PREVENTING FALLS, SILICA EXPOSURE WITH LATINO CONSTRUCTION WORKERS

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FINAL REPORT
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LIST OF TERMS AND ABBREVIATIONS

CBPR Community Based Participatory Research

LISC Leaders in Safe Construction

LCC Lawrence Community Connections

MHTF Lawrence Mayor's Health Task Force

NEBAMA Northeast Builders Association of Massachusetts

NIOSH National Institute for Occupational Safety and Health

OSHA Occupational Safety and Health Administration

PenC Protección en Construcción: the Lawrence Latino Safety Partnership

UML University of Massachusetts Lowell

ACKNOWLEDGEMENTS

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ABSTRACT

"Preventing Falls, Silica Exposure with Latino Construction Workers," (5 R01 OH008750 FY07-13) was a community-based participatory research project that became known as "Protección en Construcción: The Lawrence Latino Safety Partnership." Based in an historic Latino-majority city in northeastern Massachusetts, the partnership conducted research to understand and address the disproportionate rate of injuries and illnesses experienced by Hispanic construction workers. Focus groups, surveys and a community consultation process produced findings that resulted in the Hispanic Safety Climate Model for construction workers. This model contained the most critical factors of the work environment that were contributing to poor conditions and that might be modified to reduce exposures to hazards, and, thereby reduce injuries and illnesses. These factors include training, equipment, social support from co-workers and supervisors, non-retaliation from hazard reporting and injuries, roles and responsibilities for safety, and productivity versus safety. Our assessment findings also confirmed that supervisors were the most important target for training given their role on worksites. We developed a five-hour supervisor training intervention called "Leaders in Safe Construction." Over 100 supervisors and contractors attended the training (taught in English and Spanish) which focused on improving supervisor's knowledge, attitudes and skills necessary to improve the critical safety climate factors. Pre- and post and six-month follow-up survey results showed significant improvement in knowledge, capacity and willingness to act to improve safety planning, compliance with regulations, and communication with a multilingual workforce. The Leaders in Safe Construction training was approved for Massachusetts construction supervisor license continuing education requirements and ten multilingual trainers were trained to continue to provide the training through two of our partners to meet the demand for education credits in the target population. In addition to building and sustaining the partnership, and conducting assessment and intervention research activities, the project engaged in many bilingual outreach and engagement efforts including community conversations or "charlas" with government agency personnel, a five-part column on fall prevention in a Spanish-language newspaper, hosting OSHA on Spanish-language radio talk shows, a local fall prevention equipment catalog distributed to local city and towns building permits offices, and a public health brochure for City of Lawrence aimed at contractors and homeowners on recognizing and preventing hazards in residential construction. Our project demonstrated that a targeted, relevant and feasible supervisor training intervention has the potential to improve safety climate on residential construction sites and, thereby, reduce injuries. However, such a program needs the incentive of government requirements for training and OSHA enforcement of existing regulations in order to achieve this important goal on a widespread basis.

The principal investigator on the project was Lenore Azaroff and became Cora Roelofs, who can be reached at cora.roelofs@tufts.edu. Co-principal investigators were Milagro Grullón (Lawrence Community Connections) and Michael Gagliardi (Laborers Local 175).

SECTION 1 OF THE FINAL PROGRESS REPORT

SIGNIFICANT (KEY) FINDINGS

Protección en Construcción: the Lawrence Latino Safety Partnership was a community-based participatory research project to understand and intervene to reduce the greater injury and illness rate experienced by Hispanic construction workers. The project, based in a Latino-majority city in northeast Massachusetts, focused on preventing falls in residential construction by developing a construction supervisor training program to improve safety climate.

Our first and second aims were to create and utilize a community-based partnership to operate the research project and develop a relevant intervention. We met our first aim in building and sustaining a partnership committed to improving construction safety and health with university, community, and labor leadership, and significant participation from government agencies and construction sector businesses and associations. To fulfill our second aim, this partnership facilitated the increased understanding of the important contextual factors behind the poor safety climate we found for Hispanic workers (30% of ideal), and used these findings to develop a practical, feasible, and effective organizational and technical intervention for fall and silica exposure prevention.

The intervention we developed: "Leaders in Safe Construction" targeted the knowledge, skills and attitude shortfalls that we identified through our focus group and survey assessments. We fulfilled our third aim by training over 100 supervisors and contractors (in English and Spanish) in safety planning, fall prevention regulations and equipment, communication strategies for multilingual workforces, and hazard identification and control. While we were not able to evaluate the impact of this training on worksite conditions, pre- and post, and six-month follow up surveys demonstrated significant improvements in the safety leadership potential of trainees.

Throughout the six years of the project, extensive bilingual outreach and engagement activities were undertaken such as "charlas" or community conversations with government agencies, a five-part column on fall prevention in a Spanish language newspaper, radio appearances, and many, many meetings. Through these efforts and others, we fulfilled our fourth aim by informing the community and stakeholders of the project's "lessons learned" and providing concrete guidance for improving conditions for all workers and contractors. These activities also provided critical information back to the research project to make the intervention as relevant and feasible as possible.

Our fifth aim to institutionalize the project was accomplished by training 10 multilingual trainers to continue to provide the LISC training as certified continuing education courses required by the Commonwealth of Massachusetts for licensed construction supervisors.

Evaluation of the project demonstrated that partners had a high degree of satisfaction, increased knowledge and capacity, and new connections to continue to seed future collaborations.

Tailored training programs have the potential to enhance supervisor and contractor knowledge, skills, and attitudes and reduce injuries through improved safety climate leading to less hazardous conditions. However, such improvements must be incentivized and reinforced by greater enforcement of existing OSHA standards in the residential construction sector and enhanced safety training requirements for construction supervisors.

TRANSLATION OF FINDINGS

We found that Hispanic construction workers, particularly in the residential sector, experience a challenging safety climate as indicated by a lack of training and equipment, poor social support from co-workers and supervisors, retaliation for hazard reporting and injuries, unclear roles and responsibilities for safety, and unfavorable competition between safety and productivity. We also found that construction supervisors play the major role in determining safety climate on worksites, and are the most appropriate target of an intervention to improve safety. The factors identified in our Hispanic Safety Climate model can be modified and improved through targeted interventions that directly address the knowledge, attitudes and skills deficits among residential construction supervisors and help them become Leaders in Safe Construction, as our program was called. Our research project was focused on translating our assessment findings into a practical intervention for immediate application in the workplace. Our training materials (in English and Spanish) are available upon request.

OUTCOMES/ IMPACT

We developed an Hispanic Safety Climate Model to describe the factors that we understood to be critical to safety and health on construction sites, especially those where Hispanics worked. These factors are modifiable. That is to say, we found that these factors could be modified through the training of construction supervisors, who have the power and resources to alter workplace conditions. The training is motivational in order to facilitate supervisors turning their new knowledge, attitudes and skills into action, e.g. buying appropriate ladders, identifying bilingual workers to assist with tool box talks, clarifying hazard reporting protocols, could improve safety climate and, thereby, reduce injuries in residential construction. Currently, compliance with basic OSHA requirements for safety in the residential sector is very low due to limited resources of contractors and the near absence of enforcement attention from OSHA. Our project improved supervisors' knowledge, attitudes and skills. Coupling a program such LISC with greater enforcement of standards and safety training requirements for supervisors has significant potential to prevent the worsening toll of deaths and injuries in residential construction – a toll disproportionately borne by Hispanic workers. Helpful and practical training of supervisors followed by enforcement represents a fair approach in which workers are not blamed for their injuries caused by the poor conditions in which they work, and "good" contractors are not disadvantaged by their attention to safety climate.

