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ORIGINAL RESEARCH

Improving Eye Safety in Citrus Harvest Crews Through the Acceptance of Personal Protective Equipment, Community-Based Participatory Research, Social Marketing, and Community Health Workers

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ABSTRACT. For the last 10 years, the Partnership for Citrus Workers Health (PCWH) has been an evidence-based intervention program that promotes the adoption of protective eye safety equipment among Spanish-speaking farmworkers of Florida. At the root of this program is the systematic use of community-based preventive marketing (CBPM) and the training of community health workers (CHWs) among citrus harvester using popular education. CBPM is a model that combines the organizational system of community-based participatory research (CBPR) and the strategies of social marketing. This particular program relied on formative research data using a mixed-methods approach and a multilevel stakeholder analysis that allowed for rapid dissemination, effective increase of personal protective equipment (PPE) usage, and a subsequent impact on adoptive workers and companies. Focus groups, face-to-face interviews, surveys, participant observation, Greco-Latin square, and quasi–experimental tests were implemented. A 20-hour popular education training produced CHWs that translated results of the formative research to potential adopters and also provided first aid skills for eye injuries. Reduction of injuries is not limited to the use of safety glasses, but also to the adoption of timely

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intervention and regular eye hygiene. Limitations include adoption in only large companies, rapid decline of eye safety glasses without consistent intervention, technological limitations of glasses, and thorough cost-benefit analysis.

KEYWORDS. CBPR, community health workers, personal protective equipment (PPE), safety glasses, social marketing

INTRODUCTION

Information from the 2007 Bureau of Labor Statistics indicates that the annual rate of eye injuries among farmworkers is more than twice the incidence rate among workers in the private industry (3.8/10,000 versus 8.7/10,000). Furthermore, the rate is higher among farmworkers working on fruit trees (11.5/10,000),[1] and the difference may be even larger if we consider that many of the agricultural workers are less likely to report injuries as a result of cultural stigma, vulnerability in the work place (especially if they are undocumented), and lack of familiarity with laws and regulations in agriculture.[2,3]

Florida is the second largest producer of fruits and vegetables, only behind California, but largely surpasses most countries in the world in the production of citrus. According to the Florida Department of Agriculture and Consumer Services (FDACS), an executive agency charged with marketing, research, and regulation for the industry, Florida produces more than 70% of the United States' supply of citrus juices.[4] The production of citrus during 2011 generated $3.8 billion of farm gate sales. These sales represented more than 70% of Florida's total agricultural output and nearly 90% of all farm sales from just crops.[5] In terms of labor, there are at least 60,000 citrus harvesters in Florida each season, according to some estimates.[6]

Citrus harvesting is physically demanding: Pickers stand on an 18-foot aluminum ladder that leans on the branches deep inside the canopy of an orange tree. Starting at the top of the ladder, with a large canvas bag across one shoulder, they descend, snapping off oranges using both hands and filling the bag. A full bag can weigh 90 pounds. Once on the ground, the picker drags the full bag over to a large bin, lifts it to the edge, and empties it. Each bin holds up to 600 pounds of fruit and, when full, can be worth $7.00 to $15.00, depending on the set price that day. An experienced worker can fill 8 to 18 bins (more than 2 tons of oranges or grapefruit) in a day and sometimes more if the fruit is plentiful and easy to harvest.[7]

The hazards citrus workers face include ergonomic injuries, fallings, heat stress, wildlife encounters, but particularly eye injuries caused by tree debris, dust, mildew, and fungus on tree leaves, insects, citrus flowers, water droplets contaminated by chemicals, and, especially, sand coming from the particulate-prevalent soil conditions of the state. Less frequent but more dangerous are traumatic eye events with branches and fruits. Constant exposure to ultraviolet (UV) light also increases the risk of developing pterygia, pinguecula, cataracts, and retinal damage.[8–11]

Moreover, because workers are paid by piece rate, there is a tendency to work fast without further risk considerations, whereas supervision is limited, and safety equipment is inadequate, and, in most cases, not readily available. When injuries occur, agricultural workers often are deterred by complicated reporting procedures, expensive treatment, reliance on crew leaders and subcontractors for access to health services, and a lack of health insurance.[3] In some instances where companies are engaged in safety programs, they are also affected by injuries due to the associated costs of workers compensation insurance and loss of working hours.

