level. Similarly, differences between post-test and follow-up scores are significant at the $p<.01$ level.

Students were asked to correctly identify agricultural workers' rights, from a list of seven possible rights.[10] Knowledge gains among intervention group students are statistically significant, compared to comparison group students. Intervention group students were able to correctly identify a mean of 4.8 rights at pre-test, which increased to 6.3 at post-test and 6.8 at follow-up. Comparison group students' knowledge increased minimally from 4.4 at pre- to 4.9 at post-test, but rose considerably, to 6.0, at follow-up.[11]

Furthermore, the percentage of intervention students able to correctly identify all seven rights increased considerably, from 27% at pre-test to 68% at post-test and 91% at follow-up. Comparison group students displayed small increases from pre-test to post-test (17% to 26%), with, however, a large increase at follow-up, where 74% correctly identified all rights. Intervention group students displayed significantly larger increases in knowledge for each of the rights included in the survey. The greatest increase in awareness among the intervention group was with respect to the right to join a union, which was correctly identified by 41% at pre-test and 77% at post-test, an 88% increase. Other laws with large increases in awareness were the right to health and safety training (47% increase) and the right to information about the pesticides that agricultural laborers work with (31% increase). Awareness of other rights showed smaller increases, principally due to higher levels of awareness at baseline.

Follow-up survey results also reveal high levels of retention. Knowledge of agricultural workers' rights actually increased among intervention and comparison groups, compared with pre- and post-test results. However, there were no significant differences regarding knowledge of workers' rights between intervention and comparison group scores on the follow-up survey, with the exception of knowledge of the right to earn the minimum wage, which 96.8% of intervention group students were aware of, compared with 81.6% of comparison group students ($p<.01$). Students in both groups may have obtained information while working in the fields the summer following the curriculum, or may have become familiar with the questions (testing effect). [12]

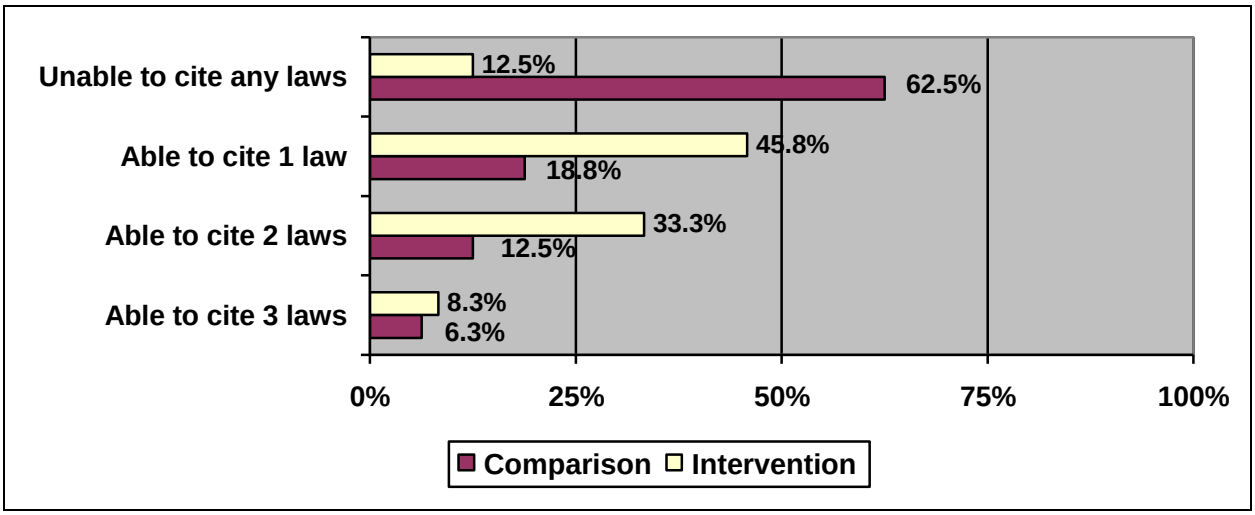
The follow-up survey also included an open-ended question asking students to name specific laws that protect agricultural workers. Nearly 90% of intervention group students could name one or more laws, compared with only 33% of comparison group students. Over 40% of intervention group students were able to cite two or more laws, compared with less than 20% of comparison group students.

[10] These included: right to join a union, to earn a minimum wage, to health and safety training, to report health and safety problems, to drinking water and clean bathrooms, to information about pesticides, and to medical care if hurt or injured on the job.

[11] Increases in knowledge among comparison county students in the follow-up survey may be due to "testing effect," and verification of this information on their own. High levels of retention may subsequently be due to "actively" seeking this information out, rather than "passively" receiving it in a classroom setting.

[12] Students included in the follow-up survey were those who identified as having worked in the fields in the past, or likely to work in the fields that summer. This group of students did not score better on the post-tests compared to students with no agricultural experience. Therefore, increased scores between post-tests and follow-up survey is likely due to information obtained that summer or to testing effect.

Exhibit 6: Percent of Respondents Able to Cite Laws Protecting Agricultural Workers: Follow-up



Laws most frequently cited by intervention group students in the follow-up survey were those regarding the ages at which youth can legally perform specific tasks in the fields, the right to clean bathrooms, laws governing the number of hours teens can work in the fields and the right to clean drinking water.

Knowledge of Child Labor Laws

In addition to information regarding the rights of all agricultural workers, the curriculum taught students about some of the child labor laws protecting teen farmworkers. In particular, a dramatic increase was noted with respect to knowledge of the minimum age at which youth may legally work in agriculture. That increased from 1.4% to 58.1% among intervention group students from pre-test to post-test, with however, a sharp decline at follow-up, signifying a significant drop in retention. Comparison group students showed a smaller, albeit significant increase from pre-test to post-test, with however no loss of retention at follow-up.

Exhibit 7: Ability to Identify the Age at Which Youth May Legally Work in Agriculture

	Intervention % (n)	**Comparison** % (n)	**P value**
Pre-test	1.4 (1259)	1.4 (290)	NS
Post-test	58.1 (1259)	19.7 (290)	$p < .01$
Follow-up	18.7 (209)	22.2 (36)	NS

A GLM analysis indicates that differences between pre-test and post-test are significant at the $p<.01$ level. Differences between post-test and follow-up scores, however, are not significant at the $p < .05$ level.

The curriculum also provided information on specific tasks young workers under and over the age of 16 may legally perform. Knowledge of tasks that youth under the age of 16 may or may not perform increased minimally from pre-test to post-test. Conversely, there were higher increases in knowledge of allowable tasks for youth over age 16, particularly with respect to working with pesticides and driving a tractor. One reason for this may be greater retention of knowledge regarding tasks that youth *may* engage in, which is largely the case for those over 16, whereas laws affecting youth under 16 largely prohibit engaging in many tasks.

Knowledge of Health And Safety Problems

The pre- and post-tests included an open-ended question asking students to identify up to three health and safety problems they might encounter working in agriculture. Approximately two-thirds of students in both groups were able to mention at least one health and safety problem on the pre-test. That figure rose to 92% for intervention group students on the post-test, compared with 77% of comparison group students. The percentage of intervention group students able to identify three health and safety problems increased from 42% to 79%, while remaining virtually unchanged for comparison group students.

Exhibit 8: Number of Health And Safety Problems Cited: Pre- and Post-test

	Pre-test		**Post-test**		
	Intervention (n=1280) **%**	**Comparison** (n=292) **%**	**Intervention** (n=1280) **%**	**Comparison** (n=292) **%**	**P value** (post-test)
0	28.9	31.7	7.8	22.8	$p < .01$
1	9.8	10.3	3.4	11.7	$p < .01$
2	19.0	16.6	9.5	21.0	$p < .01$
3	42.3	41.4	79.3	44.5	$p < .01$

A GLM analysis indicates a significant difference ($p<.01$) between the mean number of health and safety problems intervention and comparison group students were able to identify at pre- and post-test.

The most commonly identified health and safety problems mentioned on both the pre- and post-tests were pesticide-related issues, water issues (including access to clean water, drinking sufficient water and avoiding dirty water, such as from irrigation canals), accidents, and ergonomic issues, such as lifting heavy items without asking for help.

Exhibit 9: Principal Health and Safety Problems Cited: Intervention Group

Health and Safety Problem	Pre-test (n=1259) %	Post-test (n=1259) %	Follow-up (n=149) %
Pesticides	28.7	29.7	24.7
Water issues	18.2	22.4	22.7
Accidents	14.6	15.1	20.6
Lifting heavy items, back pain, ergonomics	11.5	11.2	3.6
Sun, heat	6.2	6.9	9.3
Dirty bathrooms	3.9	6.1	5.2
General health (asthma, cancer, dust)	4.0	1.0	0.5
Not using protective gear	2.6	3.3	1.0
Work conditions (general)	2.2	1.0	5.7
Dangerous animals, plants	2.0	0.2	0.5
Not following instructions, lack of training	1.9	1.3	1.5

In addition to naming a greater number of health and safety problems, intervention group students were able to articulate more specific problems on the post-test and follow-up surveys. For example, the number of intervention group students reporting tractors or ladders in general as problems associated with accidents increased by 146% and 31% respectively from pre-test to post-test. However, awareness of specific problems discussed in the curriculum, such as riding a tractor when someone else is driving or climbing a ladder over 20 feet tall[13] showed ten- and four-fold increases respectively. That was not the case for the comparison group, whose answers did not become more specific from pre to post-test.

Exhibit 10: Changes in Awareness of Specific Health and Safety Problems: Intervention Group

Health and Safety Problem	Pre-test %	Post-test %	% Change
Tractors (general)	5.1	12.5	146
Riding a tractor someone else is driving	0.3[14]	4.8	1420
Driving a tractor under age 16	0.4	1.0	114
Ladders (general)	7.0	9.1	31
Climbing a ladder over 20 feet	0.7	3.5	400

[13] While the law prohibits only teens under the age of 16 from climbing a ladder over 20 feet tall, respondents generally cited the height of the ladder, with reference to age.

[14] Students were responding to an open-ended question that asked them to name health and safety problems. Although the n values for each of these problems is small, the percentage increase from pre- to post is impressive.

