

## **Lessons Learned from a Camp Health Aide Safety Program for Farm Workers**

**Diane Mashburn**

University of Florida  
PO Box 110540  
Gainesville, FL 32611  
352-392-0502 ext 244  
Fax 352-392-9585  
diane.mashburn@ufl.edu

**Paul Monaghan**

University of Florida

**Amy Harder**

University of Florida

**Glenn Israel**

University of Florida

**Tracy Irani**

University of Florida

### **Abstract**

*Migrant farmworkers face a disproportionate risk of injury on the job. This study looked at the risks faced by citrus harvesters in Florida and developed an intervention to reduce the most common injuries by promoting the use of safety eyewear. Using two methodologies, community-based social marketing and camp health aides (CHAs), the project developed a curriculum and safety intervention that changed the behavior of migrant workers. In 2007, the intervention was evaluated for effectiveness and to better understand the factors that influenced worker acceptance of new safety technology. Citrus harvesting crews that had a CHA promoting the use of safety glasses had higher use rates and the activities of the CHA were found to influence the decision of workers. The age of citrus workers was also significant, suggesting that future interventions should develop targeted programs aimed at distinct groups. The results have significance for Extension programs that seek to improve safety of agricultural labor and also those wishing to utilize social marketing methodologies or camp health aides in innovative ways.*

**Keywords:** social marketing, camp health aides, behavior change, farm workers, evaluation

## Introduction

Agriculture is among the most dangerous industries in the United States according to the Bureau of Labor Statistics ([http://www.bls.gov/iif/oshwc/osh/os05\\_04.pdf](http://www.bls.gov/iif/oshwc/osh/os05_04.pdf)). Occupational injury costs in agriculture are 30% higher than the national average (Leigh, McCurdy, & Schenker, 2001). Agricultural work is particularly dangerous to low-skilled migrant and undocumented workers because they often lack training and health insurance and are exposed to a wide variety of musculoskeletal, respiratory and skin disorder risk factors (Villarejo & Baron 1999). Some of the most overlooked, yet largely preventable agricultural injuries are eye injuries. Because of the conditions of agricultural work, the physical activities involved, and the numerous environmental hazards, eye injuries are common, potentially disabling and often costly to treat (Islam, Doyle, Velilla, Martin, & Ducatman, 2000; Saari & Aine, 1984). Although most eye injuries can be prevented through the use of personal protective equipment (PPE), the use of safety eyewear is not common among agricultural laborers (Quandt, Elmore, Arcury & Norton 2001). In addition, changing the culture of eye safety at the industry level and modifying the behavior of individual employees is difficult, particularly when employees are low-skilled, migrant and undocumented.

In this paper we describe an innovative eye injury prevention project that combined different methodologies of behavior change, such as train the trainer and social marketing, to successfully convince migrant citrus harvesters to adopt safety eyewear in Florida. The program and the methods used to design and implement it are relevant to Extension programs focusing on occupational safety, particularly those in agricultural industries that often employ low-skilled or migrant labor. Reducing the incidence and severity of eye injuries in agriculture has a positive impact not only on workers but on the financial bottom line of employers. Extension professionals will also be interested in this program for the use of train-the-trainer and social marketing methodologies.

### *Background: The Partnership for Citrus Worker Health*

The Partnership for Citrus Worker Health (PCWH) is a collaborative effort of university researchers, community members, migrant farm workers and citrus companies working to improve health and safety among migrant and seasonal citrus harvesters in Florida (Monaghan, Bryant, Baldwin, Zhu, Ibrahimou, Lind, Contreras, Tovar, McDermott, 2008). Begun in 2001 with funding from the Centers for Disease Control and Prevention, the various stakeholder groups were convened in southwest Florida by faculty from the College of Public Health at the University of South Florida. The effort was guided by a planning process known as Community-based Prevention Marketing, which combines community organizing with the principles of social marketing to improve health-related prevention projects (Bryant, Forthofer, McCormack Brown, Landis & McDermott, 2000). Soon after strategy sessions with the community advisory board began, the partners agreed by consensus to direct their attention to the overlooked problem of eye safety and injury reduction among Florida's citrus harvesters.

Although good injury surveillance data are not available for farm workers in Florida, citrus growers and harvesting companies report anecdotally that eye injuries from branches and foreign objects are the most frequent injuries experienced by their employees. During the formative stages of research for the project, workers confirmed that eye injuries were commonly experienced and not reported to supervisors and that treatment was often delayed.

