

Community Collaborations for Farmworker Occupational Health
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Final Progress Report

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Table of Contents

Abstract	2
Highlights	3
Translation of Findings	3
Outcomes	4
Scientific Report	4
Publications	9
Inclusion Tables	10
Final Financial Report	11
Final Invention Status	12

Abbreviations

HRHC	-	HudsonRiver Health Care
FW	-	farmworker
MHP	-	migrant health program
MMHP	-	Maine Migrant Health Program
MSD	-	musculoskeletal disorder
NIOSH	-	National Institute for Occupational Safety and Health
NYCAMH	-	The New York Center for Agricultural Medicine and Health
PCP	-	primary care practitioner
WT	-	Work team

Final Report Abstract:

The Community Collaborations for Farmworker Safety and Health Project was established in 2003 as part of the National Institute of Occupational Safety and Health's (NIOSH) Environmental Justice Initiative. The project involved a multi-disciplinary coalition consisting of a research team at the New York Center for Agricultural Medicine and Health (NYCAMH), primary care practitioners (PCP) in the study region, and migrant health program (MHP) directors. Coalitions were formed in Orange County (southeastern NY) and Washington County in eastern Maine. The cornerstone of the collaborative intervention process at each site was the "work team," consisting of farmworkers (FW), farm owners, clinicians and other agency personnel. These groups gathered and assessed data from the larger community, and enlisted public participation in planning and implementing project activities.

In New York, we worked with Hudson River Healthcare (HRHC) and a team of farmworkers and farm owners to address the problem of eye irritation related to the very fine black soil in the region. Several different types of protective eyewear were selected by the workers and systematically tested in field trials. Workers were also provided ready access to eyewash solution and were given training on eye protection, irritation and infection at the beginning of the season. Low-literacy Spanish pocket information cards were tested, modified and then distributed to workers. There was good support of this effort from the limited number of owners on the work team. Comparison of workers on intervention and control farms showed statistically significant reductions in eye irritation and several eye symptoms. In the final year, these interventions were made widely available to all workers in the region and the project materials were

disseminated to migrant agencies in Oswego, NY where there is similar fine black soil and related eye irritation. The local migrant clinic in Orange County will sustain the eye intervention in the future, possibly with the help of the local Lions Club.

In Maine, we worked with the Maine Migrant Health Program (MMHP) and a team of blueberry rakers and farm owners. The team selected musculoskeletal problems related to raking of blueberries as their major occupational health priority, and selected rake design as the mode of interaction. In the second year's harvest, a systematic trial of several potential intervention designs resulted in an extended handle design on both 70 & 80 tine rakes. In the following harvest, these were systematically compared to the traditional short handle rake by involving workers who tried a different design each day for five days. The extended handle rakes were greatly preferred by workers, were associated with less pain, required less force (subjectively) and were associated with increased productivity. In the last season's harvest, extended handle kits were produced by two different manufacturers and distributed at meetings in various camps early in the season. At each meeting, the goals and results of the project were reviewed with workers. A staff member was available to install any handles that workers chose to buy. Over the relatively short season, the supply of handles was completely exhausted. Maine's major rake manufacturer was involved in the work team and is a firm supporter of this intervention. Extended handle kits are now prominently featured in his catalogues and website. With support from the Maine Department of Labor, an instruction video (in Spanish and English) has been prepared which covers raking ergonomics and extended rake handles as well as heat and sun exposure, insect bites and other health concerns. We are currently seeking grant funds for a similar three-year undertaking in northern Maine broccoli production.

Impact of the Project:

Highlights / Significance Findings:

- The Maine project has been reported in the American Journal of Industrial Medicine and has been selected for one of two national awards for excellence in intervention evaluation by NIOSH.
- The Maine intervention results in less discomfort and less subjective perception of force while clearly enhancing worker productivity.
- Portions of the Hudson intervention have been exported to other migrant clinic sites in NY where similar dust exposures occur.
- Participants at both sites expressed a desire to undertake similar projects with NYCAMH in the future.