Knowledge of Health and Safety Solutions

In addition to information on health and safety hazards, the curriculum provided information about measures that youth can take to protect their health and safety. An open-ended question on the pre- and post-tests asked students to identify up to three solutions to the health and safety problems previously identified. The findings closely parallel findings regarding the numbers of health and safety problems cited. Approximately two-thirds of students in both groups were able to identify one or more health and safety solutions in the pre-test. At post-test, that figure rose to 92% for intervention group students, while remaining virtually unchanged, at 69%, among comparison group students. The percentage of intervention group students able to cite three solutions increased dramatically, from 43% to 79%, with a smaller increase of 34% to 47% among comparison group students. A GLM analysis indicates a significant difference ($p<.01$) between the mean number of health and safety solutions intervention and comparison group students were able to identify at pre- and post-test.

The health and safety solutions most commonly identified on the pre- and post-test had to do with water (including drinking sufficient water, drinking clean water and avoiding dirty water from irrigation pipes and canals); wearing clothing to provide protection from the sun; using handkerchiefs and other protective gear to reduce exposure to pesticides and dust, and the general use of protective gear. The health and safety solutions exhibiting the largest increases in awareness were reporting problems to the foreman (61%); following instructions and reading signs before entering fields (59%); having clean bathrooms (42%); dressing for protection from the sun (37%); and taking precautions to reduce pesticide exposure (29%).

As with health and safety problems, intervention group students' ability to articulate specific health and safety solutions increased noticeably from pre-test to post-test. For example, there was a significant increase in the number of students that cited not riding a tractor driven by someone else as a means of avoiding accidents, and, to a lesser extent, not climbing ladders over twenty feet.

Knowledge of Places to Report Health And Safety Problems

Knowledge of places to report health and safety problems increased significantly among intervention group students from pre-test to post-test, with however, a drop in retention at follow-up. Comparison group students showed significant increases in knowledge as well, albeit to a much smaller degree.

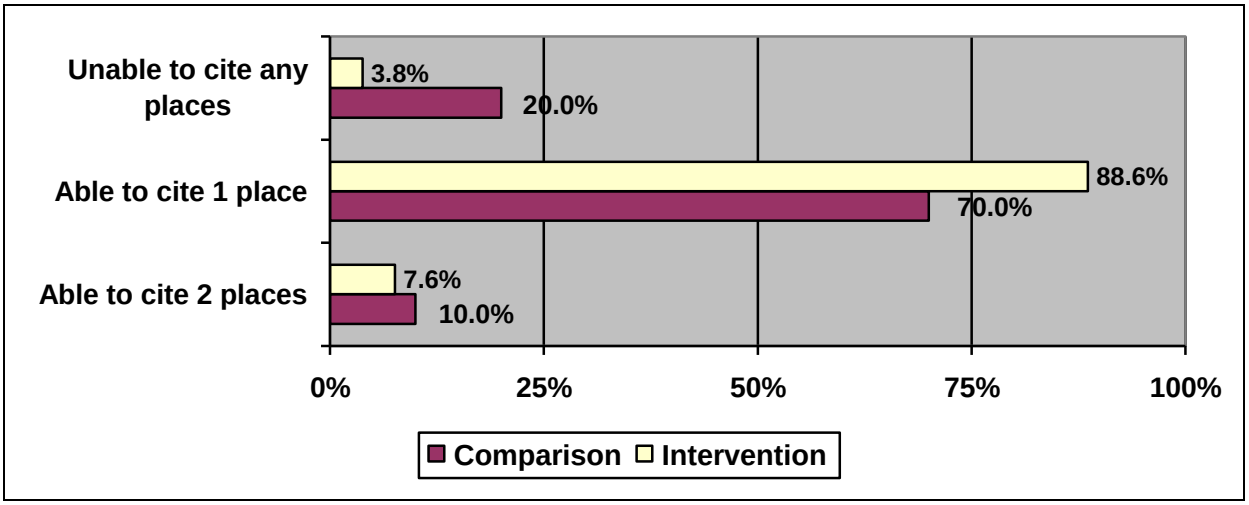
Exhibit 11: Percent of Respondents Familiar with Places To Report Health and Safety Problems

	Intervention % (n)	**Comparison** % (n)	**P value**
Pre-test	19.8 (1250)	10.8 (288)	$p < .01$
Post-test	69.1 (1257)	19.2 (287)	$p < .01$
Follow-up	50.5 (208)	27.8 (36)	$p < .05$

In addition, a GLM analysis indicates that differences between pre-test and post-test scores are significant at the $p<.01$ level. Differences between post-test and follow-up scores are however not significant at the $p < .05$ level.

A question on the follow-up survey asked respondents to cite specific places where teen agricultural workers can report health and safety problems. As seen in the exhibit below, virtually all intervention group students were able to cite at least one place to report health and safety problems, compared with 80% of comparison group students. [15] Fewer than 10% of students in either of the groups were able to identify more than one organization where they could report problems.

Exhibit 12: Number of Places Cited for Reporting Health and Safety Problems: Follow-up Survey



When asked to identify specific organizations where they could report health and safety problems, the response most commonly offered by intervention group students (31.7%) was that they had the contact information provided in the curriculum at home (the implication being that they would be able to contact one of those organizations should the need arise). That was followed by more specific options, including contacting the union (17%), discussing the problem with the foreman (15%) and reporting problems to OSHA (14%).

[15] This figure includes students reporting that they would access the contact information provided in the class, rather than identifying specific places.

Impacts on Attitudes

Key Findings

- ***The percentage of intervention group students displaying positive attitudes with respect to all attitudinal questions (i.e. scored "100%) increased from 37% at pre-test to 53% at post-test. Comparison group students went from 37% to 42%.***
- ***Attitudes changing the most were the belief that it is dangerous to ride a tractor when someone else is driving, teens' perceptions of their ability to avoid accidents or illness in the fields and attitudes regarding the dangers of pesticides.***
- ***In the follow-up survey, 92% of intervention group students reported being more aware of health and safety problems, compared with 63% of comparison group students. The majority of students attributed greater awareness of health and safety problems to the ESL classes.***

A second objective of the curriculum was to improve student attitudes regarding agricultural health and safety, including heightened awareness of the dangers inherent in agricultural labor and strengthened perceptions that youth can take concrete steps to avoid work-related accidents and illnesses.

A twelve-item section of the pre- and post-tests gauged student attitudes toward health and safety in the fields. In general, all students scored highly on this scale. Both groups answered 87% of those questions correctly on the pre-test, with an increase to 91% and 88.5% on the post-test for intervention and comparison group respondents respectively. The percentage of intervention group students exhibiting positive attitudes on all items in this section increased from 36% at pre-test to 53% at post-test, representing a 47% increase. Conversely, comparison group students showed a more modest increase of 14%, from 37% to 42%. As the following exhibit reveals, the specific attitudes that changed the most from pre-test to post-test were: belief that it is dangerous to ride a tractor when someone else is driving, perception of their own ability to implement measures to avoid accidents or illness in the fields and attitudes regarding the dangers of pesticide exposure.

Exhibit 13: Attitudes Toward Health and Safety

	Pre-test		Post-test		P value (post-test)
	Intervention (n=1255) **%**	**Comparison** (n=287) **%**	**Intervention** (n=1255) **%**	**Comparison** (n=287) **%**	
It's dangerous to ride on a tractor when someone else is driving (% agree)	79.4	79.4	91.6	87.9	p < .05
There's not much I can do to avoid accidents or illnesses in the fields (% disagree)	82.7	81.2	90.1	80.9	p < .01
Working with pesticides can cause health problems (% agree)	89.3	90.6	95.1	87.1	p < .01
Sometimes I think it's not worth trying to improve conditions in the fields, because nothing is going to change (% disagree)	87.7	83.5	90.7	83.6	p < .01
There's nothing wrong with asking for help when lifting heavy objects (% agree)	85.8	88.4	88.7	91.0	ns
I could get hurt lifting heavy objects without asking for help (% agree)	90.5	92.4	93.2	94.4	ns
Drinking water from irrigation canals or pipes may harm your health (% agree)	83.7	86.1	85.9	86.9	ns
If I see someone doing something unsafe, I should say something to them (% agree)	93.0	95.1	95.4	93.7	ns
It's important to drink a lot of water when working in the sun (% agree)	90.3	93.7	92.1	93.8	ns
It's important to read all signs before entering a field or orchard (% agree)	95.9	97.9	96.8	97.9	ns
I prefer not to report health and safety problems in the fields because my parents or relatives may get upset with me (% disagree)	96.6	94.4	96.5	91.7	p < .01

Awareness of and Reporting Problems in the Fields

The evaluation also gauged students' general sense of awareness of health and safety problems and their willingness to report those problems. In the follow-up survey, administered after the students' summer work experience, students were asked about their awareness of health and safety problems, compared with their awareness during previous experiences working in the fields. Fully 92% of intervention group students reported being more aware of health and safety problems, compared with 63% of comparison group students. The majority (69%) of respondents attributed greater awareness of health and safety problems to the ESL classes, followed by on-the-job training and work experiences (18%) and information from parents, relatives and co-workers (9%).

However, despite greater *awareness* of health and safety hazards, the percentage of respondents that reported *noticing* problems in the fields decreased considerably, from 19.6% to 10.6% among intervention group students, and from 21.1% to 8.3% among comparison group students.[16]

Follow-up survey respondents reporting that they had noticed problems (n=25) were asked to identify the kinds of hazards they had noticed. Responses referred to both health and safety hazards and health problems associated with working in the fields. Issues cited included dirty bathrooms, lack of water for drinking or washing hands,[17] workers not using protective gear,[18] unsafe ladders, workers eating in the fields, being asked to lift heavy items, cuts and sprains, and coworkers fainting from exhaustion after reportedly being forced to work sixteen hour days.

The pre- and post-tests asked students to whom they would report health and safety problems in the fields. Intervention group students showed larger increases in both the percentage that would report problems to various agents, as well as the number of different agents to whom they would report problems. The mean number of individuals to whom students would report problems increased by 35% among intervention group students, from a mean of 2.3 to 3.1, compared with a 19% increase among comparison group students (2.1 to 2.5) ($p<.01$).

Exhibit 14: Individuals to Whom Students Would Report Problems: Pre and Post-test

	Pre-test			**Post-test**		
	Intervention (n=1258) **%**	**Comparison** (n=290) **%**	**P value**	**Intervention** (n=1258) **%**	**Comparison** (n=290) **%**	**P value**
Boss or foreman	83.5	77.6	p < .05	91.7	84.5	p < .01
Agency	54.7	56.9	NS	79.8	57.9	p < .01
Parent, guardian, or relative	47.1	43.8	NS	70.9	53.8	p < .01
Unrelated co-worker	44.4	35.9	p < .01	67.0	49.3	p < .01
Wouldn't report the problem to anyone	2.4	3.8	NS	0.7	1.7	NS

[16] "Aware of" refers to the general knowledge that certain hazards exist and should be looked out for, whereas "noticing" refers to observing specific problems in the fields.