Harvesting of citrus is particularly hazardous because workers stand on 20-foot ladders while carrying a picking sack that holds up to 90 pounds of fruit (Mossler & Aerts, 2006). The

employer costs of these injuries include lost time and wages, clinic visits, as well as administrative and insurance costs. Not measured are the costs to workers such as pain and suffering and the impact on retention of the workforce and seasonal turnover. Studies of serious occupational eye injuries have demonstrated that the use of safety glasses prevent the majority of these injuries (Fong & Taouk, 1995; Xiang, Stallones, Chen, & Smith, 2005). However, worker acceptance is a key element in any program that depends upon the use of safety eyewear (Lipscomb, 2000).

### *Using Community-based Prevention Marketing to Understand the Audience*

Community-based prevention marketing was developed from the principles of community-based social marketing. According to McKenzie-Mohr and Smith (1999), community-based social marketing is based upon the theory that behavior change occurs when barriers to an activity are removed and benefits of the activity are highlighted through the initiatives delivered at the community level. There are five steps involved in community-based social marketing: (a) selecting which behavior to target, (b) identifying barriers and benefits to the selected behavior, (c) developing a strategy to decrease barriers to the selected behavior while simultaneously promoting the behavior's benefits, (d) piloting the strategy, and (e) evaluating the strategy after broad implementation (McKenzie-Mohr, 2008). Community-based social marketing has been effective for promoting behavior changes such as healthier eating (Reger, Wootan, Booth-Butterfield, & Smith, 1998), increased recycling (Yepsen, 2007), and better food safety practices (Redmond & Griffith, 2006).

In order to increase worker acceptance, this project combined two methodologies, community based prevention marketing and a train the trainer program (also called camp health aides). The prevention marketing approach helps the team define a target audience, specifies what behavior is to be encouraged, and develops and tests hypotheses about why the target audience would choose to change their behavior. The research findings are then incorporated into a social marketing strategy that includes the "4Ps" of marketing: Product, Price, Placement and Promotion (Andreasen, 1995). The "product" promoted in this project includes both the actual safety glasses but also the beneficial results; a reduction in pain, irritation and lost time with fewer eye injuries. The "price" or cost of wearing the safety glasses is recognized as some initial discomfort when getting used to wearing the glasses in the humid Florida environment, which is significant when one considers that it is an entirely new way of working and is not the norm. The "placement" of the product is the importance of having safety glasses on hand when workers are most likely to make the decision to use them – just as marketing for soft drinks or fast food is tied to having them readily available near to the consumer (Andreasen, 1995). The "placement" and the "promotion" (the outward marketing through advertising and spokespersons) are both carried out by the trained camp health aides. They act as spokespersons for the use of safety glasses and they distribute them in the fields and encourage their use.

The Partnership for Citrus Worker Health identified the barriers to the adoption of the selected behaviors through the use of focus groups with citrus workers and interviews with employers. Harvesters believed safety glasses would fog easily, collect sweat, and obstruct their vision with the dirt and dust that is so prevalent in the groves. The time lost to cleaning the glasses and the added annoyance of the increased heat, sweat, and fogging all contributed to a perception that safety glasses were not a feasible alternative to the risk of eye injury. Most eye injuries were not reported by workers for a variety of reasons, including inadequate health care services, lack of immigration documentation, and cultural barriers such as language. Employers

tried to implement mandatory safety glasses programs among their workers, but the lack of supervision in the groves and the need to keep good workers to complete the harvest often forces employers to abandon these programs. Employers also lacked information on the proper safety glasses that would be most suitable in the environmental conditions of the citrus groves.

### *Identifying and Adapting a Camp Health Aide Program for Safety*

Early in the process of designing a social marketing campaign for citrus workers, the partners teamed up with another research team in the Midwest (the Great Lakes Partnership for Agricultural Safety and Health - GLPASH). These researchers had created an eye safety program and curriculum for farmworkers utilizing trained camp health aides (Forst, Lacey, Chen, Jimenez, Bauer & Skinner, 2004). The camp health aide approach has been used for many years in developing countries to provide community training in health care. It relies on local non-professionals who receive training in particular health issues and act as educators, advocates, and providers of first aid in a variety of situations, from vaccinations to pre-natal care. The model had not been widely used to provide health or safety training in the workplace. The PCWH and GLPASH partnered on a grant application and received funding to pilot test the curriculum in Florida among citrus workers. In January of 2004, seven citrus workers were trained in eye safety and first aid and they began serving their peers in each of seven harvesting crews. While the pilot test was a success, the curriculum was determined to need extensive revision to be more focused on citrus-related injuries and a low-literacy audience. In addition, because the camp health aides were the workers themselves, their training and supervision had to be extensively modified to reflect their employment situation and their relationship with their peers on the citrus harvesting crews.

The modified curriculum and program design was much streamlined from the original designed by GLPASH, and focused on decreasing the barriers to safety glasses use (various negative perceptions by workers) and improving eye injury treatment. The effectiveness of the strategy was evaluated during the fourth year of the PCWH initiative. This study is focused on the results and implications of that evaluation.