The Florida Prevention Research Center (FPRC) in the College of Public Health at the University of South Florida (USF) is 1 of 37 centers that form the network of Prevention Research Centers funded by the Centers for Disease Control and Prevention (CDC). The centers were created to conduct prevention

research and are leaders in translating research results into policy and public health practice.[12] Aware of potential impacts to citrus workers' health, the FPRC committed itself to the implementation of a program to prevent injuries and also test the feasibility of a community-based prevention marketing model (CBPM) in a rural area, with low-literacy workers, and traditionally opposed groups such as agricultural management and farmworkers advocacy groups.

PROGRAM IMPLEMENTATION

Community-Based Prevention Marketing

CBPM is a data-driven model that combines community organization principles and social marketing's conceptual framework of product benefits, product costs, placement, and promotional strategies to design, implement, and evaluate health interventions.[13] Social marketing has been used in public health for about two decades.[14] It has been used to promote breastfeeding, condom use, nonuse of illicit drugs, human immunodeficiency virus (HIV) prevention, among other programs.[15]

The CBPM in the citrus workers project case followed nine steps: (1) mobilize the community, (2) develop a community profile, (3) prioritize and select target behavior, (4) build community capacity, (5) conduct formative research, (6) develop marketing plan, (7) develop program materials, (8) implement program, and (9) monitor and evaluate.[3]

Whereas the mobilization of the community and the development of the stakeholders profile was headed by the FPRC, the selection of the target behavior, conduction of the formative research, and implementation of the intervention program was led by members of the Community Advisory Board (CAB) under the technical support and evaluation of the FPRC.

Technical support included training in the implementation of the CBPM model and the development of the CAB bylaws, measurement instruments, and the community health worker (CHW) training protocol. All documents were reviewed by the CAB and their application included the capacity building of its members to conduct data collection, popular education trainings, and evaluation tools.

In 2002, faculty and staff of the FPRC in collaboration with staff and sympathizers of the Farmwoker Association of Florida (FWAF), an advocacy group formed in 1983 and with presence in Immokalee, Florida, invited stakeholders to serve in a CAB. The board was composed of harvesting citrus workers, industry supervisor (health and safety managers and resources personnel), local health department's staff, and other local stakeholders[3] such as the Lions Club.

Although distrust permeated the initial encounters, regular meetings and the task-oriented nature of each occasion allowed participants to build up trust and divide the tasks and stages for implementation. In least than a year, members were able to agree on the programs name, specific target, the use of community health workers (CHW), and even a bilingual logo. The newly form Partnership for Citrus Workers Health (PCWH) discussed strategies and methods to collect and analyze the data of the CBPM program.

Community members learned to conduct focus groups, surveys, and systematic observation, whereas safety managers allowed data collection in the farm labor camps (seasonal housing for harvesters) and the groves as well as provided personal protective equipment (PPE), first aid kits, and material to conduct trainings and supervision. Crew leaders in these companies were instructed by management to comply and support members of the PCWH and coordinated with workers for regular safety trainings and meetings.