SECTION 2 OF THE FINAL PROGRESS REPORT: SCIENTIFIC REPORT

BACKGROUND FOR THE PROJECT

In the United States, Hispanic construction workers have had consistently higher work-related death rates compared to non-Hispanic construction workers.[1] In 2009, Hispanic workers experienced the highest rate of work-related fatal injuries at 3.7 incidents per 100,000 full time equivalent workers, compared to 3.4 for whites and 3.0 for blacks.[2] They are twice as likely to experience a fatal fall from a roof than non-Hispanic workers. [3] Dong's study of more than 7,000 construction workers' medical records found that Hispanics were nearly 30% more likely to have medical conditions due to work-related injuries than white, non-Hispanics, after controlling for occupation, gender, age, and education.[4] Their injuries were also more likely to be severe enough to cause lost workdays. Hispanic construction workers number almost 3 million and hold 30% of non-management jobs in construction.[5] These workers generally have limited-English language ability and lower education levels than other construction workers. They also are more likely to hold the more hazardous jobs within the construction industry. Despite a declining trend in work-related deaths overall, among Hispanic workers such fatalities continued to rise until the crash of the construction industry in 2009.[6]

Several investigators have examined, or have attempted to explain, the reasons for the disparity in injury rates. Language barriers, cultural differences, lack of safety training, economic disadvantage, lack of construction experience, and relegation to the most dangerous jobs within construction have all been suggested as reasons behind the rates.[7-11] Dong and Platner note that Hispanics are over-represented in jobs with the more hazardous conditions laborers, helpers, and roofers face, and that "these dangerous occupations typically offer fewer opportunities for worker control of the work process, less on-the-job training, less job security, and lower average wages."[1, 4, 12] One of the most prominent of the reports on Hispanic workers' greater risk cited "inadequate knowledge and control of recognized safety hazards and inadequate training and supervision of workers, often exacerbated by different languages and literacy levels of workers" as contributory factors based on federal and state investigations of the deaths of 200 Hispanic workers.[9]

Language barriers, i.e., communication challenges resulting from lack of a common language between employers and employees, are often cited among the reasons for the higher rates and/or as a key factor to address in order to ameliorate the disparity. Menendez and Havea, in response to the growth in the proportion of construction fatalities among Hispanic construction workers, noted that Hispanic construction workers may need more language and literacy-appropriate safety training and information about their rights.[11] Pransky et al. hypothesized that the increased risk was potentially attributable to several factors, including: limited economic and political resources, language and cultural barriers, relegation to the most hazardous jobs, language difficulties, and workplace discrimination that may result in inadequate safety.[10] However, in their study among non-agricultural Hispanic workers, they did not find that injured workers were less likely to speak English, to have received safety training, or to have received safety training in Spanish than non-injured Hispanic workers.

Goodrum and Dai [10] attributed higher Hispanic injury rates to the limited effectiveness of traditional training techniques due to Hispanic construction workers' lower education levels and more limited ability to understand English language and American culture. However, a language only becomes a barrier to safety training when training is provided. McGlothlin's survey of Hispanic construction workers in New Orleans found that 57% had

never received any safety training.[13] O'Connor assessed the adequacy of safety training provided to young Latino immigrant construction workers (14-21 years old) and found that, although the workers frequently performed tasks that posed significant injury risks, one quarter of respondents received no safety training at all, and approximately another quarter received less than an hour of training.[14]

Forst et al's hospital-based interviews with injured Hispanic workers (more than half of whom worked in construction) found that the injured workers provided the following explanations for their injuries: unsafe working conditions, including not understanding or being trained about the hazards, problems with personal protective equipment (not provided or defective), being overworked, and carelessness on their own part.[15] Another hospital-based interview study found that Hispanic construction workers were more likely than blacks or whites to report that "nothing" could have prevented their injuries.[16]

As we conducted our study from 2007-2013, we and other investigators began to develop a collective literature regarding the safety climate faced by Hispanic construction workers and its contribution to the injury disparity.[17-19] As shown below, we found that several factors contributed to a poor safety climate for Hispanic construction workers, and we designed an intervention to specifically address and improve these factors.

Our proposal described several factors that remain compelling factors in understanding the context of this research. We documented how construction is a sector that experiences high rates of injuries overall and faces numerous challenges to improving conditions. These include the “changeability” of the construction environment, the tight production timeframes, prevalent economic disincentives for safety, and the sector organization that facilitates the shifting of responsibility for safety. The prevention of falls in construction is an on-going challenge, particularly in the residential sector, where until recently, OSHA was inhibited from fully enforcing fall prevention requirements and, as a result, compliance with the basic rule that mandates protection when working above 6ft, has been infrequent. (See https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=23388)

We initiated this research with a proposed “theory of change” for reducing Hispanic construction worker disparities. This model drew on social ecological and social actor theories to present a multi-level model of change. We proposed to investigate and describe necessary changes in the knowledge, social and physical environmental and behavior (actions) of key players in the context of the research aims. We found this to be a resilient model and have added to it our proposed model of Hispanic Safety Climate.

SPECIFIC AIMS

As stated in the proposal, there were six specific aims of the project:

1. Develop and maintain a community-based partnership committed to improving construction safety and health in Lawrence, Massachusetts
2. Apply a community-based participatory approach to adapt organizational and technical interventions for fall prevention and silica exposure prevention to the study setting
3. Implement the interventions developed and evaluate their effectiveness at reducing silica exposure and fall hazards
4. Diffuse effective interventions for Hispanic construction worker health through the Lawrence area
5. Institutionalize a community-university-employer-labor partnership that combines the skills and resources of all members to protect the health of vulnerable workers over the long term

6. Evaluate the community-based participatory process

Each of these aims and the sub-aims are discussed below.

Aim 1: Build a Community-based partnership

The project formed Protección en Construcción: the Lawrence Latino Safety Partnership (PenC) consisting of the Lawrence Mayor's Health Task Force, Laborers International Union of North America Local 175, University of Massachusetts Lowell Department of Work Environment and Lawrence Community Connections. These organizations coordinated and conducted the research on a day to day basis, determined the overall scope of work and goals, and guided the participation of other organizations and individuals in project work from the beginning to the end of the project. The partnership operated on a consensus basis, with a great deal of consideration for procedures that ensured equitable participation and mutual decision making. We coordinated the project with the help of a web-hosted project management platform that allowed us to share documents, keep records, chart progress and tasks and maintain a common calendar.

A core group of promotores/community outreach workers also participated in every phase of the research. On an ad hoc basis, many other organizations participated in the project including MassCOSH, Jackson Lumber, the Occupational Safety and Health Administration North Boston office, the Massachusetts Division of Safety, and the Northeast Builders Association. Many, many individuals attended research, networking and outreach meetings including day laborers, union and non-union workers, large and small contractors and supervisors, community health workers, religious representatives, community organization leaders, media editors, public officials and others.

Aim 2: Use Community Based Participatory Research (CBPR) to develop an appropriate intervention

PenC used extensive CBPR techniques to develop research strategies, protocols and instruments to assess the social, economic and work organizational factors most necessary to develop an appropriate intervention to reduce falls and silica exposure. PenC conducted focus groups and in-depth interviews with Lawrence residents, construction workers' families, local agencies, and health care providers. We held listening sessions and ran interactive activities including risk mapping and theater games with key informants in English and Spanish. We systematically analyzed the themes related to resources, social networks, obstacles, and opportunities at multiple levels (individual, community, etc.) for improving construction worker safety and health around Lawrence. Based upon this formative research, PenC conducted a community-wide survey to assess the findings in a larger population. Based on the results of the qualitative and quantitative data findings and research advisory input, combined with best practices, feasibility analysis, and community input, we developed the Leaders in Safe Construction (LISC) program designed to improve overall safety climate for Hispanic construction workers and to reduce falls and silica hazards.

Aim 3: Implement the interventions and evaluate effectiveness

After determining that our initial proposed intervention was not feasible, we substantially revised LISC and implemented it as a training course with over 100 contractors and supervisors. We were not able to conduct a site-based intervention and thus we were not able to evaluate the impact of the intervention in reducing fall and silica hazards. However, our pre-post program evaluation and our 3-6 month post-intervention evaluation showed significant improvement in knowledge, attitude and safety-related action scores in all areas impacting safety climate among participants.

Aim 4: Diffuse effective interventions

We were able to qualify our LISC program in English and Spanish for the continuing education credits now required for Massachusetts construction supervisors and train ten trainers to continue the LISC training through our two training coordinators, Lawrence Community Connections and the Northeast Builders Association. We developed a "Results Brochure" in English and Spanish that was used to promote the project at numerous community, labor and health meetings and locations. We made a special presentation to the community on the study findings and presented to the Mayor's Health Task Force membership of area community health organizations. We had numerous media appearances on television and radio and a three part series on fall prevention in English and Spanish in a local Spanish-language newspaper. In collaboration with the City of Lawrence we developed their first public health advisory brochure on Safety in Residential Construction that is distributed by Inspectional Services when permits are pulled. We developed and distributed fall prevention equipment catalogs to all area Inspectional Services offices. We participated in the construction fall prevention task force convened by the Massachusetts Department of Public Health and OSHA's national "Stop Falls" campaign. A video aimed at training and motivating contractors and supervisors to utilize fall prevention equipment is in production as a joint project with the Laborers International Union of North America.

Aim 5: Institutionalize a community-university-employer-labor partnership

PenC has become institutionalized as a program of Lawrence Community Connections who will maintain a website of project materials and findings and will continue to provide the LISC training supported by training fees. Additionally, PenC was able to support worker training on fall prevention through Lawrence Community connections. Laborers Local 175 is supporting Lawrence Community Connections in these efforts. The City of Lawrence Inspectional Services Department has committed to continue to provide education materials on residential construction safety. The Northeast Builders Association has adopted the LISC curriculum as part of their regular training program.