[17] In that context, one student reported asking the foreman to bring more water after it ran out, with which the foreman complied.

[18] This included reports of eyes burning from pesticides and a worker fainting from lack of protection from the sun.

A GLM analysis also reveals significant differences between pre- and post-test with respect to the percentage of intervention and comparison group students that would report problems to: a boss or foreman ($p<.01$), an agency ($p<.01$), parents or other relatives ($p<.01$) and unrelated co-workers ($p<.01$).

Impacts on Behaviors

Key Findings

- ***Nearly half of intervention group students reported implementing new behaviors to protect their health and safety in the fields.***
- ***Nearly half of intervention group students reported implementing new behaviors to protect their health and safety in the fields, compared with 33% of students in the comparison group.***
- ***The most notable behavior changes among intervention group students were the percentage of youth under the age of 16 who reported working with pesticides, which decreased by 96%, and the percentage of youth under age 16 who reported driving a tractor, which fell by 93%.***
- ***Other notable impacts on behavior included the percent of respondents who reported not lifting heavy items without asking for help, which increased by 49%, and the percent who reported wearing long-sleeved shirts for protection from the sun, which increased by 20%.***
- ***The curriculum had spillover effects beyond the students, with 73% of follow-up survey respondents reporting sharing information with others, including parents, friends, other***

A third objective of the curriculum was to promote behavior changes that would contribute to improved health and safety outcomes. While we can look at patterns of behavior change reported by intervention group students, it is difficult to compare these findings with students in the comparison group due to the very low number of comparison group students included in the analysis. The findings in this section should therefore be interpreted with caution.

On the follow-up survey, nearly half (49%) of intervention group students reported implementing new behaviors to protect their health and safety compared with previous times they had worked in the fields, which was true for 33%[19] of comparison group respondents ($p<.01$). Of those reporting behavior changes, two-thirds of intervention group respondents reported making at least one change, while over one-third of respondents implemented two or more changes.[20] Nearly half (45%) of responses to an open-ended question regarding behavior changes referred to increased caution and greater use of protective gear to avoid accidents and illnesses (45%),

[19] N=24.
[20] Comparison group figures are unreliable due to the small number of respondents.

followed by increased use of clothing for protection from the sun (34%), drinking clean water (13%) and asking for help when lifting heavy items (8%).

A series of questions on the pre- and follow-up tests measured specific self-reported behavior changes. The most dramatic behavioral changes among intervention students were the percentage of youth under the age of 16 that reported working with pesticides, which decreased by 96%, and the percentage of youth under age 16 that reported driving a tractor, which decreased by 93%. Other notable changes included the percent of respondents not lifting heavy items without asking for help (49% increase) and a 20% increase in the number reporting wearing long-sleeves for protection from the sun.

Exhibit 15: Behavior Change: Pre-test [21] and Follow-up

	Pre-test			Follow-up		
	Intervention %	**Comparison %**	**P value**	**Intervention %**	**Comparison %**	**P value**
Worked with pesticides under age 16 (% no)	70.8 (n=248)*	76.3 (n=38)	NS	98.8 (n=84)	100.0 (n=10)	NS
Drove a tractor under age 16 (% no)	81.8 (n=253)	89.7 (n=39)	NS	98.8 (n=82)	90.0 (n=10)	NS
Lifted something heavy without asking for help (% never)	55.7 (n=458)	61.4 (n=70)	NS	83.1 (n=154)	78.3 (n=23)	NS
Wore a long-sleeve shirt while working in the sun (% a lot of the time)	78.0 (n=459)	80.0 (n=70)	NS	93.5 (n=154)	78.3 (n=23)	P <.01
Rode on a tractor someone else was driving (% never)	78.3 (n=461)	78.6 (n=70)	NS	87.0 (n=154)	78.3 (n=23)	p < .01
Wore a hat while working in the sun (% a lot of the time)	88.5 (n=461)	77.1 (n=70)	p < .05	96.1 (n=154)	87.0 (n=23)	p < .05
Drank water from irrigation pipes or canals (% never)	90.2 (n=461)	82.9 (n=58)	p < .05	98.7 (n=154)	95.7 (n=23)	NS
Washed hands before eating any food (% a lot of the time)	75.6 (n=459)	65.7 (n=70)	NS	79.2 (n=154)	78.3 (n=23)	NS

*The n values refer to the total number of students who responded to each question.

A GLM analysis controlling for baseline scores identifies significant differences at the $p < .05$ level between intervention and comparison county students at pre-test and follow-up for the following variables: rode on a tractor someone else was driving (% never); wore a hat while working in the sun (% a lot of the time); and wore a long-sleeve shirt while working in the sun (% a lot of the time).

Another promising behavior is that over half (57%)[22] of intervention group students noticing health and safety problems discussed that with someone else. Of those who reported a problem,

[21] Behavioral questions on the pre-test refer to work experiences during the summer before receiving the curriculum.
[22] N=13

57% talked with a foreman, 29% with a coworker, and 14% discussed the problem with a parent or guardian.

The curriculum has also had spillover effects beyond the students, with 73% of follow-up survey respondents reporting sharing information with others. The majority of those doing so (73%) shared information with parents, followed by friends (32%), relatives (31%) and coworkers (19%). The information most commonly shared had to do with agricultural workers' rights (36%), followed by general (unspecified) information about health and safety (31%), means of avoiding accidents (14%) and issues around water, including the right to clean water, the importance of drinking sufficient water and not drinking dirty water (9%).

Incidence of Work-Related Accidents and Illnesses

Through the follow-up survey, there was an attempt to assess change in the incidence of work-related accidents and illnesses during the summer following the curriculum. However, due to the very small number of follow-up respondents reporting accidents, illnesses and near misses, these figures are considered unreliable and are presented for informational purposes only.

The incidence of self-reported accidents and illnesses declined for both groups, from 14.8% to 8.3% among intervention group students, and from 20.3% to 2.8% among comparison group students. Of intervention group students, eight reported accidents, five reported heat-related conditions and one reported a back injury. The number of students reporting "near misses" also declined from pre-test to follow-up, from 9.3% of intervention group students and 8.3% of comparison group students.

Specific Aim #2: Impacts of Parent Workshop Attendance on Student Outcomes

Key Findings:

- ***A total of 240 parents of 173 students in Kern and Tulare Counties attended workshops on agricultural health and safety.***
- ***Parents found the workshops informative, and most reported sharing information with their children and virtually all reported implementing changes to protect their children's health and safety as a result of the workshops.***
- ***Nonetheless, virtually no associations were found between parent participation in health and safety workshops and student knowledge, attitude or behavior outcomes.***
- ***Knowledge of places to report health and safety problems was the only statistically significant difference between the two groups: 57% of students whose parents attended a workshop reported knowledge of places to report problems on the follow-up survey, compared with 51% of students whose parents did not attend a workshop.***

An additional component of the intervention consisted of workshops on agricultural health and safety for parents of teens receiving the curriculum. The evaluation assessed whether community-based interventions, such as those reaching parents, helped augment the learning that occurred in the classroom. A total of 240 parents and family members of 173 students receiving the curriculum in Kern and Tulare counties attended those workshops.

In an effort to avoid contamination of the survey findings, the parent workshops were conducted after the students completed the post-tests. The impact of parental attendance on students was assessed in the follow-up survey. Fifty-four (31.2%) of the 173 students whose parents attended workshops completed the follow-up survey. These 54 were compared with the 155 students who completed follow-up surveys but whose parents did not attend the workshops.

The follow-up survey findings reveal few differences in knowledge, attitudes or behaviors between students whose parents attended workshops and those whose parents did not. The only statistically significant – albeit small – difference between the two groups is with respect to knowledge of places to report health and safety problems, which was reported by 57.4% of students whose parents attended a workshop and 51.1% those students whose parents did not attend a workshop ($p<.01$).

Nonetheless, parents and family members who attended the workshops demonstrated a high level of enthusiasm, and virtually all reported discussing the issues presented in the workshops with their children. This was corroborated by the fact that 90.7% of students reported that their parents had spoken to them about what they had learned in the workshops. Most (40%) students did not specify the type of information their parents shared with them, while 26% reported their parents provided them with information on how to avoid accidents in the fields, and 19% reported receiving information regarding workers rights.

Exhibit 16: Workshop Information Parents Shared with Students (As Reported by Students)

Information Shared	Number of Times Mentioned	Percent of All Responses
General information	19	40.4%
How to avoid accidents	12	25.5%
Workers rights[23]	9	19.1%
Water (right to, importance of drinking, avoiding dirty water)	3	6.4%
Clothing for protection from sun, heat	2	4.3%
Protection from pesticides	1	2.1%
Asking for help lifting heavy items	1	2.1%
Total Responses	47	100.0%

Fifty-two percent of students whose parents attended workshops also reported that their parents had taken new measures to ensure their children's health and safety when the teens worked in the

[23] Workers rights cited include general rights (3), the right to report problems in the fields (4), and the right to clean bathrooms (2).

fields the summer following the curriculum and workshop. The principal behavior change report was with respect to talking to their children about these issues. Students stated that their parents talked to them about taking care of themselves to avoid accidents (42%), protecting themselves from pesticides, mainly by washing hands and not eating in the fields (26%), not lifting heavy items (11%), drinking water and/or avoiding dirty water (11%), and wearing clothing for protection from the sun (11%).[24] One student reported that he and his parents "began to exchange ideas about how to protect ourselves" in the fields.

Despite high levels of parental satisfaction with the workshops and reports of sharing information and implementing changes with respect to their children's behaviors in the fields, parent attendance at workshops on health and safety in the fields had virtually no impact on their children's knowledge, attitude or behavioral outcomes. These findings suggest that parental attendance at these workshops does not have significant impacts on health and safety outcomes among their children.

Effects of Modifying Variables

The evaluation assessed the impacts of modifying variables including: age; gender; number of educational sessions completed; length of time working in agriculture; prior exposure to safety information; and history of work-related injuries on student outcomes. Findings show these variables had minimal, if any, impact. Significant differences at the $p<.05$ level were only detected with respect to gender and the number of curriculum sessions attended.