Community Health Workers

The use of CHWs to intervene in the health problems of the poor and underserved continues to gain proponents in settings where members of the community are economically disadvantaged, medically underserved, and hard-to-reach. For this project, a uniquely trained group of CHWs was employed to improve citrus worker health and to reduce health care costs by treating eye injuries in citrus groves or work camps before they became chronic problems or more severely acute ones. In addition, CHWs attempted to improve access to health care by making referrals to community health centers in the event of non–work-related injuries or conditions. These CHWs, also known as *promotores*, were peers of

other citrus harvesters who work in agricultural settings and reside in migrant work camps.[16]

The initial curriculum was derived entirely from the materials provided by Migrant Health Promotion (MHP), a nonprofit organization based in Michigan with over two decades of experience launching *promotor(a)* programs in Michigan, Texas, and Colorado. The MHP curriculum materials used by the Florida CHW project were developed originally for an Illinois-based project to reduce eye injuries in Latino apple farmworkers.[17] However, the adaptation of training, selection of appropriated eye safety equipment, and the development of additional materials for the promotion of the targeted behavior were grounded on the formative research conducted by the FPRC and the trained members of the PCWH.

Recruitment for CHW candidates began by asking crew leaders and employers about harvesters most respected by their peers. This procedure typically resulted in identification of candidates who were superior harvesters on a particular crew. Workers who declined the invitation to undergo CHW training also were asked to recommend coworkers, usually a more experienced worker they sought out for advice. Candidates had to be willing to commit time to training during evenings and weekends. Because of the lack of worker leisure time, this commitment deterred some potential candidates. All harvesters who agreed were men living and working among their fellow crew members. The 20-hour training of CHWs was conducted in Spanish and covered eye hazards specific to citrus harvesting, eye diseases, first aid, and methods for distributing, fitting, and promoting use of safety glasses. During the selection process, PCWH members were aware of three crews with a few indigenous workers. To address this issue, five of the CHWs trained were bilingual workers (four Nahualt-Spanish speakers, one Tzoltzil-Spanish speaker). To ensure consistency, FPRC personnel and the migrant service organization regularly oversaw trainings. Each crew had two to three individuals selected to complete the training so that effects of turnover would be minimized.[18]

At the end of training, the research team selected the individual on each intervention crew who had performed the best during the training. In addition to the piece rate, they were paid for the amount of citrus harvested; CHWs received a stipend (equivalent to 10 hours/week of agricultural minimal wage). The CHWs were required to spend several hours conducting outreach and performing first aid in addition to keeping records of their activities and meeting with the coordinator. Weekly records included logs of educational encounters, numbers of injuries treated and safety glasses distributed, and any problems that arose. Records were used for CHW evaluation and follow-up with injured crew members.[18]

The Institutional Review Board (IRB) at the University of South Florida received and approved all data collection materials, informed consents, and human subject certificates.

FORMATIVE RESEARCH METHODS AND EVALUATION

Qualitative Data

Beside the initial bibliographical and labor statistical analysis by the academician team, several qualitative methods helped gain understanding of workers' perceptions of occupational hazards, their personal injury experiences, and perceptions of safety eyewear. Participant observation was conducted throughout the study. For instance, FPRC personnel and their community partners accompanied workers on buses as they traveled to and from the groves, harvested fruit alongside them, and spent time in workers' homes and camps. One FPRC researcher conducted key informant interviews with 10 citrus company representatives for their perspectives on workers' risks, their experiences with injury prevention, and views on worker acceptance of safety eyewear. FPRC and community researchers conducted eight focus groups with 50 citrus harvesters at workers' homes.[18]

During the pilot program phase, FPRC personnel observed CHWs and other workers in the groves to determine the proportion wearing safety glasses and obtain feedback about their experiences with them. An industry representative on the community board facilitated researchers' entrée for making eight unannounced visits to intervention and control

crews. Researchers also observed CHW training sessions, CHW educational sessions with coworkers, and obtained feedback from CHWs and other workers. At the end of the season, researchers interviewed CHWs as a group to obtain opinions about program strengths and weaknesses.[18]

Except for some key informant interviews, all data were collected and recorded in Spanish. FPRC personnel analyzed the data and prepared summaries for the FWAF and PCWH boards to review, provide feedback, and offer interpretation. Focus group recordings, individual interviews, and field notes were transcribed, translated, and coded to identify themes. Of special interest were topics related to marketing's conceptual framework (product benefits and costs, placement, and promotional strategies) and other factors that influence workers' use of safety eyewear. Observational data were tabulated by hand.[18]