Aim 6: Evaluate the community-based participatory process

PenC engaged an evaluation consultant who was integral to the project from start to finish. Through the evaluator's participation and leadership in partnership building, the evaluation aim was accomplish via dynamic and integrated cyclical approach. The evaluation assessed partnership dimensions including: participation, enhancement of relationships, capacity building, empowerment, products, and policy. The evaluation used a participatory approach, allowing partners to take an active role in the evaluation process. Research partners determined their goals for the evaluation, informed key research questions and methods, and identified the study sample. When initial data collection and analyses were completed, study findings were shared with participants to inform the partnership process. Overall evaluation findings indicated the presence of a cyclical relationship between participation, capacity building and empowerment, whereby participation led to new knowledge and connections leaving partners feeling empowered to act, which then increased participation. Knowledge attained through participation has influenced and enhanced partner work in the community.

METHODOLOGY

As a comprehensive assessment and intervention research project was guided by several methodological frameworks. First and foremost, the Community-based Participatory Research (CBPR) process informed every aspect of the project work including the assessment strategy and the design of the intervention. Second, while we certainly investigated the role of "personal" or individual factors or characteristics in determining risk and protection, we aimed our research at uncovering the social, organizational and environmental conditions that contributed to the greater risk and that could be modified to reduce risk. Finally, each research activity and investigation described below was informed by what we understood to be "best practices" – in community engagement, health communication, construction safety management, training, qualitative interviewing and survey design. The methods employed in specific research activities are described below within the discussion of the overall activity.

PenC broadly followed a path from assessment to intervention to dissemination, however most of these activities continued throughout all phases of the project in addition to partnership building and evaluation and outreach activities. The CBPR process facilitated and directed every phase and fundamentally permitted the success that we achieved. Without a CBPR framework, we would have been tied to failure instead of being able to adapt to challenges and take advantage of new opportunities. However, CBPR also presents its own challenges including the requirement to devote considerable time and resources to process rather than goal-oriented research activities. PenC faced many additional challenges including several staffing and partnership changes, a crash in the construction sector, and the discovery that our first proposed intervention was infeasible. Nevertheless, we were buoyed along by the partners' deep commitment to the goals of the project, our organizational strengths and resources, and a spirit of problem-solving, creativity and support.

RESEARCH ACTIVITIES

Research activities included those related to the forming, operating and evaluating of the partnership; assessment through qualitative and quantitative methods to understand the context and avenues for effective intervention; intervention; and outreach. Additionally, we developed special attention to dissemination of findings and sustainability of the intervention. Each of these activities are described in detail here.

PARTNERSHIP

Partnership activities fall into three categories: organization, capacity building and evaluation.

ORGANIZATION

The organization of the PenC partnership began well before the submission of the grant for funding and before the name PenC was

Photo 1. Pre-Grant OSHA Training in Lawrence

chosen. Initial activities that drew together the partners included collaboration on Hispanic Worksafe", a Spanish-language OSHA 10-hour training between the Laborers Local 175 (the Union) and the University (M. Brunette) funded by a Susan Harwood training grant. Additionally, the Lawrence Mayor's Health Task Force brought together early collaborator JSI Training and Research (G. Latowsky), City of Lawrence Community Development (M. Grullón) and the University Department of Work Environment (L. Azaroff and C. Roelofs), to work on principles and practices of community-based research for Lawrence through the Research Initiative Working Group. The grant was written from a process that involved discussion of common aims and commitment to the partnership and research process. During the submission, waiting and resubmission of the grant application, the future partners worked on extending the 10 hour training to non-union workers through City support.

Following the awarding of the grant, the partners met to devise our Principles of Collaboration (see Appendix A). In English and Spanish, these principles directed the partners to "differ without rancor," to "share our snack" in spirit of conviviality, to feel free to introduce new business at every meeting, to respect the processes and structures of the collaboration, to accept that "no one is more, no one is less," and several other simple but strong guiding ideas. Following adoption of these principles, we collectively selected the name: Protección en Construcción: The Lawrence Latino Safety Partnership to be one which would function in two languages without translation.

Equitable bilingualism has always been a central feature of this project. That meant that any partner or participant could participate in the project in English or Spanish and translation would be provided in either direction. Several members of the research team were bilingual, some with Spanish as their first language and some with English as their first language. Other members were monolingual in English or Spanish. Translation from Spanish to English happened as often as from English to Spanish with both project staff and specially hired translators providing interpretation. Written materials were produced as often as possible in both languages. In conjunction with the City of Lawrence, we supported the purchase, and used several times, simultaneous translation equipment so that meetings and events could flow bilingually. In several cases, particular meetings were held only in one language, but these meetings were repeated in the other language. We were determined, and largely succeeded, to function as a fully bilingual project without privileging one language over another. Finally, at the end of the project, we succeeded in recruiting trainers and staff of the Brazilian Immigrant Center to participate and we added Brazilian Portuguese to our language complement.

PenC partners formed a Steering Committee composed of representatives of the partners to meet weekly to direct the project. These meetings rotated between the University, the City and the Union. The steering committee developed memoranda of understanding, defined roles and determined deliverables for all the project partners. A sample list of roles is included in the Appendix B. Each partner was responsible for participating in partnership collaborative work and for managing their organization's fulfillment of

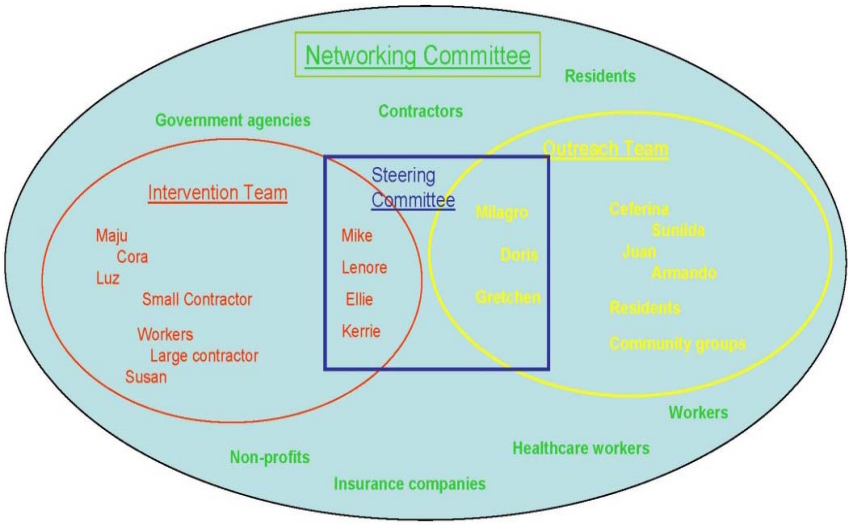

Fig. 1. PenC Partnership Structure

agreed upon tasks. This meant that each partner was responsible for determining their own staffing and supervision, however the partnership overall, and the University as the fiscal agent, in particular, played an overall stewardship role. Thus, members of the University team also met weekly to provide overall project management and to focus on the scientific tasks such as drafting of assessment strategies. Other committees formed included an Intervention Committee, and Outreach Committee and a Networking Committee. The Networking Committee was an ad-hoc committee that met periodically throughout the project to provide community input and to learn of project developments. Both the Intervention Committee and the Outreach Committee met regularly with consistent membership throughout the project. All project partners, staff and regular participants met regularly several times a year for project training, retreats and planning.

One of the first tasks of the project was to devise a project identity. The name was selected after a considerable process and a logo design process was undertaken with a local graphic design company. (The project made a decision to source products and services from local, union companies whenever possible). Our logo reflected our view that the community is supporting the worker. Additionally, a project brochure, official project description and Frequently Asked Questions document was developed. In order to manage the sharing of project documents, messages, calendars and task management, we selected Backpack, a web-hosted collaborative project management platform which allowed most members to share and have access to project documents, to post meeting minutes, to make their own pages for tasks they were undertaking, and to set dates for meetings. As discussed below, not all project staff had equal facility with computers and over the course of the project with both made arrangements to improve their computer skills and also for their full participation regardless of tech savvy. Backpack has served as a marvelous project archive and will be available to other researchers wishing to understand the complete development of a community-based research project.

Fig. 2. Project Logo

A second early task was the extensive process of assuring protection of human research subjects throughout the project and undertaking our process to assure an equitable partnership process that was respectful and benefitting of the community in which it took place. The project underwent a full review by the University of Massachusetts Institutional Review Board, and, because of the evolving nature of CBPR projects, we submitted and were approved for over 25 amendments throughout the project years. These amendments included project staff changes, translation and back-translation of survey instruments, and approval of incentives for research participation. Additionally, all project staff underwent human subjects research training, including our community outreach staff who were able to complete a special “promotor”-oriented training in Spanish.

Photo 2. PenC Promotores with Human Subjects Training Certificates

Because several members of the project had been involved in the Mayor’s Health Task Force’s Research Initiative Working Group (RIWG), and because of our commitment to equitable partnerships, PenC undertook a process to answer the questions posed by the RIWG to research projects in Lawrence. These questions prompted discussion and conclusions regarding project decision-making, dissemination of results, and allocation of project funds, among others. Based on this work, PenC further devised important guiding policies on conference participation, materials development and approval of presentations. More discussion of the partnership is included below under “Evaluation.”