Effects of Gender

There were a number of significant differences with respect to outcomes between males and females. The most notable differences included the following:

- 22% more girls reported that they shared information from the classes with others on the follow-up survey;
- 16% more girls reported never riding on a tractor being driven by someone else on the follow-up survey;
- 10% more girls reported knowledge of places to report health and safety problems on the post-test;
- 6% more girls would report a problem to the union or other outside agency.

Conversely, boys scored better than girls with the respect to increased knowledge of agricultural tasks:

- 13% more boys knew that youth under 16 may work with a hoe on the post-test;
- 12% more boys knew that youth over 16 may drive a tractor on the post-test;
- 10% of boys knew that youth over 16 may climb ladders over 20 feet high on the post-test.

In addition,

- Boys correctly identified a mean of 6.2 (of 7) agricultural workers' rights on the post-test, while girls correctly identified 6.4 rights.

[24] Figures do not add up to 100% due to rounding.

- Boys answered a mean of 10.8 (of 12) attitude questions "correctly," compared with a mean of 11.1 for girls.

Effects of Number of Sessions Attended

The number of curriculum sessions attended was the only other modifying variable with significant associations with the evaluation outcomes. An increase in the number of sessions attended is associated with a number of improved outcomes, particularly in the follow-up survey. This survey documents reports of increased awareness of health and safety hazards in the fields and increased confidence regarding youth's ability to protect their health and safety in the fields.

Exhibit 17: Effects of Number of Sessions Attended[25]

Health and Safety Outcome	Number of Sessions Attended			
	4 (n=46) %	**5** (n=175) %	**6** (n=745) %	**P value**
Knowledge of legal minimum age for working in the fields (post-test)	50.1	53.1	61.9	$p < .05$
Knowledge that teens under the age of 16 may not work with pesticides (post-test)	39.1	41.7	47.0	$p < .05$
Perception that drinking water from irrigation canals or pipes may cause illness (post-test)	73.9	84.0	87.9	$p < .05$
Perception of harm caused by lifting heavy objects (post-test)	82.6	95.4	93.6	$p < .01$
Perception of importance of drinking water when working in the sun (post-test)	82.6	92.6	92.8	$p < .05$
Increased awareness of health and safety hazards when working in fields (follow-up)	33.3	86.4	98.7	$p < .01$
Increased confidence regarding ability to protect health and safety in the fields (follow-up)	33.3	81.8	95.9	$p < .01$

Qualitative Evaluation Findings

This section presents qualitative findings from focus groups with students, interviews with teachers and with parents attending health and safety workshops.

[25] The curriculum consisted of six sessions, however only students attending a minimum of four sessions were included in the analysis.

Student Response to the Curriculum

Six focus groups were conducted with a total of 60 students who received the curriculum. The purpose of the focus groups was to assess student perceptions of the curriculum, identify aspects of the curriculum that most resonated with them, gauge changes in attitudes toward health and safety issues in the fields, discern impacts of the curriculum beyond the classroom and elicit student recommendations for improving the curriculum. Four of the six focus group discussions were held in the spring, following completion of the curriculum; two in the spring of 2001 and two in the spring of 2002. Two additional focus groups were conducted in the fall of 2002. The purpose of these fall focus groups, which were held with students who had worked in the fields the summer following the curriculum, was to gauge the impacts of the curriculum on attitudes and actual behaviors in the fields.

The focus group findings reveal a high level of student interest in and enthusiasm for the *Teens Working in Agriculture* curriculum. Most students found the classes were interesting and the information presented was useful and relevant. **They were particularly excited to learn about the rights of agricultural workers and to learn of organizations they could contact to report health and safety hazards in the fields**. Many were surprised to learn that they could not legally be fired for reporting problems. As a student explained, "Now, when we go to work, we think more about our safety. And if there's a problem, we can tell the boss about it, and if he doesn't pay attention we can call the union." The students were also interested to learn that there are laws regulating the agricultural tasks that teens of different ages may perform, and that they have the right to refuse such tasks if they are underage. Many students cited an increased willingness to report health and safety hazards to foremen and supervisors.

Many students participating in the spring focus groups, before they went to work in the fields, reported an intent to change behaviors as a result of the curriculum, such as not drinking irrigation water, not eating lunch in the fields, washing hands before eating and wearing protective gear to safeguard themselves from pesticides and the sun. As a student explained, "I will wear long sleeves in the fields now. Before I didn't like to do that, because it made me sweat a lot and it was hot. But now I know that it's better to protect yourself."

Aspects of the curriculum that students particularly enjoyed were the video (which most thought was too short), the "Jeopardy" game and interviews with partners about their experiences in the fields. Students also appreciated the opportunity to ask questions of the CRLA staff administering the survey. Understanding the pilot nature of the program, virtually all students felt this curriculum should be expanded to other schools with high percentages of youth working in agriculture.

Students **reported sharing the information in the curriculum with parents, siblings, relatives and coworkers**. As a student noted, "I was talking to my mom and dad and uncles, and I told them that pesticides are bad and that everyone should clean their hands before they eat." Many explained that their family members were very happy to receive this information, as many "didn't know about their rights and were really surprised" to learn about them. Another student reported telling her friends about the right to clean bathrooms, with positive results. She explained that, "the bathrooms were really far away from where they were working, and I told them that they have the right to have them close by, and clean. They said something to their boss and he moved them closer. I helped them. I think the boss knew that something would happen if

he didn't move the bathrooms closer." These examples of successful changes may reinforce continued efforts to improve conditions in the fields on the part of students receiving the curriculum and those with whom they share this information.

Student recommendations for improving the curriculum included: bringing in outside experts, such as CRLA representatives and staff from other agencies to speak about agricultural workers' rights, in-class demonstrations regarding the correct use of protective gear, and helping students engage in advocacy around occupational health and safety in the fields.

The focus group protocol included questions about what students remembered from the curriculum. Fall focus group participants (who had worked in the fields) demonstrated high levels of retention despite a lapse of approximately six months between the curriculum and the focus groups. **Many also reported implementing a range of behavior changes**. **Changes mentioned included staying away from recently sprayed fields, not drinking irrigation water, not eating in the fields, washing work clothes separately from other clothing, and taking work clothes off at home. They also reported increased confidence in their ability to protect their health and safety in the fields, and many have spoken to others about what they learned in the classes.**

Issues that particularly resonated with the students include knowledge of labor laws in general, and the right to clean bathrooms and to report problems in particular, avoiding dangerous pesticides and machinery and wearing clothing for protection from the sun. Student comments exemplifying behavior changes include the following:

> *"If there's a sign that says 'don't enter,' I don't, and before I sometimes would."*
>
> *"Now when we see a tractor spraying pesticides we know we have to stay far away."*
>
> *"If your boss says to go and pick up [i.e., work with] pesticides, you can call CRLA to protect your rights. You can always call them and be anonymous."*
>
> *"Because of the classes, I spoke to my dad, and my dad spoke to the foreman and they improved the conditions of the bathrooms."*
>
> *"Now we wash our clothes separately. When I get home, the first thing I do is take off my clothes. Before we used to go straight to bed and lay down, but now we take off our clothes and take a shower when we get home."*
>
> "*I used to get on the tractors for fun, but now I don't anymore, because it's dangerous."*
>
> *"We stopped playing around in the fields."*
>
> *"My father thought that if you said anything, you would get fired, but I told him about the classes, and he said something and they changed the bathroom conditions."*
>
> *"Now I wear long sleeves in the fields. Before I used to take my shirt off, but now I don't."*

"My cousin worked in the cotton fields and he got sick—now I know that he has the right to see the doctor."

"We noticed that sometimes people put pesticides in a bottle, and that's a danger because someone could drink it."

"Now we ask for clean bathrooms and a place to eat outside the fields. We also want separate water dispensers."

"*Because of the classes, we are more careful."*

Teacher Response to the Curriculum

In-depth interviews were conducted with 16 teachers who implemented the *Teens Working in Agriculture* curriculum. The purpose of these interviews was to gauge teacher perceptions of the curriculum as a means of teaching teens about health and safety in the fields, to identify components of the curriculum the teachers felt worked well, and to elicit their recommendations for improving the curriculum.

Overall, teachers were very positive about the curriculum. As one explained, "I was very impressed with the way the curriculum was presented. It was very complete, with overheads and a video. There wasn't a lot of prep work, and it was well laid out and easy to follow. We were very, very happy with the way it went." Another teacher noted, "The curriculum is pretty thorough. It moves from statistics, to case studies, to the student's own experience, to taking action. I wouldn't change any of it."

Most teachers felt their students were interested in the curriculum and in many cases excited by it. Teachers felt the students could relate to the information, which had practical applications for them. As a teacher commented, "They were excited by the curriculum. It was important for them to learn that there are agencies that are there to help them. They didn't know that before. They knew some about the hazards, but had a very small amount of the information presented." Conversely, a smaller number of teachers noted that their students were not particularly excited, reacting to the curriculum "about the same as they would to any other curriculum." The teachers' own level of interest and enthusiasm for the information no doubt plays a role in this; teachers who enjoyed the curriculum reported higher levels of interest on the part of their students than those who were less excited about it themselves.

Most teachers felt the curriculum has had positive impacts, explaining that while students were familiar with some of the information, much of it was new for them. They felt students would now be aware of this information as they worked in the fields. As a teacher commented, "Will the curriculum have impacts? Absolutely. Like noticing the heights of the ladders, the bathrooms being dirty, being sure they have cups for water, not driving a tractor until you're 16, not being able to mix pesticides. Some of the kids were really picking up on the preventative stuff. They're going to watch what they're doing a little bit better. It's going to be on their minds."

According to another teacher, “I would say the curriculum will have impacts on the kids, because now they know about their rights. For example, before they wouldn’t say anything about problems because they’re illegal, but now they know who to call. Now, for example, they know about contamination. They know they should take a break and stretch, and use safety clothes.” According to another, “A lot of the kids commented on the fact that they now know that the landowners have to provide bathrooms, water and breaks. The course opened their eyes to what was going on and will give them confidence about how to approach the supervisor. It also gave them ideas of who to contact to protect themselves. The kids are empowered and not intimidated.”

However, most teachers did agree that many students would continue to be reluctant to report health and safety problems, despite knowledge of their legal right to do so, given real fears of being fired or other ramifications. As a teacher explained, “I think they’ll be less likely to report problems to agencies or legal people because of their status. They’re scared to do this. I’m just not sure they trust the system to keep them anonymous.”