### **Purpose & Objectives**

The purpose of this study was to evaluate the effectiveness of the camp health aide program in encouraging the use of safety eyewear. The camp health aide strategy had been developed and repeatedly revised over three citrus harvesting seasons (2004-2006). Camp health aides were trained on more than a dozen citrus harvesting crews. Regular observation of the participating crews found approximately 30% of workers adopted the use of safety eyewear each season. The PCWH researchers sought to understand the effect the camp health aides had on adoption of the new practice and to measure the influence that age, injury history, and work experience had on the decisions of citrus workers regarding safety glasses.

### **Methods**

In 2007, the research team of the PCWH evaluated the effectiveness of having a camp health aide on a crew by monitoring 13 crews over the course of a harvesting season. Observations were divided into a pre- and post-test format with crews assigned to control and intervention groups. All crews had access to safety glasses at the beginning of the harvest in January, but none initially received the camp health aide intervention. All 13 crews were observed on three separate days early in the harvest and researchers counted the number of

individuals using safety glasses. The observations were repeated four times on each of the days in order to verify that workers did or did not use the glasses consistently in the mornings and afternoons. Observers arrived in the citrus groves unannounced. Because safety glasses use was voluntary, workers were free to make the choice to use them or not.

After the first three observations were completed, nine of the crews were selected to receive the intervention. For more than a month, coordinators and trainers with the project recruited and trained individuals on each crew to be “eye safety promoters.” For the four crews in the control group, no camp health aides were trained. While members of the control crews were given safety glasses at the beginning of the season they received no promotion or encouragement from the program.

Approximately one month after the promoters began working with their crews, the observations were repeated on three additional days for both the control and intervention crews. Two methods were used to gather data on participants. Researchers walked through the groves on three separate days early in the harvesting season to establish a baseline of safety glasses use for each crew. Then the program was implemented among nine of the crews and after one month, the three days of observation were repeated for both the control and intervention crews. Each individual day of observation contained four separate passes through the rows of trees to count and observe each worker.

During one of the observation days, a short survey (10 questions) was administered to every worker present. This is the survey discussed in this paper. Before the interview began, each worker was identified by the observer as either wearing or not wearing the safety glasses while they picked. Workers that had the glasses nearby or who had them on their head or hanging around their necks were recorded as “not using.” The research team hypothesized that age, experience, a past history of eye injury, and interaction with the camp health aide would affect whether the worker was wearing glasses or not.

Logistic regression was used to estimate the effect of the intervention on the likelihood of workers wearing the safety glasses versus not wearing the glasses. A positive and significant parameter estimate means that the predictor variable is associated with a higher probability of wearing the safety glasses as compared to the reference category of that predictor.

## **Results**

The larger study of six total days of observation in the groves demonstrated the intervention crews with a camp health aide had significantly higher rates of safety glasses use. The usage of glasses among control crews was 2.4% over the course of the three observations before the intervention. Post-intervention, usage rates remained low (2.6%) for the control crews. Among intervention crews the overall usage during the three baseline observations was 11.1% and use rates climbed steadily after the intervention to a high of 35.5% on the last day of observation for a post intervention average of 27.5%.

### *Results of Survey Questions*

The cross-tabulation of using safety glasses by the intervention group (control versus treatment) and promoter contact (promoter helped, didn't help, or wasn't known) showed a significant association (see Table 1). Nearly half of workers in the treatment group who received help from the promoter were observed using the safety glasses. Workers in the treatment group who knew the promoter but did not receive help were somewhat less likely to use the glasses (nearly one-third) and only one-quarter of those who did not know the identity of the promoter

used the safety glasses. Finally, less than one-tenth of the workers in the control group were observed using the safety glasses.

Table 1.

*Use of Safety Glasses by Intervention Category*

Was Worker Wearing Glasses at Time of Interview?	Promoter contact			Control group	Total ( <i>n</i> )
	Promoter helped	Promoter didn't help	Promoter not known		
Yes	48.9%	31.8%	24.0%	8.2%	79
No	51.1%	68.2%	76.0%	91.8%	200
Total ( <i>n</i> )	90	66	25	98	279

Note. Pearson Chi-square = 39.003, *df* = 3, *p* = .000

The impact of the safety glasses intervention was elaborated using logistic regression, controlling for picking experience, age group, and injury experience (see Table 2). The joint effects of the predictors in the model were significant ( $p = .000$ ), indicating an improvement over the intercept-only model. In addition, the type 3 effects, which indicate the significance of the set of categories for an individual predictor, were statistically significant for the intervention categories ( $p = .000$ ) and for picking experience ( $p = .020$ ). Examination of the parameter estimates for the individual categories for intervention category showed only workers who received help from the promoter (estimate = 1.094,  $p = .000$ ) were significantly more likely to use the safety glasses than workers in the control group (the reference category). Workers who knew the promoter but did not get help used the safety glasses more than the control group but this difference was significant only at the .090 level.