Translation of Findings:

- The rake intervention is now in common use in parts of Maine. It is prominently featured on the website of Hubbard Rakes, the leading rake manufacturer in Maine.
- The eye interventions introduced in New York are being sustained in the region through the efforts of the HRHC migrant clinic site in Orange County.
- The findings of both studies have been presented at several national meetings and reported in the literature (though a complete report on the Hudson project is currently in preparation).

Outcomes / Relevance / Impact:

A new design for the blueberry rake is being widely disseminated and accepted by workers, owners and manufacturers throughout Maine. This has been associated with less force and less pain. It has been found to be more productive. It is now being promoted by manufacturers, extension agents and individual owners.

This community-based strategy has been adopted by Maine Migrant Health Program to address additional occupational and non-occupational (diabetes) problems in their population. A grant to undertake a similar project with Maine broccoli workers has been submitted. MMHP has already recruited a work team for this project.

A teaching video in Spanish and English that deals with all of the most common occupational hazards in blueberry harvesting has been designed by the work team and is currently being distributed.

A successful eye irritation intervention has been devised and shown to be effective on Orange County vegetable operations. This will be sustained by the HRHC migrant clinic, possibly with the help of the Lions Club. Materials from this project have been disseminated to a migrant setting elsewhere in NY.

Low literacy Spanish and English pocket cards have been developed and tested for effective communication of eye protection advice. These have been disseminated in both Orange county and Oswego County.

Members of the Orange County work team, including the farm owners, have expressed a desire to undertake additional intervention projects.

This community-based methodology is now recognized at both sites by workers, farm owners and agencies as being effective and desirable.

Publications:

May J, Hawkes L, Jones A, Burdick P, Ginley B, Santiago B, Rowland M. [2008] Evaluation of a community-based effort to reduce blueberry harvesting injury. *Am J Indust Med.* 51(4):307-15.

Earle-Richardson G, Hawkes L, May J. [2008] Evaluation of Process in Two "Identical" Community-based Projects Aimed at Migrant Farmworker Occupational Injury — submitted *Am J Pub Health*

Hawkes L, May J, Paap K, Santiago B, Ginley B. [2007] Identifying the health needs of migrant farm workers: A community-based approach. *Journal of Community Practice.* 15(3): 57-76.

Scientific Report

A. Specific Aims

This project had two ultimate goals: 1) build an effective coalition of primary care practitioners (PCPs), a community migrant health program and a research team – the New York Center for Agricultural Medicine and Health at two separate sites in the Northeast; 2) develop and test a process through which these coalitions can generate effective interventions to reduce occupational injury and illness in the migrant and seasonal farmworker community.

Four basic aims were specified: 1) - solicit the participation of the migrant community in assembling a team of migrant and seasonal farmworkers, employers, health professionals and other stakeholders who share the common goal of reducing occupational injury and illness at each of two community migrant health center sites. 2) guide these teams in establishing injury/illness priorities and identifying prominent risk factors through the use of existing data on the community's occupational injury/illness patterns. 3) design and test interventions intended to reduce illness / injury under the guidance of the community team. Evaluate the impact of each intervention upon migrant worker injury and illness. 4) assess the results of these evaluations with the community team and assist community organizations to disseminate and institutionalize those interventions found to be effective.

Each of the goals and each of the specific aims were accomplished at both of the project sites.

Methods and Results

Aim 1 Solicit participation of the migrant community.

The cornerstone of the process at each of these sites was the “work team,” consisting of FW, farm owners, clinicians and other agency personnel. This group gathered and assessed data from the larger community, and enlisted public participation in planning and implementing project activities. With the help of others, the site coordinators hired by MMHP and HRHC were charged with assembling the work team at each site.

The key members of the work team (WT) were the farmworkers and employers. At both sites enlistment and retention of work team members was an ongoing challenge, often reflecting the many demands of agricultural production work and other personal priorities. Clinic outreach staff at both sites were mainly responsible for recruiting workers. Employers were solicited with a letter from a physician at MMHP and with advertising and an invited event at HRHC. At the Maine site, membership in the work team tended to be relatively stable, with the same people participating for much of the four-year project. At the New York site membership of the team was far more fluid and the team generally consisted of a larger number of farmworkers who showed up for a given meeting and dinner but may have only participated in occasional such meetings over the course of the project.