In addition to impacts on students, a number of teachers commented on the curriculum’s impacts on parents. As a teacher explained, “Several kids wanted to take the information home. The parents who came to the workshop were listening and making comments; they said that before they wouldn’t call to report problems because they might be fired, so they also learned about their rights.” Another reported, “The students were very eager to learn about everything, especially about the laws. We had an open house around the time of the curriculum and the parents were very interested in it too. One father said that he didn’t know about health and safety and he was glad that his kid was learning about it. I made sure that the students took the information home. It was good for the students.”

The curriculum was offered in classes with teens who work in agriculture, as well as those who do not. While most teachers noted that students who work in the fields were particularly interested in the information, they felt that all students were interested at some level, since virtually everyone in those communities knows someone working in agriculture. As a teacher explained, “I think the curriculum is very good. The students could relate to agriculture, because either they or their parents work or have worked in the fields. They were very attentive because it was very relevant. They also responded positively to writing on farmworkers’ experiences. Some of them actually wrote quite detailed compositions.”

A number of teachers reported that the curriculum was effective in stimulating classroom participation from an ESL perspective as well, since students often felt more confident discussing issues with which they had personal experience. As a teacher explained, “Whenever we were discussing things, they participated, which is something my classes struggle to do. They were more willing to participate than they have been at other points in the year, because they felt confident about what they were saying.”

Several teachers also commented on how much they enjoyed teaching the curriculum and how much they learned from it themselves. Several teachers who had worked in agriculture as teens claimed they would have liked to receive a similar curriculum at that age. As a teacher explained, “I wish that when I was a teenager working in the fields I had had a curriculum like this one.” Another noted that, “When I was a kid I was a migrant worker myself.

We did a lot of dangerous stuff and we didn't even know it. I could relate to the curriculum. I have a hectic schedule but I would definitely teach it again."

Another teacher offered the following exchange between herself and a neighbor who is a farmworker. She explained that, "I was talking to my neighbor who works in the fields and he told me that he has seen people dropping because of heat exhaustion. He said that the owners used to tell him he should just be happy to have a job and not say anything. He explained that they never taught people about their rights, and he never knew what the bosses could do. He was very impressed that we were teaching the kids about that."

Teachers offered a number of recommendations for improving the curriculum, including providing more time to teach the curriculum, making the video longer, inviting guest speakers, simplifying the language in the readings, and providing information on a range of alternative solutions in accordance with individual comfort levels.

Several teachers made modifications to the curriculum. One asked students to interview family members or friends who had worked in the fields in addition to interviewing classmates, which the students "really got into." Another asked students "to make a skit of their own, where they present a problem and a realistic solution to the problem." According to that teacher, "some of the students even went a step further and did videos, or did their skits out in the community and in the fields."

Virtually all teachers felt this should become a regular part of the ESL curriculum in schools with large numbers of teen farmworkers. As a teacher explained, the curriculum should be taught "for safety. It's real life; it's what they are doing. We should teach them how to protect themselves and teach others, like their uncles, aunts, cousins. I think that they go home and talk about it. I know that when I was working in the fields I didn't know this information. If I would have gotten that information, I would have talked to my mom and I would have told her this is what we can do." Another teacher reported that, "I will continue teaching this curriculum no matter what. It's so nice, because there's so little that comes at the students with experiences they know of, and they're so much more willing to share and talk about personal experiences, since they relate to it. When they share and participate it really helps with drawing out vocabulary."

With respect to implementing this curriculum on a larger scale, however, a number of teachers noted that they would be much more likely to adopt it if it included information regarding the specific state language requirements that it fulfills.[26] This is an issue with which teachers constantly struggle, greatly influencing the types of curricula teachers adopt.

Parent Response to the Health and Safety Workshops

Interviews were conducted with 19 parents who attended health and safety workshops *and* whose children worked in the fields the summer following the curriculum. The purpose of the parent interviews was to assess whether parents talked to their children about what they learned in the

[26] In California, teachers are asked to comply with specific standards set forth for each grade level. With an increased emphasis on testing, there is a move toward stricter adherence to the standards.

workshops and what they told them; whether students spoke with their parents about what they learned in the curriculum; and, whether parents did anything differently to make sure their children protected their health and safety in the fields as a result of the workshops.

The parents' response to the workshops was very positive, and many noted that much of the information presented was new for them. As one explained, "I thought the workshop was going to be a waste of time. But it was very interesting and I learned a lot. They gave us sheets with information and telephone numbers to call. They told us about our rights, for example, that we have the right to talk to the *mayordomo* [foreman] if there's a problem."

As with the student focus groups, a question in the interview asked parents to mention aspects of the workshop they recalled. Most parents retained significant amounts of information, including knowledge of agricultural workers' rights, laws affecting teen farmworkers, health and safety hazards, protective behaviors, and information on where and how to report health and safety violations.

Almost all reported discussing what they learned in the workshop with their children. **Many noted that this was the first time they had ever discussed health and safety in the fields with their children**. As a mother explained, "It's important to know how to protect yourself in the fields. This was the first time we talked about protecting ourselves in our family and it was the first time I discussed this information with my son." Another parent explained, "I already knew a lot of the things they talked about, but before this workshop it hadn't occurred to me to talk to my son about these things." A mother commented, "Parents are the ones that tell our kids how to protect themselves. You have to explain these things to them so they know how to protect themselves and defend their rights. But sometimes I don't know how to explain these things to my kids, and sometimes you're so busy that you forget to talk about these things."

Most parents reported behavior changes with respect to their children working in the fields. Examples of some of these changes include the following:

- *"I now tell my daughter that she has to cover her face to not breathe in pesticides, that she should wear gloves and that she can complain if the bathrooms are dirty. They gave us a number to call in the meeting."*

- *"I told my daughter that young people in the fields need to be protected and respected. I told her that they can complain, personally or by telephone if they have a problem."*

- *"Now I try to protect my children more. I put a bandana over their faces and another on their heads. Before I didn't know about that, but since they taught me about that I started to use a bandana on my children."*

- *"My son used to wear a cap, but now he wears a hat with a brim and a long-sleeved shirt. He's more careful about not getting cut and he takes water with him to the fields. Now I also make iced tea for him to take to the fields."*

- *"I told my son not to wear the clothes he wears in the fields at home or in school, because it's full of chemicals."*

- *"I told my son that he should wash his hands before eating and that he shouldn't drink water unless he's sure it's clean. Since that meeting we bring our own water to the fields so we can be sure we have clean water."*

- *"I make sure that my son wears long sleeves and a hat, and that he covers his face. If I see him working without a shirt I tell him to put one on. I also tell him that he has to wear shoes, not sandals in the fields. I'm also more aware of symptoms [of illnesses], to make sure he's not getting sick."*

The parents discussed the impacts of the curriculum on their children. **Many reported that their children had discussed what they learned in the classes at home, as well as with their friends**. As a parent explained, "My daughter talked to her friends about what she learned in the classes. They were very interested. She gave them information sheets and telephone numbers. You begin to realize that you have rights, that you can speak out about things." Another parent explained, "I like that the classes are directed to young people, because now they know that there are protections for them. It so often seems like nobody cares about them." As one parent noted, the classes are important, "because children don't believe what they hear from their parents; they need to hear it from a teacher."

A parent described the impacts of the curriculum on her son. "The *mayordomo* told me that my son wasn't working well. But my son spoke directly with the *mayordomo* and told him that he was working well. Thanks to those classes he knew his rights and was able to speak directly with the *mayordomo* to defend himself."

The parent workshops have had spillover effects as well, and many participants reported sharing this information with others, including spouses, other children, relatives, friends and coworkers. As a mother explained, "I talked about this with my husband and my brothers and sisters. I told them how things should be. They were very interested. For example, they were very interested to learn that children can't be forced to use pesticides or to drive tractors." Another reported telling a friend about her rights, explaining that, "her son's lungs swelled up because of all the chemicals he was exposed to. My friend was afraid to say anything because they don't have papers, but I told her that all workers have rights, and that the grower has to pay for the medicine. They taught me that in the workshop, that all workers have that right."

Many parents also noted that the workshops have had an impact on them as well. As one explained, "I knew some of these things, but now I know much more. If the *mayordomo* tells you to do something, you do it if you don't know your rights. The *mayordomo* can threaten to fire you, so you do what he tells you to do. Now we know our rights. Now I know that I can talk directly with the *mayordomo* and explain things to him, because I'm not afraid any more. It makes a big difference when you have that kind of information."

Specific Aim #3: To explore and pilot outreach and education methods that could be successful for reaching youth in the fields

In the final year of the project, CRLA carried out a number of community activities to reach teenagers or their parents with health and safety information drawn from the *Teens Working in Agriculture* curriculum. These activities included:

- Making presentations at migrant parent meetings in the schools, migrant camps, and churches
- Participating on seven radio talk shows with Radio Bilingue and Radio Campesina
- Making presentations at the *albergues* or camps along the border in Mexicali and Tijuana, where youth congregate before entering the U.S. for work
- Outreach at health fairs and swap meets, as well as through field inspections (stopping and talking to workers during breaks, lunch or immediately after work).

CRLA also developed a campaign to distribute water bottles to teens, together with a wallet-sized card that listed key rights and contact information for CRLA. 1,000 water bottles were distributed, to 600 teens and 400 adults. The response to both the bottles and the information on the cards was positive, and farmworkers specially liked receiving the water bottles.

Of all these activities, the collaborations that were seen as most successful were with the Migrant Education Programs and with Radio Bilingue and Radio Campesina. The instructors from Migrant Education were very interested in the curriculum and the information it conveyed, and enthusiastically supported these efforts. Both radio stations were interested in interviews or special programming about the legal rights of teen agricultural workers as well as health and safety issues related to this work. Health festivals were also very useful, as workers and others were there already looking for help and information on health issues.

The albergues were selected as potentially good outreach mechanisms, especially for emancipated youth, and were recommended by the Mexican Consulate in Los Angeles, a CRLA outreach worker and a director of one of the albergues. However, actually connecting with the teenagers at the albergues proved challenging. The teens had questions related to Border Patrol, crossing the border and immigration, and their health and safety on future jobs wasn't forefront on their minds. Therefore, CRLA felt that much of the information conveyed in these presentations fell on deaf ears. CRLA also found that outreach at work through field inspections wasn't so useful for reaching teens. Many times the foremen would deny employing teens, and at other times, parents would not allow their sons or daughters to talk to the outreach worker in this setting.

One of the most critical aspects of successful outreach was having an outreach worker who used to work in the fields and was a parent herself. On many occasions, parents and students at a community presentation would be reluctant to talk about their experiences, but when the outreach worker took time to reflect upon her own experiences as a teen working in the fields and as a parent of young teens, it would break the ice and the stories would just flow.