The partnership weathered several staffing changes over the years. The union was represented by three different people; the Mayor's Health Task Force remained a partner while its former leader and co-Principal Investigator of PenC, Milagro Grullón, left city service and founded Lawrence Community Connections and continued in leadership of the project; the promotores who originally were engaged with the project through JSI became more directly connected through the University; several staff moved on or joined project, including the change of Principal Investigator from Lenore Azaroff to Cora Roelofs. Additionally, PenC became connected to new organizations such as the Northeast Builders Association who functioned as a partner for the intervention. Despite the changes, the core project staff remained committed to the goals of the project and riding the waves of the CBPR process to complete the project work.

Photo 3. PenC Team circa 2009

CAPACITY-BUILDING

A key component of the partnership work over the years was capacity building. We engaged in on-going efforts to improve our ability to work together, to understand each other and the needs and resources of the Lawrence community, to problem-solving and skills-building. We conducted numerous internal trainings on occupational health and safety and construction hazards, research strategies, and "cultural competency." Language skills were enhanced through project work, along with presentation and writing skills. Computers and computer training were provided as necessary. A highlight of this process was the promotores attendance and presentation at the NIOSH Health Disparities Conference where they represented the project. Capacity building is further documented below under evaluation.

EVALUATION

The aim of the PenC evaluation was to document the partnership process. Partnerships are an essential element of CBPR that involve diverse stakeholders representing multiple interests. The goal here is to understand and document factors that both facilitate and impede partnership development. Based on the work of Chrisman, the evaluation assessed partnership dimensions including: participation, enhancement of relationships, capacity building, empowerment, products, and policy.[20] The evaluation used a participatory approach, allowing partners to take an active role in the evaluation process.[21] Research partners determined their goals for the evaluation, informed key research questions and methods, and identified the study sample. When initial data collection and analyses were completed, study findings were shared with participants to inform the partnership process.

As part of its design, PenC involved a CBPR process evaluation that was longitudinal, formative and participatory. The evaluation employed mixed-methods including open-ended partner interviews, annual partner surveys, meeting observations, and document review. In addition, team building activities and problem solving games were

used to address deficiencies in the partnership and to illustrate power dynamics. Such games have been found to be successful in building and maintaining CBPR partnerships.[22] Prior to implementation, the University of Massachusetts Institutional Review Board (IRB) approved research protocols.

Partner Interviews: University, community and industry partners were invited to participate in yearly semi-structured interviews. Interviews explored perceptions of the project and project goals, partner roles, experiences of the project, challenges and facilitating factors associated with the work, ideas for overcoming challenges and for facilitating the work, level of participation, new information garnered and relationship forged. Partners were contacted by telephone. At the onset of the telephone conversation, the evaluation purpose and the interview procedures were explained in detail. Participants were given the option to participate in Spanish, English or in a combination of both. Interviews generally lasted between 15 and 40 minutes. Interview were be recorded by hand and typed in Microsoft word file. Data was coded thematically and key findings were presented back to participants at team meetings and retreats.

Partners Surveys: The partner survey was conducted annually. The survey, itself, was based on the Eastside Village Health Worker Survey, which was designed to explore group dynamics including participation, capacity building, empowerment and decision-making.[23] The survey included 64-items with both Likert type and open ended response categories. Partner surveys were announced during a project meeting and the procedures were explained. Surveys were then sent to partners via U.S. mail (and electronically upon request). Surveys were sent in the language requested by the respondents (Spanish or English). Quantitative data was entered into a Microsoft Excel 2007® file and then exported to SPSS. Respondents were categorized by partner type (university researcher, organizational researcher, or promotor) to explore variation in responses. Bivariate and univariate analyses were conducted. Once analyzed, all data were presented back to project partners. Key themes and initial findings were shared with steering committee members and feedback was elicited to help contextualize the data.

Meeting observations and document review: The evaluator attended project meeting and took notes. Summaries were provided back to project leadership. The evaluator also met regularly with project leadership providing feedback related to group dynamics, communication and dissemination. In addition, to meeting observation the evaluator monitored electronic communication and reviewed meeting agendas and activities, providing feedback based on evaluation findings. In many cases the goal of this activity was to assure project partners had an equitable voice in decision-making.

Communities are complex and comprise multiple sectors with historical ties, some positive others negative. The PenC partnership joined municipal government, labor, academic and grassroots organizers. Although, all were committed to improving working conditions for Latino construction workers, each approached the work through with a different lens and lexicon. Furthermore, historical relationships in some cases were tense and threatened the partnership. As did language barriers within the group. Not surprisingly initial evaluation themes included communication barriers and mistrust. In addition, initial themes were centered on role confusion. As such, initial formative work included communication starters and team building activities, and was aimed at relationship building. The team also implemented a system to link partners by creating small teams (or buddies).

Overall evaluation findings indicated the presence of a cyclical relationship between participation, capacity building and empowerment, whereby participation led to new knowledge and connections leaving partners feeling empowered to act, which then increased participation. Partners actively shared project related information in the community. For example, outreach workers reported sharing information related to worker rights with people they meet in the community, while union staff explained that new connections to Lawrence-based organizations

made through the project, such as the Mayor's Health Task force, provided valuable information on available health services. Knowledge attained through participation has influenced and enhanced partner work in the community.

ASSESSMENT

In addition to forming a functional partnership and evaluating that partnership, PenC's first activities related to assessment, or the research investigation of the conditions and context for potential solutions to the disparate rates of illness and injury facing Hispanic construction workers. These assessment activities both sought to answer research questions and to provide input to develop the intervention. In 2008-2009, we held multiple focus groups, small group activities, listening sessions, and interviews with union and non-union workers, contractors and supervisors, Lawrence residents and construction worker family members, and public and community health advocates. In 2011, we undertook a broad community survey of workers, contractors and supervisors, Lawrence residents and construction worker families to evaluate the themes that had arisen in the focus group and other qualitative assessment data. All interview guides, activities and surveys were constructed through an extensive iterative process that sought to balance best practice in question construction with community input on the language, style and value of questions. We also conducted assessment of our intervention impact, however those activities are described in the intervention section.

FOCUS GROUPS AND RELATED ACTIVITIES

We conducted over 10 focus groups with over 70 participants. Additionally, we conducted several unique activity sessions designed to engage participants in sharing their experience of the construction work environment. These included sessions in which participants created risk maps and skits in which problems were posed and solutions suggested. Focus groups were conducted with union and non-union Spanish speaking construction workers, Spanish and non-Spanish speaking construction supervisors and managers, and construction worker family members. While all focus group summaries influenced the development of project, most importantly the development of the survey and of the intervention, only a sample have been analyzed formally at this time. The results of our focus group analysis were published in the open-access journal *Environmental Health* under the title: "A qualitative investigation of Hispanic construction worker perspectives on factors impacting worksite safety and risk." This article details our CBPR-approach to formative qualitative research.

Fig. 3. Focus Group Activities

The abstract from that article is reproduced here along with a link to the full article describing these methods and findings:

Abstract: A qualitative investigation of Hispanic construction worker perspectives on factors impacting worksite safety and risk (http://www.ehjournal.net/content/10/1/84)

Background : Hispanic workers have higher rates of injury and death on construction worksites than workers of other ethnicities. Language barriers and cultural differences have been hypothesized as reasons behind the disparate rates.

Methods: We conducted two series of focus groups with union and non-union Hispanic construction workers to ask them about their perceptions of the causes for the unequal rates. Spanish transcripts were translated and coded in QSR NVivo software for common themes.

Results: Workers reported a difficult work environment characterized by supervisor pressure, competition for jobs and intimidation with regard to raising safety concerns. Language barriers or cultural factors were not strongly represented as causative factors behind the rates.

Conclusion: The results of this study have informed the development of an intervention trial that seeks to prevent falls and silica dust exposure by training contractors employing Hispanic construction workers in the elements of safety leadership, including building respect for their Hispanic workers and facilitating their participation in a safety program.

COMMUNITY SURVEY

In addition to the focus groups, we conducted an extensive community survey to test the themes of the focus group and to help evolve a Hispanic safety climate model that we could use to develop an effective and practical intervention. A draft of the completed (and submitted) manuscript describing this community survey is included in the appendix C to this report and the abstract is reproduced here:

Abstract: Results of a Community-based Survey of Construction Safety Climate for Hispanic Workers

Hispanic construction workers experience higher rates of occupational injury. This disparity has been previously explained as resulting from individual factors such as limited English ability, organizational factors such as lack of employer-provided safety training, and social factors such as employment discrimination. Using safety climate as a framework, we surveyed Hispanic construction workers, contractors and community members to assess their perception of the factors impacting risk and safety on construction sites. 243 participants responded the 40-item survey of six safety climate dimensions such as productivity versus safety, roles and responsibility for safety, and training. While contractors and construction supervisors' scores were statistically higher, in general, respondents shared a negative perception of safety climate along the six dimensions. Non-retaliation and importance given to safety over productive obtained the lowest scores. Safety climate scores were not associated with English language ability or years lived in the United States.. The results of this survey were utilized in a construction supervisor safety leadership program to designed to improve safety climate and reduce injuries and illness.