Quantitative Data

Several quantitative methods were used to select effective and affordable PPE, ascertain the demographic characteristics of the target population, and evaluate the implementation of the program. Fogginess is the main complain of workers while using glasses; the high humidity of Florida and the demanding physical activity of harvesting produce constant condensation on lenses, impeding the visibility, and although there are alternatives to this problem, its cost was unaffordable to companies (high-tech glasses) or workers (constant cleanup of glasses). A Greco-Latin square design test several low-cost glasses that workers found attractive and were marketed as anti-fog solutions on real working conditions. To test the effectiveness of using CHW, a quasi-experimental design was implemented for a whole harvesting season.

A Greco-Latin square, also known as orthogonal square, is capable of determining combinations of observer, tester, period of testing time, and glasses such that each type of glasses, each test period, each observer, and each tester would appear in the experiment equal number of times and each time with a different combination of experimental conditions. This is illustrated in the table below.

	User 1	User 2	User 3
Observer 1	PPE A–Period a	PPE B–Period b	PPE C–Period c
Observer 2	PPE B–Period b	PPE C–Period c	PPE A–Period a
Observer 3	PPE C–Period c	PPE A–Period a	PPE B–Period b

In this scheme, each of the three PPE tested (A, B, and C) as well as the period of usage (a, b, and c) appears precisely once in each column and in each row of the matrix. Greco-Latin square design ensures that in each period, all three types of glasses are tested exactly once to accommodate weather/work conditions, which will likely vary; the three types of glasses tested in each period are worn by three different testers (pickers) to avoid potential bias arising from any single tester if he wears overwhelmingly just one type of glasses; each tester-glasses pair is observed by a distinct observer to avoid potential bias arising from assigning a single observer to the same tester or same type of glasses. Overall, each type of glasses will be worn once in each of the three periods, once by each of the three testers, and observed once by each of the three observers, thereby to achieve a balanced assignment of experiment condition over all factors. At the end of each day, a random assignation of safety glasses and time period ensured the observers and workers bias was avoided; the test lasted for 12 days, never was the same table used.

Times of the day correspond to an early period when conditions should be the wettest (7:00–8:30 AM), at a period when trees dry and there is relatively low temperatures (9:00–10:30 AM), and during the highest time of the day (12:00–1:30 PM). In each observation period of a day, the test consisted of asking workers to wear the glasses during two 20-minute segments. Testers were instructed to use the glasses as they normally would and to notify the observers at the moment the glasses fogged, became wet, or needed to be cleaned. Observers were also instructed to record any instance in which the testers adjusted the glasses, and to inquire the reason for the adjustment. At the end of each segment, observers cleaned the glasses to prepare for observation in the next segment. Data were collected on occurrence of fog or dew. A scale of 0-1-2 is used to measure the occurrence,

with 0 indicating absence, 1 for some amount of fog (or dew) and 2 for a lot of fog (or dew).

We evaluated the CHW program during 2007 with a prospective, quasi-experimental, time-series design to determine if the presence and activities of a CHW on a harvesting crew were associated with increased use of protective eyewear compared with control crews that received eyewear but had no CHW. The evaluation had two major components: (1) repeated observations of workers during harvesting, and (2) interviews with workers on all crews near the end of the harvesting season. Participants in the control and intervention (CHW) crews were provided with safety glasses at the beginning of the harvesting season. Replacement eyewear for lost or damaged glasses was available on buses that transported workers to the fields, and for intervention crew members, from CHWs as well.[19]

RESULTS

Face-to-Face Interviews, Key Informants, Focus Groups, In-depth Interviews

Workers' perceptions of risk are high, but also their refusal to use PPE. Among all kind of injuries, as expressed by key informants, eye irritation from foreign objects and trauma were the most frequently reported worker injuries. Workers also noted seasonal, environmental, and grove conditions that increase eye injury risk, as the following worker comments illustrate.