Discussion

The need for sustained education and outreach on agricultural safety and health is evident through this study. Only one-fourth of the students reported receiving information about health and safety through other venues, including classes, work or in the community. While 74% of the students reported on the pre-test that their parents had spoken to them about health and safety, focus groups with students and interviews with parents indicated that talking about health and safety was something new, and had happened as a result of either the curriculum or the parent workshops. It is possible that after participating in the curriculum, students had much more in-depth or more specific discussions about health and safety.

The evaluation findings indicate that the *Teens Working in Agriculture* ESL curriculum is an effective means of teaching youth about agricultural safety and health. There was a significant impact in terms of the knowledge gained by the students who received the curriculum. Short-term impact is evident in the analysis of pre- and post-tests, but there were also very high levels of retention of information demonstrated in the follow-up survey that was carried out after the summer (up to 6-9 months after the curriculum). While the comparison group also showed some gains in knowledge in the follow-up survey, the intervention group did much better in open-ended questions that asked them to name specific laws (90% compared to 33% of students). In the post-test, the intervention group could also name a greater number of health and safety problems and solutions, and could articulate more specific examples of each of these than the comparison group.

Knowledge gains about child labor laws were not as consistent. The post-test showed a significant change with respect to the percentage of teens who could name the minimum age required for farm work, but this dropped off dramatically by the follow-up survey. There was also not much change between the pre- and post-tests with respect to the tasks that youth under sixteen are not allowed to do in the fields. However, youth who received the curriculum did show a gain in knowledge about the tasks that youth older than sixteen are able to do. It is likely that it is easier to remember that youth over sixteen are able to do most tasks in the field, as opposed to which tasks are restricted for youth under sixteen.

Greater increases in attitude and behavior had been anticipated. The gains in terms of attitudes were not as large because the youth's scores on the pre-test were very high. In both the intervention and comparison groups, teens scored a mean "correct" responses of 87%. The questionnaire was field tested for validity and reliability. However, this section consisted of a series of dichotomous "agree/disagree" questions, which may have increased the likelihood of students selecting the correct response. There were significant differences between the groups when the analysis looked at the percentage of students who answered ALL attitudinal questions correctly. The intervention group changed from 37% at pre-test to 53% at post-test, whereas the comparison group showed a slight increase from 37% to 42% ($p<.01$). The specific attitudes that showed the greatest change from pre-test to post-test were: concerns about riding a tractor when someone else is driving; perception of their ability to implement measures to avoid accidents or illnesses in the fields and attitudes regarding the danger of pesticide exposure.

In addition, 92% of the intervention group students reported being more aware of health and safety problems when they worked in the fields over the summer, compared to 63% of the comparison group. The majority of the intervention group stated this greater awareness was due

to the ESL classes. However, there was a drop in the percentage of students that reported noticing health and safety problems in the fields (compared to the previous summer of work), despite a greater feeling of awareness about health and safety. This is a surprising finding, with several possible explanations, but we were not able to explore this further in this study. One possible explanation is "question fatigue." All respondents – whether or not they reported noticing problems in the fields – were asked to respond to follow-up questions regarding what they did, or would have done, if they had noticed such problems. Whereas virtually all respondents who said they noticed problems responded to these follow-up questions, only 38% of those who did not notice problems responded to follow-up questions. Therefore, students may have realized they wouldn't have to respond to as many questions if they said they didn't notice problems. Other possible explanations are that the students did not retain the knowledge or ability to identify problems in the field or didn't feel comfortable identifying these problems, or that they had a better understanding of the question so that they realized the "problems" they had identified at pre-test were not actually health and safety problems.

A final attitude indicator measured whether students felt they could report health and safety problems to a variety of people, and therefore increase the potential resources that they could turn to. On both the pre- and post-tests, a large percentage stated they would report a problem to the boss, but there were significant increases at post-test in the percentage who said they would turn to a boss ($p<.01$), parent ($p<.01$), coworker ($p<.01$) or an agency ($p<.01$).

Changes in behavior were measured through the follow-up survey, comparing the students' summer work experience post curriculum to the previous summer. As with attitudes, the scores for "correct" behavior on the pre-test were higher than expected. However, there is not sufficient power to compare the groups because of low response rates to the follow-up survey. There are some encouraging patterns of behavior among students who received the curriculum, including that almost half reported implementing new behaviors to protect their health and safety compared to previous times they worked in the fields. Of those who reported behavior changes, nearly half referred to increased caution and greater use of protective gear, followed by increased use of clothing for protection from the sun, drinking clean water, and asking for help when lifting heavy items. When asked about specific behaviors related to child labor laws at follow-up, there were dramatic changes in the percentage of youth under age 16 who reported working with pesticides (96% decrease) and those under 16 who reported driving a tractor (93% decrease). Another promising behavior is that over half of the intervention group students who noticed health and safety problems talked to someone about them. In the focus groups the following fall, students reported a variety of behavior changes, including staying away from recently sprayed fields, not drinking irrigation water, not eating in the fields and washing work clothes separately from other clothing.

There was little difference found between students in terms of knowledge, attitude or behavior change when various modifying variables were evaluated. The only variables with identifiable differences included gender and the number of curriculum sessions completed.

In addition, the study suggests that information given to parents through community workshops does not result in increased positive outcomes among their children. In fact, there were no significant differences in knowledge, attitude, or behavior among students whose parents attended the workshops and students whose parents did not attend. However, comparisons

between these groups are hampered by lower numbers than necessary for sufficient statistical power.

The qualitative findings help support the findings from the quantitative measurements. There was great enthusiasm for the curriculum among students, teachers and parents who were involved in focus groups or interviews. Many students and teachers recommended that this curriculum be implemented in all schools with a large percentage of farmworkers. While students were familiar with the hazards in the field, the information on solutions or steps they could take to reduce risks, as well as on their rights, was new to them and they reported feeling excited to learn this. Additionally, many students reported sharing the information obtained through this curriculum with relatives, friends and coworkers.

While the study had hoped to include an analysis of the rates of accidents or illnesses reported before and after the curriculum, the numbers are too few to draw any conclusions, as only 15% of the intervention group reported accidents, and another 18% reported near misses. There was a decrease in the follow-up survey, but we cannot draw any significant conclusions due to the small number of cases. Moreover, use of these indicators is difficult for a relatively short-term project.

The results of this evaluation point to the need for some modifications in the ESL curriculum. For example, the students were able to identify a wider range of hazards and solutions at post-test, but the hazards they named most frequently were not the ones they are most likely to be exposed to. There was a greater focus on pesticides than ergonomic hazards, even though farmworkers are more likely to suffer an ergonomic injury. The curriculum will be modified to include more discussion about the actual rates of injuries and illnesses in agriculture, and which are the most likely hazards they will face in the fields. In addition, the fact that students were not able to recall the tasks that are prohibited by child labor laws for youth under 16 points to the need for the curriculum to provide more emphasis on that information.

Data Limitations

This evaluation study was not able to include sufficient numbers of students who had completed pre-, post- and follow-up surveys, in order to meet power calculation criteria. The research design called for complete (pre-, post- and follow-up) surveys from a minimum of 186 students in each intervention group and 157 in the comparison group (90% power). Pre-, post- and follow-up surveys, however, were completed by 245 students (67 in Fresno County, 142 in Tulare/Kern Counties and 36 in the comparison counties). Although this does not affect the significance of the results, it may limit our ability to detect more subtle differences between groups. In addition, the high ratio of intervention to comparison group students may also skew some of the results. All findings from the follow-up survey should therefore be interpreted with caution.

These lower response rates for the follow-up survey across all groups was a function of several factors, including a lower than expected number of students working in the fields over the summer, and difficulty reaching students by phone. Some had moved, others may not always have received a message, and some parents were suspicious about strangers calling their

children. The dramatically lower numbers in the comparison group involved several additional factors. It was difficult to recruit teachers to participate in a comparison group, where there was little immediate benefit to their students or schools. In addition: several teachers who had initially agreed to participate cancelled at the last minute; some teachers overestimated how many students they would have in their ESL classes; and, one school refused to allow the evaluation staff to collect student contact information for purposes of the follow-up survey. Finally, although efforts were made to recruit students from similar schools and agricultural regions as those in the intervention group, a lower than estimated percentage of comparison county students worked in agriculture the summer after the curriculum. This resulted in a lower number to draw from for inclusion in the follow-up surveys.

Another limitation, characteristic of all survey-based studies, is that all information is based on self-report. With regard to the follow-up survey the difficulty with self-report is two-fold: 1) students may not accurately recall behaviors that took place several months prior and, 2) students may overestimate positive changes in behavior to "please" the researchers.

Additionally, the analysis of the curriculum's impacts on behaviors is based on recall data over unequal amounts of time. Behavioral questions on the pre-test referred to work the previous summer, i.e. approximately eight months earlier, whereas the follow-up test was generally administered to students within two to four months of working in the fields. This difference may have affected the accuracy of some responses, particularly on the pre-test.

The design of the survey may have affected the measurement of attitudes. For example, the effort to make the survey easier to implement through close-ended questions was limiting, particularly for measuring attitudes, where students appeared to be able to easily determine what the "right" answer was. Finally, "testing effect" likely played a role in the increases seen in the comparison group, particularly between the post-test and the follow-up survey. Students may have recognized what the answer should be, or also been more cognizant of the issues during their summer work experience because they participated in the pre- and post-tests.

Key elements of the approach

The results indicate that using high school ESL classes to provide workplace health and safety information to teens is an effective model, not only because it results in significant knowledge gains, but also because it is a successful way to reach teen farmworkers. This study found that 54% of the intervention group had worked in the fields, whereas a 1997 survey found that 71% of students in ESL classes worked in the fields. A number of factors contributed to the success of the model, and the following section describes some of the lessons learned through the implementation of this study.

1) Teachers like the curriculum and are willing to implement it.

Teachers reported that the curriculum was easy to use, that student participation was generally high since the information was relevant to their lives, and that the students enjoyed the interactive activities. Limited observations of some of the teachers implementing the curriculum indicated that the teachers' own enthusiasm and interest for the topic carried over to the level of energy and interest evident in the class, but this did not seem to impact what or how much

students learned. Teachers were asked to follow the lesson plans as closely as possible, and only a few modifications were reported, mostly due to timing. All the teachers who participated reported that they would use the curriculum again, and many stated that the curriculum was effective in stimulating classroom participation from an ESL perspective as well, since students often feel more confident discussing issues with which they have personal experience.