The manuscript reporting on our community survey results presents our Hispanic Construction Safety Climate Model (Table 1 and Figure 4).

This model describes the PenC analysis of the root causes of the higher injury rate among Hispanic construction workers and also the modifiable risk factors that we addressed in our intervention, further described below.

Fig. 4. Hispanic Construction Safety Climate Model

Table 1 Safety Climate Scores

Elements	Mean	Median	Safety Climate Score		
			Workers	Supervisor & Contractors	Residents & Family Members
Total Safety Score	**30%**	**28%**	**31%**	**47%**	**27%**
Protective Equipment	49%	33%	54%	72%	40%
Social Support	29%	20%	31%	46%	24%
Productivity	17%	0%	14%	40%	15%
Training	25%	25%	25%	36%	23%
Roles and Responsibilities	49%	50%	49%	58%	49%
Non-Retaliation	9%	0%	7%	35%	7%

INTERVENTION

As described above, we used our CBPR process and the findings of our assessment activities to draft a design for an intervention that we believed would address the root causes of the disparity in exposures experienced by Latino workers. It was our understanding that there were a number of perverse incentives and organizational and economic challenges that competed with contractors' ability and willingness to support an effective safety climate. We also determined that construction supervisors were the ideal target of our intervention efforts. Our respondents believed that supervisors held the key to a change in the conditions that were detrimental to safety. Thus, we developed and reviewed through consultation with our community partners and informants, a safety leadership training program for supervisors.

We intended to coach contractors and supervisors of participating contracting companies through an extensive program that we named "Leaders in Safe Construction" while evaluating pre-, mid- and post-intervention performance via an on-site audit of hazards and safety conditions. This program specifically targeted the components of the safety climate model described above and thereby improve the safety knowledge, attitudes, skills and capacity of small firms employing Hispanic workers. Figure 5 shows how we adapted our findings into an intervention.

Fig. 5. LISC Logo

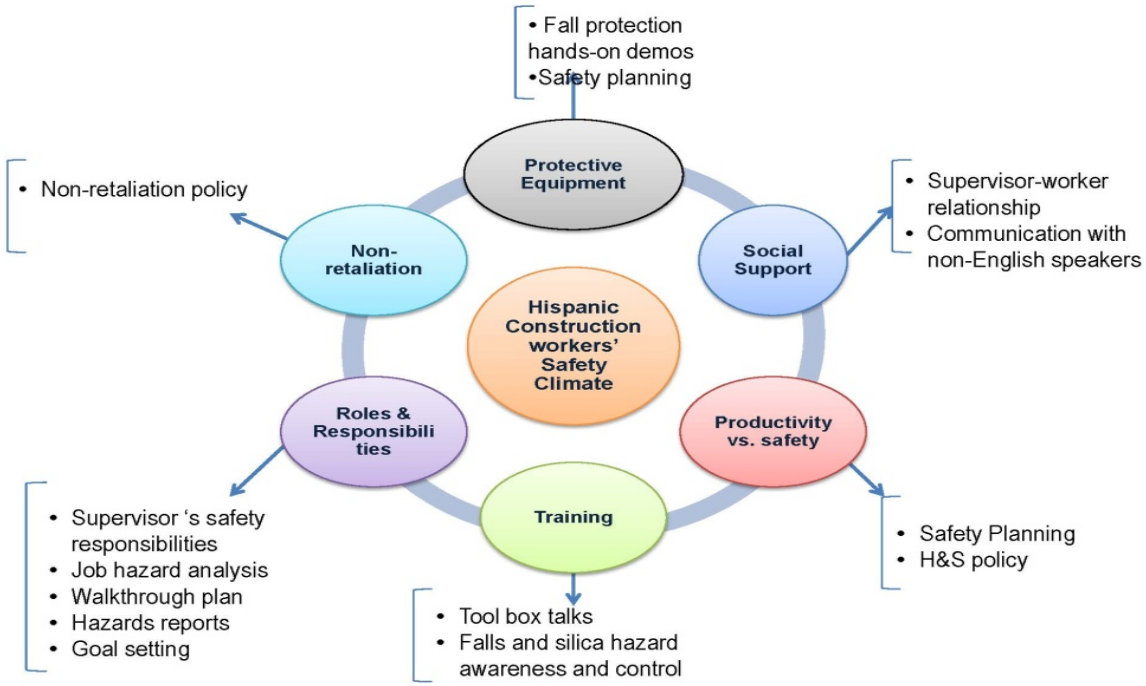

Fig. 6 Adaptation of Findings into Intervention

We invested significant energy and resources in recruiting companies to participate and utilized our community partners and their connections. For example, we attempted to enroll the companies pre-qualified by the City of Lawrence to perform lead abatement under federal grants. The City worked with us to enroll these companies and several of them did agree to participate. We developed banners and a media marketing strategy to promote participating contractors in order to entice them to participate.

However, in our recruiting and, more importantly, in our follow-through, we encountered very serious obstacles which were beyond the control of the project to overcome. We immediately discovered that companies were unwilling or unable to allow us on site during their construction projects. Additionally, many if not most of the companies that we attempted to enroll did not meet our basic recruitment criteria which included: employing Hispanic workers, holding a current workers' compensation insurance policy and having both falls and silica exposure in their jobs. Small contractors rarely maintain employees on a payroll, but engage in a series of subcontracting and contingent (casual) employment agreements. We were astounded to learn that no contractors we contacted employed Hispanic workers, despite our understanding that 30% of construction workers are Hispanic. Indeed, contractors rarely employ anyone and none would "admit" to having Hispanic workers. This meant that they did not carry workers' compensation either. These were, in a sense, technical obstacles. What proved fatal to our attempt to not only enroll, but undertake the program with interested contractors, was their lack of willingness to let us on site to perform the audits in order to demonstrate the effectiveness of our intervention. We were not successful, despite more than a year of attempt. Thus, we decided to abandon what we called "LISC 1.0," in favor of another approach that we felt was more feasible. The second iteration of LISC (LISC 2.0) would be an intervention that would still address the fundamental issues that we felt were key to improving safety climate, but would be more attractive to supervisors and contractors. We condensed LISC into a five hour supervisor training class with limited on-site access. Unfortunately, this meant abandoning the evaluation of changes in baseline and post-intervention conditions on intervention and control sites. Indeed, the evaluation of LISC 2.0 consisted of a much more modest pre-, post- and 3-month follow up survey of knowledge, attitudes, and capacity to prevent falls.

In conjunction with a new partner, the Northeast Builders of Massachusetts, a local branch of the National Association of Home Builders, and with assistance of a local lumber yard, we were able to recruit many contractors to participate. Additionally, we provided the class in Spanish via our local Lawrence networks. Over 100 contractors, supervisors and foremen participated. Some of the preliminary results are provided below in tables 2, 3 and 4. These results suggest that for both English and Spanish-speaking LISC trainees, there were improvements in knowledge, skills and attitudes post-intervention, including three-six months post intervention. Perhaps the most important result, is the improvement in contractors' self-assessed ability to comply with OSHA fall protection standards and their ability to communicate with Spanish-speaking workers. There are many limitations of our intervention and the measurement of its impact. However, we feel that we were able to devise a feasible, practical and effective intervention targeted at improving the safety climate factors that would reduce the Hispanic construction worker injury disparity and improve conditions for all workers.

Table 2 LISC Intervention Draft Results

Module	Participants			PRE-TEST (% correct)	POST-TEST (% correct)	Change
	Total	English	Spanish			
All Modules	118	75	43	69%	87%	26%
Module 1 Fall Prevention and Silica Exposure	73	30	43	63%	82%	30%
Module 2 Leadership and communication	82	46	36	60%	80%	33%
Module 3 Safety Planning	64	28	36	75%	93%	25%

Table 3 Results by Language of Trainee

Module	English Speakers			Spanish speakers		
	PRE-TEST	POST-TEST	Change	PRE-TEST	POST-TEST	Change
Total Participants	71%	90%	**27%**	65%	82%	**26%**
Module 1 Fall Prevention and Silica Exposure	68%	84%	**23%**	60%	82%	**37%**
Module 2 Leadership and communication	64%	82%	**28%**	58%	75%	**30%**
Module 3 Safety Planning	74%	93%	**26%**	76%	93%	**22%**

Table 2 Three to Six Month Follow Up Results

12a. Improve communication with Spanish speaking workers				8a. Conduct fall prevention training in the worksite				13. Plan tasks to reduce safety issues			
To a great extent	To some extent	A little	Not at all	To a great extent	To some extent	A little	Not at all	To a great extent	To some extent	A little	Not at all
46%	35%	15%	4%	47%	32%	12%	9%	43%	46%	11%	0%

14. Be a Leader in Safe Construction				14a. Have positive impact on your safety leadership role				9a. Improved ability to comply with fall protection requirements			
To a great extent	To some extent	A little	Not at all	To a great extent	To some extent	A little	Not at all	To a great extent	To some extent	A little	Not at all
34%	60%	6%	0%	41%	54%	5%	0%	40%	51%	9%	0%

DISSEMINATION AND SUSTAINABILITY

The CBPR process often dictates that interventions be comprehensive, sustainable, and shared. We invested considerable design and project work time toward accomplishing these goals. While it is inherently difficult to measure the impact of all the components, we nevertheless attempted to comprehensively influence the multitude of factors that contribute to poor conditions on construction sites where Hispanic workers are employed. Our LISC training program addressed knowledge and equipment gaps, contractor unwillingness or inability to overcome language differences, ways to foster a respectful work environment, and skills in recognizing hazards and planning to address them in the course of job planning.