> *When there is heat, there is more dust from the ground. The goat [truck] is running fast and it stirs it up. The dust gets on the leaves and when we pick it gets in our eyes . . . When the groves are blooming the flowers get in our eyes . . . When the grove is wet, the chemicals sprayed on the leaves fall into my eyes every time I climb up the tree and shake it. But the main risk is the decay grove for their debris (palos barañudos).*

Harvesters frequently encounter foreign objects. However, even when irritation persists, few workers seek medical treatment, relying instead on over-the-counter medicines and assistance from coworkers. Most workers also self-treat eye abrasions they receive from branches and leaves. Even when traumas are painful and infected, workers frequently delay treatment. This postponement reflects harvesters' view of eye injuries as unavoidable in citrus work, the economic consequences of missing work, and the fear of alienating crew leaders and employers.[18]

Workers recognized the protection that safety glasses could provide them, particularly against the dangers of foreign objects and the risk of greater injury but few workers wore safety glasses and most had formed negative attitudes towards them because of the costs they associated with them. One problem observed before glasses were tested was the poor performance of most of the PPE; workers complain about the size, comfort, style, and fogginess of the glasses. To partially overcome this problem, CHWs tested approximately 20 commercially available safety glasses and provided feedback about features that affected their use when harvesting.[18] The styles selected as most suitable for the groves were sportswear style, adjustable, lightweight, and had low distortion and high-quality optics and coding for fogging and scratching, frameless lenses that could be elevated off the face to relieve heat, a soft nosepiece for comfort, a gap in the top of the frame to provide ventilation, thereby reducing fogging, and a short, sports-style band that kept them attached with low likelihood of becoming entangled with tree branches.

Participant companies provided selected glasses to workers without charge, but workers were still deterred by fears that they would impede harvesting efficiency, resulting in lower wages: they are too hot to wear in warmer months; the extra perspiration and dirt they accumulate necessitate pause from working to clean them, thereby slowing the harvesting; glasses fog in Florida's humid climate; glasses get caught in tree branches and fall off; and tinted lenses impede vision, obscure the fruit, and increase risk of falling. With wage incentives based primarily on speed, any perceived

barrier to expedience becomes magnified.[18] The following remarks reflect this belief:

> *Yes (I would wear glasses) these would protect from the garbage, the problem is the heat. I picked one day with sunglasses and they protected me from the garbage. But it was slower. By the hour it would be no problem.*

Although most harvesters worked independently, they usually lived with other crew members in camps or trailer parks and became familiar with their peers' experiences and skills. In some cases, workers had been recruited by relatives or friends from their home towns in Mexico with whom they worked and came to trust as mentors. Undocumented workers trusted few people outside their peer network, whereas documented (also known as H2A) guest workers came from the same towns, making skilled harvesters the most credible and trustworthy information sources about injury prevention and other subjects.

Regarding promotional methods, most citrus harvesters relied on Spanish-speaking radio and television for information and entertainment. Some camps had cable television that included Mexico-based channels featuring soccer and other entertainment. Although educational posters were displayed in some housing units, low literacy made print materials ineffective. Word-of-mouth was the most effective channel for providing health and safety information.[18]

Pilot Program

The pilot program demonstrated the value of using peer workers as CHWs, the characteristics of safety glasses suited for harvesting citrus, and the benefits of wearing them. The CHWs attended training sessions on weekends, wore glasses during most of each day, provided educational messages and first aid to coworkers, and kept activity diaries.[18] The pilot program during 2004 was associated with increased use of safety glasses and reduce eye injuries; however, proper data analysis was not possible because observations were not systematic, nevertheless in many cases registered an increase of PPE usage from 2% at the beginning of the season up to 37% at the end.