The scheduling of meetings in New York soon came to revolve around opportunities when a sizeable group of workers might be assembled rather than the smaller regular monthly meetings that occurred in Maine. Meeting agendas at both sites followed the very specific plans that had been outlined in the original funding proposal. Meetings in Maine proceeded at a faster pace with the use of simultaneous translators and headsets for participants, which the New York team elected not to use.

Aim 2. Guide these teams in establishing local injury/illness priorities

Each work team's first job was selection of the highest priority health challenge. Data on local occupational injury and illness patterns were presented to each work team in a format comprehensible by all team members. Each team was to rely upon its medical professional and community input (key informant interviews, focus groups) in its prioritization tasks. The teams ended up approaching these tasks in a somewhat different fashion.

Maine – The work team was composed of both Hispanic and Native American farmworkers, and representatives from several of the larger blueberry producers in the “downeast” region of Maine. The organization of this team and its efforts in determining priorities for intervention are described in great detail in our first paper (Hawkes et al.). Briefly, the team relied upon its first-hand knowledge of work processes, epidemiologic data gathered by NYCAMH, ergonomic consultation, and important input from community interviews and focus groups, to designate the reduction of musculoskeletal injury as its leading priority. The team selected rake design as a mode of intervention.

New York – The NY team was composed of Latino workers and owners of several relatively small vegetable operations in the area. Participation in the team by the workers was irregular and a consistent core of workers never really developed. Efforts to gather priority data from community members with taped interviews and surveys did not prove to be successful. In this region the project learned to find occasions when groups of workers might already be gathering for other purposes and meet in that setting. As a result considerably larger number of workers would often gather than for the meetings in Maine, but the continuity of their participation was less predictable. In most cases these larger gatherings served to represent the larger community without the gathering of additional input. Eye irritation (related to sun, wind and the very fine black dust found in this region) was selected by the community work team as the highest occupational health priority.

Aim 3 - Design and test interventions intended to reduce illness / injury under the guidance of the community team.

Maine - Following extensive community data collection and discussion, the work team chose to address the elbow, shoulder, back and wrist problems associated with blueberry raking as its highest priority. The team met with a consulting ergonomist several times during its second year to better understand the specific raking motions most likely associated with musculoskeletal injury. They then undertook assessment of a number of ad hoc rake modifications made by various workers in the community. Additionally the consulting ergonomist provided suggestions on other potential modifications. The team considered several rake design factors: handle length, extension height, diameter, and tilt, along with the number of tines (i.e. rake width). An artist was hired to work with the team to produce accurate drawings of candidate designs. From these drawings, the team selected three basic designs for comparison with the traditional short-handled rake. These included: a) the design with the two longer handle extensions described above; b) a traditional short-handled rake with a side grip to stabilize the box while raking; and c) a rake with a semi-circular, steering wheel-like grip that enabled the worker to hold the rake with one or two hands in a variety of positions.

The team conducted a pilot study employing 12 rake designs during the 2005 harvest. In total, four head widths (60, 70, 80, and 90 tines) were included, as well as three handle designs (steering wheel, side grip, and extended handles). Over the course of a 12-day rotation trial, rakers were systematically assigned each of the 12 variations (three handle designs times four widths). At the end of each work day, each raker was interviewed with a standardized English / Spanish questionnaire regarding the experience with

the particular rake assigned that day. Information collected included self-reported muscle or joint pain, its location, and the worker's description of the postures associated with the discomfort. Rakers also provided information about the functional problems and/or benefits encountered with each specific rake design. Finally, the number of standard boxes of blueberries harvested using each specific test rake was documented.