LISC 2.0, as a contractor training program that could be carried out by community partners, was, in fact, a much more sustainable design than our original consultant-based model. We were able to build sustainability into the program by taking advantage of the relatively new Massachusetts construction supervisor licensing requirement for continuing education credits. We got our LISC training modules (in English and Spanish) approved for five credit hours and we supported both the Northeast Homebuilders and Lawrence Community Connections in becoming accredited course coordinators and in offering the approved LISC course models, for which they could charge training fees. We then conducted two rounds of "train-the-trainer" sessions to train 10 construction safety trainers in the LISC curriculum and goals. These trainees include English, Spanish and Portuguese-speaking trainers. We were able to take advantage of the state requirement for training and the existing training infrastructure available through LCC and the Northeast Homebuilders to provide a sustainable and continuous path for our training beyond the end of the federal research funding.

Lastly, we communicated about our project throughout its course, but we put special effort into disseminating the findings and useful materials in the final stage. Our sustainability strategy, described above, was also a dissemination strategy. Additionally, in consultation with our outreach workers and partners, we developed a "results flyer" (see Appendix D) in English and Spanish that was widely circulated in Lawrence and beyond. We held community meetings and we attended several organizations' meetings including the Lawrence Mayor's Health Task Force to inform the public health community about our project and its results. At the well-attended Mayor's Health Task Force meeting where we presented our findings, we were elated to receive applause upon describing the sustainability strategy described above. Our project materials will all be available on the PenC page of Lawrence Community Connections' website. More outreach activities are described below.

OUTREACH/COMMUNITY INTERVENTION

As a CBPR project, we engaged in community-dialog and outreach activities throughout the six years of the project. Several of these are described below:

- Charlas: We held five bilingual community conversations with OSHA, MassCOSH, the Massachusetts Division of Occupational Safety (OSHA consultation office), and the Massachusetts Attorney General's Office. These informal events were an opportunity for agency officials to both share information about their work and services and to hear from the community about their perceptions of the agencies and to ask questions. These two-way conversations transferred knowledge both ways and provided insight into the strengths and limitations of each agency's work to protect workers.
- Community events: Each year, PenC was represented at the City of Lawrence's Building Safety Week and the Bread and Roses Heritage Festival. Additionally, we participated and brought workers and community members to three "OSHA Listens" tour stops.
- Equipment Demonstrations: We sponsored fall arrest and guardrail system demonstrations at Jackson Lumber and Laborers Local 175 with two different equipment manufacturers. This led to our partner, the Northeast Builders, bringing back the MSA representative to hold another demonstration at one of their well-attended meetings.
- Media: From early to late in the project, we participated in Spanish-language radio segments on the programs "La Verdad en Acción" and the "Late Morning Show." We arranged for a bilingual OSHA inspector to be on the Spanish-language radio for the first time. We also had two appearances on the local community television station, and received press coverage in Rumbo, Siglo 21 and the Lawrence Eagle Tribune as a result of our press conference with the Mayor about the launch of our project. We produced a five part bilingual fall prevention column that appeared in the regional Spanish weekly Rumbo. We also produced our own quarterly newsletter that was distributed to community partners and contractors and workers. Lastly, we are currently producing a bilingual fall prevention video in conjunction with the Laborers International that will be designed for wide dissemination, principally through YouTube.
- Community organizing: We attended meetings and presented at numerous organizations including: the Lawrence Mayor's Health Task Force, Lawrence Training School, Northeast Builders, OSHA, Massachusetts Department of Public Health Fall Prevention Taskforce, Bread & Roses Community Development, Lawrence Community Works, AMEDAL, City of Lawrence Community Development (including contractor pre-bid meeting), Greater Lawrence Family Health Center. Hancock Neighborhood Association, Area Health Education Center, Pathway Ways to Family Success, Greater Lawrence Technical School, and Jackson Lumber.

- Community Informational: We developed and distributed educational materials including a fall prevention equipment catalog (see Appendix E) that was distributed to several towns' inspectional services departments, a worker training solicitation with a visual-based literacy approach, a public health advisory on residential construction safety from the City of Lawrence to contractors and residents (the City's first public health brochure), a results flyer and the newsletter.
- Research presentations: We presented podium, roundtable and posters at APHA (four times), AIHA (twice), NOIRS, ASSE (three times), a special NIOSH-sponsored Workshop on Translational Research, a Healthy Communities Conference, University of Massachusetts Lowell Student Research and Community Engagement Symposium, UML School of Health and Environment Research Symposia (twice), and the NIOSH Health Disparities Conference.

RESULTS AND DISCUSSION

Presentation and discussion of results from each of our research efforts are discussed above in their sections. In summary, we were able to create and sustain a CBPR-based partnership project that conducted extensive activities related to understanding and addressing issues facing Hispanic construction workers. We learned that Hispanic construction workers face a tough safety climate, but that many of the elements of that safety climate are modifiable. Our intervention, Leaders in Safe Construction, was designed to address the root causes of the poor conditions Hispanic workers face by training construction supervisors and contractors to improve safety planning, communication and respect on worksites, and hazard recognition and control. We were able to make this intervention sustainable in the community by taking advantage of state requirements for continuing education credits and by training multilingual trainers to continue to provide the training beyond the end of the project. Our partnership project was unique in the depth and breadth of outreach efforts that we employed in order to inform and inspire change in the community and government agencies.

Protección en Construcción: The Lawrence Latino Safety Project faced many challenges and there are limitations of the results. First and foremost, this research was based in a particular community and context and that may limit the applicability and reproducibility of the research. Additionally, we designed and implemented a comprehensive intervention with too many moving parts to evaluate. Our evaluation findings were based upon pre and post-training surveys and do not gauge the impact on exposure conditions. Despite these limitations, we recognize that our project contributes not only to a growing body of research on the disparities faced by Hispanic construction workers (many of which reinforce our findings), but also to the advocacy, education, enforcement and outreach efforts that may result in the critical mass required to shift the statistics for Hispanic workers and improve conditions for all workers in residential construction.

CONCLUSIONS

We conclude with several summary observations of lessons learned from PenC.

- The CBPR and partnership research process requires a significant resource investment, but it produces tremendous rewards. It assures that the correct questions are asked, that the right people are found to answer them and that the answers are interpreted correctly. It also assures that those results will not languish in file cabinets (or hardrives), but be put to use in the community improving public health.
- An inherent limitation of CBPR is that the problems that it usually seeks to address are not specific to the community in which it is undertaken, but are national/historical/multi-factorial problems expressed in

one community. These problems (and their solutions) are artificially understood as local, when, in fact, they may be (as in this case), national, or even international, and dependent upon policy and economic factors that go far beyond the community in question. The CBPR process may contribute research to address and change this broader context, but a danger remains that this approach maybe "sending to the provinces" problems that are as common in Lawrence as they are in Fairbanks.

- We learned that with dedication and some technology, bilingual research projects are possible and can facilitate participation of research partners with limited English skills. Beyond the necessity of communication, a bilingual project placed research partners of different linguistic and cultural backgrounds on more equal footing and helped to even out power differentials between university and community researchers.
- We were successful in many of our project goals, but fundamentally we felt that the research question presented in our proposal: "how can residential construction contractors who employ Hispanic workers prevent falls?" maybe best answered by increased OSHA enforcement of the standard in this sector.