Perhaps more importantly, the pilot program made it possible to assess changes in workers' perceptions of safety eyewear as a result of their being able to field test different models. Workers wearing glasses no longer believed that the glasses reduced productivity and earning capacity, suggesting that this barrier could be reduced if workers could be persuaded to participate in a trial period with this eyewear. Also, they reported less eye irritation from dust, sand, insects, and chemicals, suggesting that the reduction of daily irritation should be added to the product ''benefits'' promised in future promotional efforts.[18] The questionnaires offered other evidence of increased program penetration from 2004 to 2005. For instance, there were some attitudinal changes in citrus workers' perceptions concerning the effect of wearing safety glasses on personal harvesting productivity, speed of harvesting, harvesting without worry, and experience with eye irritation and eye fatigue.[16]

Greco-Latin Square Test of PPE

The results of the Greco-Latin square glasses test show a clear trend that the fog index and dew index were higher in earlier morning and steadily dropped toward noon. It is worth noting that variation among the testers was considerable in terms of a 4-folder range (0.22∼0.95) for the fog index and a 10-folder range (0.02∼0.20) for the dew index. The results of analysis of variance (ANOVA) indicate that the fog index decreased by 0.21 ($P = .19$) unit from period 1 in early morning to period 2. However, the drop in fog index of 0.65 unit by period 3 is highly significant ($P = .0001$). Analysis of variance for the dew index was conducted using models with either nonrandom effects or random effects for testers. With nonrandom effects for testers, the dew index dropped 0.12 units ($P = .08$) from period 1 to period 2, and dropped 0.24 unit to period 3 ($P = .0007$). The analyses suggest that there are no detectable differences between PPE in dew

resistance. However, PPE A was more resistant to fog than the other PPE tested.

Quasi-experimental Test

Field observations demonstrated that crews with CHWs had significantly higher rates of eyewear use than control crews ($t = -3.070$; $P = .012$). For intervention crews, the mean baseline percentage of protective eyewear users was 11.1%. The mean proportion of adopters across intervention crews reached a high of 35.5% on the last day of observation for a postintervention mean of 27.5%. Use among control crews was 2.4% over the course of the three preintervention observations. Postintervention use rates averaged 2.6%. The more time the CHW spent with his crew, the greater was the observed use of glasses. When we used Spearman's rank correlation statistic, we found strong correlation between the time the CHW was in the field and the level of safety eyewear use among workers ($\rho = .77$; $P < .01$).[19]

Worker Survey

The citrus harvesters interviewed for this study ($n = 301$) were all males (mean age of 30.7) working in large crews (23.2 workers per crew on average). Seventy-seven percent of the workers were from Mexico (26.5 % from Veracruz, 11.3% from Chiapas, 11.2% from Guanajuato, 6.3% from Oaxaca, 4.3% from Guerrero, and 17.1% from other Mexican states). Three percent were from Central America (Nicaragua and Guatemala) and 20% did not provide information regarding their nationalities. We did not interview workers about their legal status, but participant companies informed us that many were H2A guest workers. In terms of experience harvesting citrus in Florida, 34% reported less than a year of experience, whereas 17% reported more than a year but less than 2 years of experience. Twenty-eight percent reported between 2 and 5 years of experience and 21% reported over 5 years of experience.

For members of the intervention crews ($n = 200$), we examined use of glasses and level of contact with the CHW (CHW helped, CHW didn't help, or CHW wasn't known) and found a statistically significant relationship ($\chi^2 = 39.00$; $P < .001$). Nearly half of the workers who received help from the CHW (48.9%) were observed wearing glasses. Workers on crews who knew their CHW but did not receive help were somewhat less likely to wear glasses (31.8%), and just 24.0% of workers who did not know the identity of their CHW wore them.[19]