The 2005 trial of twelve candidate rake designs (three handle types and four head widths as previously noted) involved three farms and 42 workers. Available data were limited by workers' unwillingness in some cases to use certain rake designs for the entire day, most notably those designs that featured the steering wheel handle, which proved to be uniformly disliked by the rakers. From a comparatively small sub-sample of 13 workers who named a single "best" rake, all such rakes were of the extended handle type. Eight of these "best"-ranked, extended handle rakes (62%) were 70-tine width, three were 80-tine width (23%), and two were 90-tine width (15%). Employers on the WT advised that the 90 tine rakes would be unacceptable to most farm owners because of excessive damage to the fruit and plants. Thus the 70 & 80 tine extended handle rakes emerged as the clear favorites for a rake intervention.

In the following harvest season the project undertook a comparison of the traditional rake vs the extended handle design using a two-factor experimental design with fixed rake head width at two (2) levels (70 and 80-tine) and rake handle type at four (4) levels (center handle and 12", 14" and 16" extensions) for a total of eight (8) test rake configurations or "treatments. Each of 29 workers was randomly assigned to assess five of these configurations. Data from the 29 subjects were analyzed using two-factor analysis of variance. There was increased productivity ($p=0.041$); greater acceptability ($p < 0.0001$); less force ($p<0.001$) and less pain ($p<0.0001$) with the extended handle designs. The 80 tine width was favored over the 70.

New York – The work team designed a three-part intervention scheme consisting of ready access to eyewash, protective eyewear and worker education on eye care. Several different types of protective eyewear were selected by the workers and subsequently systematically tested in field trials. Workers were also provided ready access to eyewash solution and were given training on eye protection, irritation and infection at the beginning of the season. Low-literacy Spanish pocket information cards were tested, modified and then distributed to workers. A committee of workers evaluated a number of safety glasses designs and selected a model with wrap-around dark lenses. In the subsequent growing season, randomly selected workers tested the protective eyewear and pocket-sized containers of saline solution. Farmworker and owner feedback from the pilot study suggested that safety glasses were important in reducing eye irritation. However, participants felt like dust was still getting into their eyes. The tinted lens color also made it difficult to determine if a commodity was rotten. For these reasons the team again examined various types of glasses and eventually selected a goggle-type design with a clear lens that would completely exclude ambient dust. These were tested in the following season. Owners helped recruit other owners for participation in testing that involved randomly selected intervention and control farms. The local site coordinator did data collection, which consisted of weekly Spanish language questionnaires documenting eye redness, pain, irritation, and blurring of vision.

Control and Intervention subjects self-reported five outcome measures: Eye Pain, Red Eyes, Blurry Vision, Itchy Eyes and Dry Eyes on a 3-point scale of occurrence (1=never, 2=sometimes, 3=always). Additional endpoint included subject's use of safety glasses and/or eye drops during follow-up phases of the study. Assessment of these results has been complex for several reasons. First, the goggle design proved to be an utter failure once hot weather arrived. No workers used the intervention glasses and so, with only a few weeks remaining in the season, different protective glasses were distributed to the

participating workers. In addition to incomplete use of the intervention, analysis uncovered the use of protective eyewear by some of those working on the control farms. In addition, significantly more intervention subjects reported pre-existing symptoms, namely eye pain than the control group at baseline. Despite these problems, the questionnaire results showed that over the course of the season, among those free of symptoms at the beginning of the trial, the intervention group experienced significantly less eye pain than those workers on the control farms.

Qualitative feedback suggested that the overwhelming majority of intervention participants during year two favored the second pair of glasses. The primary reasons given by participants for this preference was that in the heat the goggles fogged, were hot, and made the participants sweat more. In contrast participants said the second pair of glasses adequately addressed the contributing factors (wind and dust) that were independently identified earlier in the project. In addition, the majority of intervention participants that received the eye drops felt some symptomatic relief from the drops.

Aim 4 - Assess the results of these evaluations with the community team and assist community organizations to disseminate and institutionalize the interventions

Work teams at both sites were satisfied that their respective interventions had achieved the local project goals.