Regarding the demographic variables, workers who had completed more than five seasons of picking were significantly less likely to wear the safety glasses than those picking for fewer seasons ( $p = .013$ ). Workers who had picked for more than one year and less than two years were most likely to use the glasses ( $p = .004$ ). Table 2 also shows that the youngest workers were less likely to wear the safety glasses ( $p = .012$ ) and reporting an injury had no association with using the glasses ( $p = .754$ ).

Table 2.

*Logistic Regression of Using Safety Glasses on Intervention Category*

	Parameter	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	(Probability modeled is 'Yes')	-1.114	.187	35.474	.000
Experience	Less than one year	.083	.250	.110	.740
	More than one full year, less than two full years	.832	.289	8.304	.004
	Two to five full seasons completed <sup>a</sup>	--	--	--	--
	More than five full seasons completed	-.809	.326	6.151	.013
Ever reported an injury	No	-.048	.154	.098	.754
	Yes <sup>a</sup>	--	--	--	--
Age Group	Youngest workers	-.427	.169	6.385	.012
	Older <sup>a</sup>	--	--	--	--
Intervention Category	Promoter helped	1.094	.252	18.908	.000
	Promoter didn't help	.452	.266	2.884	.090
	Didn't know promoter	-.198	.402	.243	.622
	Control group member <sup>a</sup>	--	--	--	--

Note. Model likelihood ratio chi-square = 54.509,  $df = 8$ ,  $p = .000$

<sup>a</sup>Indicates the reference category, which has a parameter estimate of zero by definition.

Type 3 effects for:

Experience – chi-square = 9.840,  $df = 3$ ,  $p = .020$

Intervention – chi-square = 31.255,  $df = 3$ ,  $p = .000$

### Conclusions

Both the social marketing approach to modifying safety interventions and the camp health aide model proved effective in this setting. Citrus harvesting crews with a CHA had higher safety glass use rates; in addition, the activities of the CHA were found to influence the decision of workers. CHAs perceived to be helpful by their crew mates had the greatest influence on safety glass usage but a positive effect was observed even when the CHA “didn’t help.” The age of citrus workers and experience on the job was also significant, suggesting that future interventions should develop targeted programs aimed at distinct groups. Previous injury history had no influence on safety glass usage.

### Educational Importance, Implications, & Application

The educational importance of this study is clearly derived from the findings associated with the utility of social marketing as an approach to behavior change and the specific use of camp health aides in achieving the desired change. Social marketing methodologies have been

shown to be effective in understanding how target audiences perceive barriers to behavior change, as was the case in this study. Further, the use of CHAs proved to be an innovative way to stimulate worker participation in the program and subsequent adoption of the safety glasses.

Promoting sustainable behavior change is, of course, the cornerstone of extension work. The results of this study demonstrate the potential that community-based social marketing, and its cousin community-based prevention marketing, have for creating behavior change in Extension settings. Both may prove to be particularly helpful when working with disadvantaged and often underserved clientele, such as migrant farm workers. The camp health aide approach compliments community-based social marketing by serving as a strategy wherein change agents can utilize members of the community as proponents of change. While the use of opinion leaders as advocates for change is not new (Rogers, 2003), this study's integration of opinion leaders into community-based social marketing to address the needs of agricultural audiences offers an innovative approach for planning behavior change.

One of the key implications from this study is based on the finding that while there was an observed overall increase in use of the safety glasses by workers exposed to the CHA intervention, the overall increase was still relatively low. Combined with the findings as to the demographic factors that were shown to significantly increase adoption, it could be inferred that for such safety interventions to be successful, audience segmentation must be utilized to more specifically target subgroups of workers with the likeliest potential for adoption. Since barriers and constraints to adoption may differ, using research to segment target groups according to these influences and then developing more specific approaches may be necessary to achieve larger increases in usage.

Although the scope of this study was confined to citrus harvesting, there is significant opportunity to apply the findings of this study to broader extension contexts. The community aspect to community-based social marketing and community-based prevention marketing holds great potential as methodological approaches that can be applied as models for implementation in consumer education settings. Extension educators could also explore applying these approaches to planned behavior change with respect to producer/grower adoption of new agricultural practices and technologies.

Recommendations for further research include exploring the application of the social marketing and CHA approaches in other Extension settings, as well as internationally. The participatory methods used by some extensionists in developing societies share commonalities with the community based approach to social marketing. Future research should include studies aimed at developing an enhanced understanding of these approaches, with a view toward enhancing their overall effectiveness.

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