Moreover, the curriculum inspired the majority of students to share the information with their parents and other family members, as fully 73% of the students reported they had shared the information. In fact, some students commented in the focus groups that they wished some of the information were available in Spanish so that they could give it to their family.

Both the teachers and the students made some specific recommendations for modifying the curriculum and many of these are being addressed and incorporated by LOHP.

The fact that all teachers stated they would use the curriculum again is very encouraging. One key challenge in disseminating the curriculum broadly involves the current climate in California's schools, which prioritize meeting specific educational standards that are linked to testing. Any new curriculum must be seen as integral to the standards, and teachers recommended that the curriculum's introduction specify exactly which standards apply.

Some specific lessons were learned about teacher recruitment:

- It is more effective to contact teachers directly, instead of going through the principal.

- To meet necessary numbers for the study, recruit more teachers than anticipated. A few teachers who initially agreed to participate did not attend the training or complete the curriculum. In addition, teachers sometimes overestimated how many students they would reach, or taught fewer classes than projected.

- Teachers may be more willing to complete the various steps involved if there are immediate incentives. To encourage more teachers to attend the training in the second year, we offered half of the $200 stipend for completing the training, and the remaining half for implementing the curriculum and completing the evaluation activities.

- School schedules can impact teachers' ability to participate in evaluation activities. In this study, we had to take into consideration the impact of state-mandated testing on the teachers' schedules. In California, state testing usually takes place in May and teachers unexpectedly had to rearrange class schedules, pull students out for specific testing, etc., so we were challenged in terms of completing the pre- and post-tests. In the second year, we tried to get teachers started as early as possible in the spring semester so they could be done before testing season even began.

2) It is challenging to recruit parents to educational workshops at the school.

While this evaluation suggests that providing information to parents or doing outreach in the community does not significantly increase positive outcomes among the teens, the potential benefits and challenges still need to be explored. The parent workshops were a challenging aspect of the intervention, as it was very difficult to recruit parents to attend the workshops.

Outreach with community organizations, school staff and teachers confirmed that it is difficult to involve parents in school-related activities, particularly when they are working in the fields during the day. A tremendous amount of staff time was involved in outreach to the parents of the students who received the curriculum in their ESL classes. Through this effort we learned that:

- The skills and personality of the outreach workers are key. In the second year, recruitment for the parent workshops was not as challenging when more experienced outreach workers were involved in the project. These outreach workers may have been more successful because they were both parents themselves and were able to establish a rapport with farmworker parents. The fact that these outreach workers' had been farmworkers themselves also helped them establish trust with the parents.

- A combination of incentives for the students and parents was useful. In the first year, parents were offered a $20 stipend for some of the workshops, since we were not reaching our projected numbers. Many parents who attended earlier workshops said they were doing so because the teacher had offered extra credit to students if their parents participated. In the second year, the pizza parties for students seemed to be appealing.

- It is still important to take into account barriers such as child care and transportation, and make arrangements to help people who need this type of assistance. Moreover, having a raffle and food at each event added to its appeal.

3) Partnering with a well-known and respected community-based organization adds legitimacy to the intervention.

Outreach workers from the California Rural Legal Assistance, Inc. implemented the pre- and post-tests as well as the follow-up surveys. The fact that they were former farmworkers themselves and members of the community established trust with students and parents. Students connected with them when they came to the classroom, and appreciated the information these outreach workers provided (sometimes outreach workers discussed the information after the post-tests were completed). In addition, CRLA was able to help identify which geographic areas and schools to target, to ensure that there would be large numbers of farmworkers for inclusion in the study.

Some of the lessons learned through this partnership include:

- it is necessary to have ongoing communication between the partners. In this project, we did a process evaluation at the end of year 1 to assess how staff felt about the collaboration and what recommendations they had for improvements.

- participatory training is useful to prepare outreach workers for their role in evaluation. Trainings were held in both years, in which the outreach workers practiced administering the pre- and post-tests, answering possible questions, and addressing potential challenges.

- the outreach workers were able to implement the evaluation activities, but it is good to plan for various quality comparison checks throughout the process. For example, by observing

the outreach staff when they administered the pre- and post-tests, and when they carried out the follow-up survey over the phone.

Conclusions

The research findings demonstrate that the *Teens Working in Agriculture* curriculum is an effective means of teaching adolescent farmworkers in California about agricultural health and safety. The study also shows that school-based ESL classes can serve as a much needed access point for young farmworkers, as over half of the intervention group students reported working in agriculture.

The need for this information is also evident. Only one-fourth of all students reported getting information about health and safety through other venues, such as other classes, work or in the community. Teachers were willing to teach the curriculum, and those who came from farmworker families themselves were particularly enthusiastic about providing teens with this information. This study's findings will help encourage teachers to incorporate the curriculum into their teaching. Presentations of the evaluation findings have also met with enthusiastic responses among farmworker advocates, who have expressed interest in adopting this curriculum in schools in their regions. LOHP is adapting some aspects of the curriculum based on the results of this study and the comments received from students and teachers. LOHP will then promote and make efforts to broadly disseminate the curriculum once the revised version is available next spring.

The youth in this study are representative of one group of hired teens; those who live in agricultural communities and are enrolled in school. More extensive evaluation of other community-based outreach methods are needed, especially to reach youth who are not enrolled in school and are likely to be "emancipated" youth – i.e., those who come to the U.S. without their families.

Although the parent workshops did not significantly improve the outcomes for youth in this study, it would be interesting to explore other methods for reaching youth through people who play a significant role in their lives. Finally, there is a continued need for a greater focus on hired teen farmworkers, to develop a better understanding of the characteristics of youth working in the fields, their experience with occupational injury and illness and successful interventions to protect their health and safety.

APPENDIX A: ADDITIONAL DATA TABLES

Exhibit 18. Grade

	Intervention (n=1252) %	Comparison (n=288) %
Grade 8	0.0	0.3
Grade 9	38.7	44.4
Grade 10	35.9	26.0
Grade 11	15.5	21.9
Grade 12	10.0	7.3

Exhibit 19. ESL Level

	Intervention (n=1149) %	Comparison (n=290) %
Level 1	8.6	4.5
Level 2	26.1	30.7
Level 3	32.5	59.3
Level 4	32.9	5.5

Exhibit 20. Gender

	Intervention (n=1252) %	Comparison (n=286) %
Male	55.8	54.2
Female	44.2	45.8

Exhibit 21. Race/Ethnicity

	Intervention (n=1250) %	Comparison (n=289) %
Latino or Hispanic	91.7	77.5
White	1.0	0.0
Asian, Asian American or Pacific Islander	6.3	17.3
African American/Black	0.2	0.3
Other	0.9	4.8

Exhibit 22. Languages Spoken

	Intervention (n=1262) %	Comparison (n=295) %	P value
Spanish	90.6	78.7	p < .01
Hmong	5.8	2.8	NS
Indigenous language	1.8	1.0	NS
Punjabi	1.7	11.2	p < .01
Other languages	2.7	15.0	p < .01

Note: Percentages add up to over 100% because respondents were allowed to indicate more than one language.

Exhibit 23. Mean Number of Agricultural Workers Rights Correctly Identified

	Intervention	Comparison	P value
Pre-test	4.8	4.4	< .01
Post-test	6.3	4.9	< .01
Follow-up	6.8	6.6	NS

Exhibit 24. Percent of Respondents Able To Correctly Identify All Rights

	Intervention		Comparison		P value
	%	(n)	%	(n)	
Pre-test	27.2	342	16.6	48	< .01
Post-test	68.1	857	25.9	75	< .01
Follow-up	91.2	197	73.7	28	< .01

Exhibit 25. Percent Correctly Identifying Agricultural Workers' Rights: Pre-test and Post-test

	Pre-test			Post-test		
	Intervention (n=1259) **%**	**Compar-ison** (n=290) **%**	**P value**	**Intervention** (n=1259) **%**	**Compar-ison** (n=290) **%**	**P value**
The right to join a union	40.9	29.3	P < .01	77.3	41.0	p < .01
The right to health and safety training	59.9	53.8	NS	87.8	66.9	p < .01
The right to information about pesticides worked with	68.4	62.1	P < .05	89.4	69.3	p < .01
The right to earn the minimum wage	73.1	69.7	NS	90.9	75.2	p < .01
The right to drinking water and clean bathrooms	76.7	69.0	P < .01	94.4	76.6	p < .01
The right to report health and safety problems	81.0	74.8	P < .05	94.8	80.0	p< .01
The right to medical care if you get hurt on the job	84.0	79.7	ns	94.4	83.1	p < .01

Exhibit 26. Percent of Respondents Correctly Identifying Agricultural Workers' Rights: Follow-up

	Intervention (n=207) **%**	**Comparison** (n=36) **%**	**P value**
The right to join a union	96.1	88.9	NS
The right to health and safety training	97.6	97.2	NS
The right to information about pesticides worked with	97.6	97.2	NS
The right to earn the minimum wage	97.1	80.6	p < .01
The right to drinking water and clean bathrooms	98.1	100.0	NS
The right to report health and safety problems	97.6	97.2	NS
The right to medical care if you get hurt on the job	99.0	100.0	NS

Exhibit 27. Percent of Respondents Correctly Identifying Tasks Young Workers May Legally Perform: Intervention Group

	Task May be Performed by Youth Under Age 16 (n=1258) % correct			Task May be Performed by Youth Age 16 and Over (n=1258) (% correct)		
	Pre-test	**Post-test**	**% Change**	**Pre-test**	**Post-test**	**% Change**
Work with pesticides	43.6	45.5	4.4	23.1	46.4	100.9
Climb a ladder over 20 feet high	46.9	47.3	0.9	52.7	68.1	29.2
Use a hoe	55.2	73.9	33.9	64.9	81.3	25.3
Drive a tractor	48.9	46.6	-4.7	42.4	71.2	67.9
Sort and pack fruits and vegetables	83.5	88.6	6.1	79.8	86.3	8.1

Exhibit 28. Laws Cited: Follow-up Survey: Intervention Group

	Number of Times Mentioned	**Percent of Responses**
Ages at which teens can perform specific tasks in the fields	38	24.5
Right to clean bathrooms	25	16.1
The number of hours teens may work in the fields	22	14.2
Right to clean water	20	12.9
Right to report problems	9	5.8
Right to protective gear	7	4.5
Right to medical care/workers comp	7	4.5
Minimum age at which youth can work in the fields	7	4.5
Right to health and safety training	7	4.5
Right to breaks	6	3.9
Right to minimum wage	5	3.2
Right to no harassment	2	1.3
Total responses	155	100.0