Maine – Two scientific papers have been published on the Maine project and a third dealing with the ergonomic assessment of the new rake is pending. In addition, extensive efforts were made to share research findings with the farming community. Results were presented during three regional blueberry producer meetings, which were held and organized by the local cooperative extension office. The site coordinator also presented at the Annual Wild Blueberry Growers Association Meeting. Results were also distributed to the local rake manufacturer, who in return distributed the findings with rake shipments. Lastly, and most importantly over 120 sets of handles were manufactured and then sold at a subsidized rate to rakers through a series of rake modification clinics. During those clinics MMHP staff visited camps and crews that in the past have not had access to the long-handled rakes. Through the clinics, staff shared with workers information about the handles, their benefits, allowed rakers to try out a two-handled rake, sold pairs of handles (at discount) and installed them with modifications to fit the individual raker.

A video summarizing the process of the rake project has been produced by the MMHP with support of the Maine Department of Labor. This video summarizes the ergonomic considerations leading up to the rake intervention and demonstrates the use of the rake. Hubbard Rake Company, Maine's largest producer of blueberry rakes now prominently features extended handle rakes and conversion kits in its catalogue and on its web site (www.hubbardrakes.com)

The report of this project's activities was published in the American Journal of Industrial Medicine in early 2008. Based upon this report, NIOSH selected this project for its national intervention evaluation award to be presented in October 2008. A proposal for a subsequent CBPR migrant project in Maine – this time with broccoli workers – was submitted to NIOSH and scored in the mid-200 range. A revision of this has not yet been submitted.

New York – The Site Coordinator shared the intervention successes at the local Vegetable Grower's Association meeting. In addition, the Site Coordinator and outreach staff continued to distribute the

safety glasses, eye drops, and educational materials throughout the region. Articles promoting the intervention and the community collaboration project appeared in the local cooperative extension newsletter. A scientific publication describing the Hudson work is now in preparation. A follow up study that specifically looks at rates of pterygium in this population is now being planned by NYCAMH.

No further funding for projects in the Hudson region has been requested to date. The work team group is not currently meeting. There is a possibility of pursuing subsequent projects with this group using NYS Department of Health funding at some point in the future.

Publications

Hawkes L, May J, Paap K, Santiago B, Ginley B. [2007] Identifying the health needs of migrant farm workers: A community-based approach. *Journal of Community Practice*. 15(3): 57-76.

May J, Hawkes L, Jones A, Burdick P, Ginley B, Santiago B, Rowland M. [2008] Evaluation of a community-based effort to reduce blueberry harvesting injury. *Am J Indust Med*. 51(4):307-15.

Earle-Richardson G, Hawkes L, May J. [2008] Evaluation of Process in Two “Identical” Community-based Projects Aimed at Migrant Farmworker Occupational Injury – submitted *Am J Pub Health*

Inclusion Enrollment Report**This report format should NOT be used for data collection from study participants.**Study Title: Community Collaboration for Farmworker Health and Safety

Total Enrollment: _____ Protocol Number: _____

Grant Number: 5 R25 OH008144-04**PART A. TOTAL ENROLLMENT REPORT: Number of Subjects Enrolled to Date (Cumulative)
by Ethnicity and Race**

Ethnic Category	Sex/Gender			Total
	Females	Males	Unknown or Not Reported	
Hispanic or Latino	49	255		304 **
Not Hispanic or Latino	23	40		63
Unknown (individuals not reporting ethnicity)				
Ethnic Category: Total of All Subjects*	72	295		367 *

Racial Categories

American Indian/Alaska Native	22	34		56
Asian				
Native Hawaiian or Other Pacific Islander				
Black or African American				
White	1	6		7
More Than One Race				
Unknown or Not Reported	49	255		304
Racial Categories: Total of All Subjects*	72	295		367 *

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

Racial Categories	Females	Males	Unknown or Not Reported	Total
American Indian or Alaska Native				
Asian				
Native Hawaiian or Other Pacific Islander				
Black or African American				
White				
More Than One Race				
Unknown or Not Reported	49	255		304
Racial Categories: Total of Hispanics or Latinos**	49	255		304 **

* These totals must agree.

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