PUBLICATIONS

Roelofs C, Sprague-Martinez L, Brunette M, Azaroff L. A qualitative investigation of Hispanic construction worker perspectives on factors impacting worksite safety and risk. Environmental Health 2011, 10:84 doi:10.1186/1476-069X-10-84 http://www.ehjournal.net/content/10/1/84

Sprague-Martinez L, Brunette M, Ndulue, U. Lessons learned from the Protección en Construcción (PenC) community research partnership. International Public Health Journal, Volume 4 Issue 3. 2012. https://www.novapublishers.com/catalog/product_info.php?products_id=36851

INCLUSION ENROLLMENT TABLE

Inclusion Enrollment Report

Study Title Preventing Falls, Silica Exposure with Latino Construction Workers
Total Enrollment: 320 **Protocol Number:**
Grant Number: 5 R01 OH008750

PART A. TOTAL ENROLLMENT REPORT: Number of Subjects Enrolled to Date (Cumulative) by Ethnicity and Race				
	Females	**Males**	**Sex/Gender Unknown or Not Reported**	**Total**
Hispanic or Latino	60	175		235**
Not Hispanic or Latino	10	75		85
Unknown (individuals not reporting ethnicity)				
Ethnic Category: Total of All Subjects*	70	250		320*
American Indian/Alaska Native				
Asian				
Native Hawaiian or Other Pacific Islander				
Black or African American				
White				
More Than One Race				
Unknown or Not Reported	70	250		
Racial Categories: Total of All Subjects*	70	250		320*

PART B. HISPANIC ENROLLMENT REPORT: Number of Hispanics or Latinos Enrolled to Date (Cumulative)				
Racial Categories			**Sex/Gender Unknown or Not Reported**	
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	60	175		235
Racial Categories: Total of Hispanics or Latinos**	60	175		235**

INCLUSION OF CHILDREN

Not applicable

MATERIALS AVAILABLE FOR OTHER INVESTIGATORS

The survey instruments are available from Cora.Roelofs@tufts.edu. Training materials will be available at www.lawrencesafetypartnership.org or can be requested from Dr. Roelofs.

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APPENDIX A. Principles of Collaboration (English and Spanish version)

Lawrence Construction Safety Partnership:

Principles for Collaboration

Use approaches that go into good personal relationships: be respectful, considerate.

Use métodos que se usan para construir buenas relaciones personales: sea respetuoso, considerado.

No one is more, no one is less.

Nadie vale más, nadie vale menos, que los demás.

Be open; listen to other perspectives.

Sea abierto; escuche otras perspectivas.

Show commitment to sustainability: the work and partnership should continue beyond the end of the grant.

Demuestre su compromiso a la sostenibilidad: el trabajo y la asociación deben seguir después que acabe el proyecto financiado.

Respect the processes and structures of the project.
Respete los procesos y las estructuras del proyecto.

Respect processes and structures that already exist in the community.

Respete los procesos y las estructuras que ya existen en la comunidad.

Be flexible: we can change, modify, and improve our processes and structures as we go.

Sea flexible: podemos cambiar, modificar, y mejorar nuestros procesos y estructuras mientras avancemos.

Make sure that if somebody wants to put something on the table, they can: include New Business on every agenda.

Asegúrese que todos tengan la oportunidad de plantear lo que quieran: incluya Nuevos Asuntos como parte de cada agenda.

All partners: share goals, funds, leadership, flexibility.

Todos los socios: compartan metas, fondos, liderazgo, flexibilidad.

Taken from "Tools for Research Partnerships in Lawrence, MA" A project of the Mayor's Health Taskforce Research Initiative:

1. *Research Is helpful to community development.*
2. *Working with community members makes better science.*
3. *Researchers and members of the Lawrence community can and should create good partnerships based on fairness & positive exchanges.*

Principles for Collaboration (con't)

"Differ without rancor": we need to be free to be open about our differences, rather than try to hide or suppress them, and argue through them without getting personal.

"Expresar distintas opiniones sin resentimiento": tenemos que tener la libertad de ser francos sobre nuestras diferencias, en vez de tratar de esconderlas o contenerlas, y discutirlas sin comentarios personales.

"Share our snack": do things together to build community, camaraderie, conviviality.

"Comparta nuestros refrigerios": colaborar para construir comunidad, compañerismo, cordialidad.

Support each other's efforts, including those outside the project.

Apoye los esfuerzos de los demás, incluyendo los fuera del proyecto.

Leave external divisions outside.

Deje afuera las divisiones externas.

Don't make assumptions about people, or just point at them to do things.

Evite suposiciones sobre otras personas, y no les encargue con tareas basado en sus suposiciones.

If someone isn't doing what they're supposed to, don't write them off – work with them to get back on track.

Si alguien no está hacienda lo que debería de hacer, no lo descarte – colabore con la persona para que vuelva al buen camino.

3

1. *Las investigaciones científicas son útiles para el desarrollo comunitario.*
2. *La colaboración con miembros de la comunidad resulta en mejores investigaciones científicas.*
3. *Los científicos y miembros de la comunidad de Lawrence pueden y deben crear buenas asociaciones basadas en la justicia y comunicación positiva.*

Inspirado por, Selecciones de "Herramientas para Asociaciones de Estudios Científicos en Lawrence, MA" un proyecto de la Iniciativa para Estudios Científicos de la Coalición de Salud del Alcalde

Proteccion en Construccion

Protección en Construcción

working description of partnership roles & responsibilities version July 14, 2010

(based on Steering Committee meeting 6/14/10, revised 6/26/10 LSM per UML input, revised further by Steering Committee on 7/12/2010)

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Community Connections:

Project coordination and implementation:

- Follows all procedures for the protection of human subjects
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- Leads media dissemination of project activities
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- Co-authors publications about study results
- In collaboration with Cora at UML, coordinates the Community Outreach Team and Community Outreach Planning Team
- In collaboration with Cora and outreach workers, plans and leads *charlas*

Leadership and capacity building:

- Technical assistance to partners about outreach, conducting *charlas*

Intervention:

- Supervises worksite field research assistant
- Worksite field research assistant performs site personnel surveys and walkthroughs with LISC contractors and assists UML field researchers in implementing the LISC program
- Recruits 6 small contractors for LISC
- Allocate staff to intervention committee
- Acts as central point person for contractor recruitment (see LISC Recruitment Protocol)

APPENDIX C. Results of a Community-based Survey of Construction Safety Climate for Hispanic Workers. Manuscript submitted.

Results of a Community-based Survey of Construction Safety Climate for Hispanic Workers

Luz S. Marin; Manuel Cifuentes; Cora Roelofs

Abstract

Hispanic construction workers experience higher rates of occupational injury. This disparity has been previously explained as resulting from individual factors such as limited English ability and organizational factors such as lack of employer-provided safety training, and social factors such as employment discrimination. Using safety climate as a framework, we surveyed Hispanic construction workers, contractors and community members to assess their perception of the factors impacting safety on construction sites. 243 participants responded the 40-item survey of six safety climate dimensions such as productivity versus safety, no-retaliation, and training. While contractors and construction supervisors' scores were statistically higher, in general, respondents shared a negative perception of safety climate along the six dimensions. Non-retaliation and importance given to safety over productive obtained the lowest scores. Safety climate scores were not associated with English language ability or years lived in the United States. The results of this survey were utilized in a construction supervisor safety leadership program designed to improve safety climate and reduce injuries and illness.

Keywords: Safety perception; immigrant workers; shared perception; residential construction; non-retaliation; occupational injury disparities.

APPENDIX D. Results flyer (English and Spanish version)

What We Learned in Lawrence About Health and Safety in Construction

Protección en Construcción: The Lawrence Latino Safety Partnership is a University-Community research project to find out why construction work is so dangerous for Latino workers and what can be done to prevent injuries.

This brochure explains some of what we have found in our research (conducted between 2007-2013) and what more can be done to improve safety for all construction workers in Lawrence.

What We Found

We learned about the issues by listening to the community. We brought together groups of Latino construction workers, contractors and supervisors to discuss their challenges and everyday realities. We talked with state, local and federal safety and health officials. Then, based on what they told us, we created a survey for the community to weigh in.

"Look, training is favorable, but no one is going to take 30 minutes to an hour to show you anything when all they want is to get the job done fast."

Lawrence construction worker

From the Focus Groups and the Community Survey, we learned that on construction sites where Latinos work, there is a **shortage of safety equipment and knowledge**. Workers, especially, but contractors and supervisors too, felt that there was **no support for raising safety concerns** and a lot of **pressure to get the job done fast**. It often seemed that supervisors had trouble communicating about safety and needed **tools for achieving a positive "safety climate"** on construction sites.

What we did

These research results gave us direction for improving safety conditions on construction sites. We knew that we had to give supervisors and workers tools to open up the conversation about safety. **Leaders in Safe Construction** (LISC) is the training program we created for contractors and supervisors to help them:

- learn safety requirements
- improve their safety communication
- build mutual respect, and
- plan for safer worksites.

We have trained over 120 supervisors and contractors to become safety leaders. These trainings took place in both English and Spanish. We are now training local trainers to teach the LISC program so that safety leadership training is available even after our project is completed. The Massachusetts Office of Public Safety has approved the LISC program for Construction Supervisor continuing education credit.

In addition to the LISC training for supervisors, we have also started a worker training program, produced a brochure on residential construction safety for the City of Lawrence, published columns on fall protection in *Rumbo*, brought OSHA and other agencies to Lawrence to talk with workers and contractors (in Spanish and English), distributed a safety equipment catalog to local building permit offices, and held safety equipment demonstrations at Jackson Lumber and Laborers Local 175.