Exhibit 29. Number of Health and Safety Solutions Identified: Pre and Post-test

	Pre-test		Post-test		P value (post-test)
	Intervention (n=1280) %	Comparison (n=292) %	Intervention (n=1280) %	Comparison (n=292) %	
0	29.5	35.6	8.5	30.5	p < .01
1	10.7	11.3	4.0	6.5	p < .01
2	17.3	18.8	8.9	16.1	p < .01
3	42.5	34.2	78.6	46.9	p < .01

Exhibit 30. Health and Safety Solutions Identified: Intervention Group

Health and Safety Solution	Pre-test (n=1259) %	Post-test (n=1259) %
Drink sufficient water, avoid dirty water	23.1	25.7
Use protective gear	17.0	10.4
Clothing to protect from sun, heat	9.8	13.4
Exercise caution to avoid accidents	9.7	6.6
Protection from pesticides	9.4	12.2
Ask for help lifting	8.2	8.2
Follow instructions	6.5	10.4
Good diet	2.9	0.8
Clean bathrooms	2.7	3.8
Good hygiene	2.7	1.9
Workers rights	2.2	2.5
Get medical attention	2.0	0.5
Report problems to the boss or others	1.8	2.9
Join a union	0.5	0.4

Exhibit 31. Changes in Awareness of Specific Health and Safety Solutions: Intervention

	Pre-test		Post-test		% Change
	%	(n)	%	(n)	
Tractors (general)	1.3	20	4.2	66	230
Not riding a tractor someone else is driving	0.1	1	1.7	27	2600
Not driving a tractor under age 16	0.2	3	0.3	4	33
Ladders (general)	1.8	27	1.4	22	-19
Not climbing ladders over 20 feet	0.1	2	0.3	5	150

Exhibit 32. Places Cited for Reporting Health and Safety Problems, Follow-up: Intervention Group

	Number of Times Mentioned	Percent of Total Responses
Have information provided in the class	33	31.7
Union	18	17.3
Boss/Foreman	16	15.4
Occupational Safety and Health Administration (OSHA)	14	13.5
Labor Office	5	4.8
La Campesina[27]	5	4.8
California Rural Legal Assistance (CRLA)	3	2.9
Proteus[28]	2	1.9
Parents	3	2.9
Migrant Office	1	1.0
School	2	1.9
Radio	1	1.0
County	1	1.0
Total Responses	104	100.0

Exhibit 33. Number of People to Whom Students Would Report Problems: Pre and Post-test

	Intervention			Comparison		
	Pre (n=1247)	**Post** (n=1248)	**% Change**	**Pre** (n=290)	**Post** (n=290)	**% Change**
0	2.4	0.7	-70	3.8	1.7	-55
1	25.3	10.3	-59	29.3	22.4	-24
2	31.1	18.2	-41	32.4	27.9	-14
3	22.7	20.3	-11	17.9	24.5	37
4	18.5	50.5	173	16.6	23.4	42

[27] Radio station affiliated with the United Farm Workers (UFW).
[28] A nonprofit offering pesticide safety trainings for farmworkers, in addition to other services.

Exhibit 34. Information Shared with Others, Follow-up: Intervention Group

	Number of Times Mentioned	Percent of Responses
Workers rights[29]	72	36.0
General information	61	30.5
How to avoid accidents	27	13.5
Water (right to, importance of drinking, avoiding dirty water)	18	9.0
Protection from pesticides	11	5.5
Clothing for protection from sun, heat	7	3.5
Age at which can do tasks	2	1.0
Ask for help lifting heavy items	1	0.5
Importance of reading signs and following instructions	1	0.5
TOTAL	200	100.0

Exhibit 35. Health and Safety Behavior Changes Implemented, Follow-up: Intervention Group

	Number of Times Mentioned	Percent of Responses
Clothing to protect from sun, heat	32	34.4
Increased protective behaviors (general)	21	22.6
Drink or bring clean water	13	14.0
Use of protective gear	10	10.8
Avoiding pesticides	8	8.6
Ask for help lifting, ergonomics	7	7.5
Attention to instructions	2	2.2
Total	93	100.0

Exhibit 36. Number of Behavior Changes Implemented: Follow-Up

	Intervention (n=67) %	Comparison (n=8) %
1	65.7	75.0
2	28.4	25.0
3	6.0	0.0

[29] Workers rights include general rights (39), the right to report problems in the fields (35), the right to clean bathrooms (8), and the right to medical attention for work-related illnesses or injuries (3).

Exhibit 37. Effects of Gender

Health and Safety Outcome	Males %	Females %	P value
Knowledge of places to report health and safety problems (post-test)	66.3 (n=697)	72.7 (n=553)	p < .05
Knowledge of the right to medical care for work-related conditions (post-test)	93.3 (n=699)	96.4 (n=553)	p < .05
Knowledge of the right to report health and safety problems (post-test)	93.6 (n=699)	96.4 (n=553)	p < .05
Knowledge of the right to drinking water and clean bathrooms (post-test)	92.8 (n=699)	96.7 (n=553)	p < .01
Knowledge of the right to information about pesticides (post-test)	87.8 (n=699)	92.0 (n=553)	p < .05
Knowledge that youth under 16 may work with a hoe (post-test)	78.5 (n=699)	68.2 (n=553)	p < .01
Knowledge that youth under 16 may sort and pack fruits and vegetables (post-test)	86.8 (n=699)	91.0 (n=553)	p < .05
Knowledge that youth over 16 may drive a tractor (post-test).	75.1 (n=699)	66.5 (n=553)	p < .01
Knowledge that teens over 16 may climb ladders 20 feet high (post-test)	71.4 (n=699)	64.0 (n=553)	p < .01
Would report a problem to the boss or foreman (post-test)	90.3 (n=699)	93.5 (n=553)	p < .05
Would report a problem to the union or other agency (post-test).	78.0 (n=699)	82.8 (n=553)	p < .05
Agreed with statement: “Drinking water from irrigation pipes or canals may harm your health” (post-test).	83.8 (n=698)	88.6 (n=553)	p < .05
Agreed with statement “It’s important to drink a lot of water when working in the sun” (post-test).	90.7 (n=697)	94.0 (n=552)	p < .05
Disagreed with statement: “I prefer not to report health and safety problems in the fields because my parents or relatives may get upset with me” (post-test)	95.6 (n=698)	97.8 (n=552)	p < .05
Agreed with statement “If I see someone doing something unsafe, I should say something to them” (post-test)	94.0 (n=698)	97.3 (n=552)	p < .01
Disagreed with statement “Sometimes I think it’s not worth trying to improve conditions in the fields, because nothing is going to change” (post-test)	89.0 (n=697)	93.6 (n=551)	p < .01
Spoke with others about what they learned in the classes (follow-up)	68.4 (n=136)	83.1 (n=69)	p < .05
Never rode on a tractor being driven by someone else (follow-up).	83.1 (n=154)	96.4 (n=83)	p < .05

Endnotes

Gielen, A.C., "Health Education and injury control: Integrating approaches." *Health Education Quarterly*, 12; 2:203-212. 1992

Green, L.W. and Raeburn, J., "Contemporary developments in health promotion." in Bracht, N.D. (Ed) *Health Promotion at the Community Level*. Newbury Park, CA: Sage, pp. 29-44. 1990.

Acknowledgements

This study was the result of a partnership between the Labor Occupational Health Program at UC Berkeley, California Rural Legal Assistance, Inc., Harder+Company Community Research and the California Institute for Rural Studies.

Special thanks to the CRLA outreach workers who were instrumental in carrying out the evaluation activities, and conducting outreach and recruitment for the parent workshops: Hector Hernandez, Elisa Hernandez, and Mirella Lopez. Thank you to Jeff Ponting for supervising and guiding all CRLA work on the project.

Thanks to Ron Strochlic of Harder+Company Community Research (and later CIRS) for his guidance and development of all evaluation tools as well as the analysis of the survey. Thank you as well to Michelle Williams and Kym Dorman of Harder+Co for their assistance.

Thank you to the teachers who participated in implementing the curriculum and carrying out evaluation activities. These teachers were:

Betty Hartig, Clovis High
Blanca Gomez, Parlier High
Celia Lopez-Clemente, Delano High
Cergio Rangel, Mendota High
Chris McCune, Arvin High
Christine Analiz, Wasco High
Dan Ragland, Coalinga High
Dean Brown, Selma High
Deana Lane, Wasco High
Deborah McDowell, Arvin High
Diana Guerra, Orosi High
Fermin Barboza, Laton High
Gary Marquardt, Coalinga High
Hans Budnarowski, Monache High
Jaime Calderon, Caruthers High
John Boland, Roosevelt High
Juan Jimenez, Porterville High
Kathleen Hicks, Arvin High
Maria Moreno, Sanger High
Marilyn Hutchings, Roosevelt High
Mark Cody Stinett, Shafter High
Mary Tamez, Lindsay High
Mayela Bujanda-Medina, McFarland High
Natalie Feinberg, Shafter High
Patti Goularte, Porterville High
Richard Diaz, Coalinga High
Roberto Mejia, Edison High
Rosalia Alfaro, Bakersfield High
Rosemary Estrada, Parlier High
Sarah Keller, Foothill High
Sylvia Nuñez, Orosi High
Thomas Morales, Foothill High

Virginia Escobar, Firebaugh High

Thanks to the teachers in the comparison group who allowed us to conduct the pre- and post-test in their classrooms. These teachers were:

Alice Castellanos, Tokay High
Carol Ahrabian, Madera High
Cathy Manassero, Tokay High
Cynthia Tabuchi, Tokay High
Dean Andreeson, Livingston High
Jennifer Runner, Atwater High
Jill VanNess, Lodi High
John Lamont, Dehli High
Kim Merenda, Linden High
Michelle Berchtold, Escalon High
Mr. Contreras, Avenal High
Ms. Romo, Chowchilla High
Rosalina McClain, Avenal High
Scott Thresher, Lodi High

A special thank you to the parents and students who were involved in the study, particularly the ones who agreed to participate in the interviews and focus groups.

Publications

The study team is planning to develop a journal article describing this project and the results of the evaluation, and anticipates publishing this article in a journal that is dedicated to agricultural health and safety, evaluation or health/community education.