DISCUSSION

CBPM recognizes the need for integrated interventions at the individual and environmental levels.[20] Through its participation, a community can develop competence in making evidence-based marketing decisions, enhance its sense of power, and enable favorable health outcomes.[21,22] Community ownership of problems and solutions can foster development of culturally acceptable and politically feasible interventions.[23] Participation in research and demonstration activities also can facilitate development of interventions that become integrated with existing structures, making them more sustainable after outside funding ceases.[24,25]

With the formation of the PCWH, a multilevel team of stakeholders, including workers, advocates, industry managers, and public officials, were able to design, implement, and manage a comprehensive eye safety program under the principles of CBPR[25] and social marketing techniques. CHWs act as positive role models and conduits for community-based social marketing to educate fellow workers about eye safety in the citrus groves and encourage workers to have a positive attitude towards safety eyewear. Promising results stem from community, academic, and industry support and collaboration.[16]

The effectiveness of the program went beyond the prevention and treatment of eye of injuries as the evaluation of the program showed. The use of multilayer mixed-method techniques improved the proper social marketing mix: product (wearing PPE), price (decrease injuries), place (harvesting), and promotion (CHW). Moreover, systematic evaluation

ensured that the project remains relevant to stakeholders and funders.

Results of interviews with crew members help explain reasons for early adoption, but they do not definitively answer why individual behavior changes. Some CHWs have a greater impact on their peers than do others. The age of citrus workers and their length of experience also were related to intervention impact, suggesting that future interventions might be directed to distinct groups or audience segments.[26] For example, workers in their second year of harvesting have both an understanding of the risks of eye injury and, possibly, have achieved a comfortable level of piece-rate work and know how much they can earn. Novice workers might worry they will not make enough income in their first year if they use glasses. Workers' age also influences their concerns about safety and providing long term for their families. Other researchers have identified age as a potential moderating variable in health behavior adoption and maintenance.[27]

Certain elements of this study limit its generalization. For instance, in the quasi-experimental test, crews could not be randomly assigned to intervention and control groups, so subtle differences among workers and company cultures were outside the control of the researchers. Moreover, members of some company crews had participated in the developmental phase of the intervention, including the pilot testing of safety eyewear, and subsequently may have been more receptive to the intervention. Because this investigation was as an experiment in a natural setting, other independent variables could not be controlled. Crew sizes vary from 14 to 40 workers and may not be constant from week to week. Therefore, the composition of crews and seasonal turnover introduce unknown variation to behavior change measurement. Finally, there is no way to guarantee that crews participating in this study are representative of other citrus harvesters.[19]

Limitations notwithstanding, two important findings emanate from this study: (1) workers can adopt the use of safety eyewear previously considered to be incompatible with the demands of piece-rate harvesting; and (2) CHWs are key factors in modeling and encouraging behavior change. Thus, full-time citrus harvesters who have only a modest level of formal education can disseminate information on eye safety and effect behavior change. Agriculture is a risky industry in which partnership of unlikely allies can improve the working conditions of this highly demanding and specialized labor.

PCWH members noted that companies had been providing incentives to crews that did not report injuries. However, according to the CHWs, this practice merely resulted in fewer reports and not fewer injuries. After the implementation of the program, companies understood that these incentives did not result in preventive measures on the part of workers. On the other hand, incentives for the use of PPE and early intervention did translate into fewer injuries. Nonetheless, piecework remains a disincentive to the use of safety glasses.

The CHW model has significance for public health practitioners who struggle to address challenges faced by migrant workers. These findings corroborate those from other studies concerning the utility of CHWs as health promoters and suggest that CHWs have value in occupational settings. Through adaptation of an evidence-based program to the conditions of citrus harvesters, CHWs fostered adoption of safety eyewear by workers to an average level of 27.5% (compared with 2.6% among crews without CHWs), administered first aid to workers, and acted as both resource and role model. In the final analysis, the CHW approach minimized the risk of major injuries and the impact of minor ones on worker downtime and challenged the myth that safety glasses impede harvesting efficiency.

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