More to Do

We hope that you will help us continue to improve safety conditions for Lawrence's construction workers. Here is a list of things to do:

- **Community leaders:** Invite us to your meeting to discuss this project and how your organization can make a difference.
- **Construction Supervisors and Contractors:** Take our Leaders in Safe Construction training.
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Protección en Construcción: The Lawrence Latino Safety Partnership includes the City of Lawrence Mayor's Health Task Force, Laborers International Union of North America – LIUNA Local 175, Lawrence Community Connections, University of Massachusetts Lowell, and community participants.

Protección en Construcción is funded by National Institute for Occupational Safety and Health (NIOSH) Grant R01OH008750

COMMUNITY CONNECTIONS

Lo que aprendimos en Lawrence sobre salud y seguridad en construcción

Protección en Construcción: The Lawrence Latino Safety Partnership es un proyecto de investigación Universidad-Comunidad para conocer más sobre por qué las obras de construcción son tan peligrosas para los trabajadores latinos y qué se puede hacer para prevenir lesiones.

Este folleto explica lo que hemos encontrado en nuestra investigación (realizada entre 2007-2013) y lo que adicionalmente se puede hacer para mejorar la seguridad de todos los trabajadores de la construcción en Lawrence.

Lo que encontramos

Aprendimos sobre los problemas, escuchando a la comunidad. Reunimos grupos de trabajadores latinos de la construcción, contratistas y supervisores para discutir sus retos y realidades cotidianas. Hablamos con funcionarios estatales, locales y federales de seguridad y salud. Luego, basados en lo que nos dijeron, elaboramos una encuesta para conocer la opinión de la comunidad.

"Mire, el entrenamiento tiene beneficios, pero nadie va a tomar de 30 minutos a una hora para que le enseñen algo, cuando lo único que ellos quieres es terminar el trabajo pronto."

Trabajador de construcción de Lawrence

A partir de los grupos de enfoque y la encuesta a la comunidad, aprendimos que en los lugares de construcción donde trabajan los latinos hay tanto ***escasez de equipos de seguridad como poco conocimiento sobre seguridad.*** Especialmente los trabajadores, pero también los contratistas y supervisores, consideran ***que no hay apoyo para plantear sus preocupaciones sobre la seguridad,*** así como también ***mucha presión para terminar el trabajo rápido.*** Usualmente, parece que los supervisores tienen problemas para comunicar los temas de seguridad y requieren ***herramientas para lograr un "clima de seguridad" positivo*** en las obras de construcción.

Lo que hicimos

Estos resultados nos dieron orientación para mejorar las condiciones de seguridad en las obras de construcción. Sabíamos que teníamos que brindarles a los supervisores y trabajadores herramientas para iniciar conversaciones sobre la seguridad. Líderes en Seguridad en Construcción (LISC) es el programa de entrenamiento que hemos creado para ayudarle a los contratistas y supervisores a:

- aprender sobre los requisitos de seguridad
- mejorar su comunicación en seguridad
- establecer respeto mutuo, y
- planear para tener lugares de trabajo más seguros

Hemos entrenado a más de 120 supervisores y contratistas para convertirse en líderes en seguridad. Estos cursos de capacitación se realizaron en inglés y español. Ahora estamos entrenando instructores locales para impartir el programa de formación LISC, de tal manera que el entrenamiento en liderazgo en seguridad esté disponible incluso después que nuestro proyecto finalice. La Oficina de Seguridad Pública de Massachusetts ha aprobado el programa LISC para ofrecer créditos de educación continua para supervisor de construcción.

Además del entrenamiento LISC para supervisores, también hemos iniciado un programa de capacitación para trabajadores, elaboramos un folleto sobre seguridad en la construcción residencial para la Ciudad de Lawrence, publicamos artículos sobre protección contra caídas en Rumbo, trajimos a OSHA y otras agencias a Lawrence para hablar con los trabajadores y contratistas (en español y e inglés), distribuimos un catálogo de equipos de seguridad en las oficinas para permisos de construcción locales y realizamos demostraciones sobre equipos de seguridad en las instalaciones de Jackson Lumber y Laborers Local 175.

Más por hacer

Esperamos que usted nos ayude a continuar mejorando las condiciones de seguridad para los trabajadores de la construcción de Lawrence. Aquí está una lista de las cosas por hacer:

- **Líderes comunitarios**: Invítenos a sus reuniones para discutir este proyecto y cómo su organización puede hacer la diferencia.
- **Supervisores y contratistas de construcción**: Tome nuestro entrenamiento para Líderes en Seguridad en Construcción.
- **Trabajadores:** Póngase en contacto con nosotros para aprender sobre la prevención de caídas.
- **Propietarios de viviendas y arrendadores**: Obtenga nuestro folleto Seguridad en la Construcción Residencial en la oficina de Servicios de Inspección de la Ciudad de Lawrence.

Para obtener mas información y entrenamiento, llame a:

Lawrence Community Connections
www.lawrenceworksafe.org

Protección en Construcción: The Lawrence Latino Safety Partnership incluye la Unidad a Beneficio de la Salud de la Alcaldía de Lawrence, el Sindicato de Trabajadores Laborers International Union of North America - LIUNA Local 175, Lawrence Community Connections, la Universidad de Massachusetts Lowell, y participantes de la comunidad.

Protección en Construcción está financiado por el Instituto Nacional de Seguridad Ocupacional y Salud (NIOSH) R01OH008750

APPENDIX E. Fall prevention equipment catalog

Aramsco
23 Northwestern Drive
Salem, NH 03079
(603) 890-6400
Website: www.Aramsco.com/

In Stock

- 3 Point Harness
- Lanyard

In-Store Catalog

- 3' Tie Adapter [Pass through design makes attaching to anchorage quick and easy]
- Aerial Lift Kit
- Anchors
- Base Plate
- Cable Choker
- Carabiners
- Compliance in a Can [Variety]
- Concrete Anchor Strap
- Cross Arm Strap
- Harnesses
- Horizontal Lifeline System
- Lanyards
- Ladder Extension System
- Ladder Leveler
- Ladder Jack
- Lifeline Assembly
- Retractable Lifelines
- Rolling Scaffold
- Rope Grab
- Safety Rail System
- Scaffold Choker Anchor
- Sliding Beam Anchor [Horizontal]

Guardian Fall Protection
Rental Program

Tel. Number: 800.767.6933

Website:
www.Guardianfall.com/about/rental-program

Fastenal Company / Website: www.Fastenal.com
3 Locations

101 Brick Kiln Road Chelmsford, MA 01824 (978) 970-3278	106 Marston Street Lawrence, MA 01840 (978) 681-7666	106 Marston Street Lawrence, MA 01840 (978) 681-7666

<u>In Stock</u>

- Compliance in Can
- Harnesses
- Lanyards

<u>In-Store Catalog</u>

- Anchor Strap
- Anchorage Connectors
- Beam Anchor
- Body Belts
- Carabiners
- Compliance in a Can [Variety]
- D-Ring Extensions
- Harnesses
- Lanyards
- Lifelines
- Retractable Lifelines
- Trauma Safety Trap

3

Grainger Industrial Supply / Website: www.Grainger.com/
121 Marston Street
Lawrence, MA 01841
(978) 794-4773

In Stock
- A variety of individual parts
- Compliance in a can

In-Store Catalog
- Anchorage Connectors
- Body Belts
- Cab-Mount Bracket
- Carabiners
- Compliance in a can [Variety]
- Connector Devices
- Fall Distance Indicator
- Fall Limiters
- Guardrails
- Harnesses
- Horizontal and Vertical Life-lines
- Lanyards
- Rope Grabs
- Self-Retracting Lifelines
- Vacuum Anchor Systems

Jackson Lumber,
215 Market Street
Lawrence, MA 01843
(978) 686-4141
http://www.jacksonlumber.com/

In Stock
- Compliance in a can

4

Lowe's Home Improvement
2 Locations:

541 S Broadway
Salem, NH 03079
(603) 681-4218

50 Lowes Way
Lowell, MA 01851
(978) 677-5679

In Stock
Compliance in a can

The Home Depot / Website: www.HomeDepot.com/
72 Pleasant Valley Street
Methuen, MA 031844
(617) 989-9025

In Stock
- Aerial fall protection in bag [body connector, connector]
- Anchors
- Compliance in a bucket
- Harnesses
- Ladder hooks
- Ladder jack rung
- Pump jacks
- Pump jack brace
- Roofing brackets
- Staging brackets
- Ultra jack
- Vertical life lines
- Work benches

The Home Depot
289 South Broadway
Salem, NH 03079
(603) 894-1900

In Stock
- Compliance in a bucket
- Lanyard
- Lifelines
- Pump jacks
- Roof brackets
- Work benches

The Home Depot
85 Main Street
Tewksbury, MA 01876
(978) 640-0400

In Stock
- Roof brackets
- Workbenches
- Pump jacks
- Compliance in a bucket
- Staging brackets
- Ladder hook, w/ wheel
- Vertical lifelines

Wise El Santo Company
28 Pelham Avenue
Methuen, MA 01844
(978) 557-9070
Website: www.Wisesafetyenv.com/

In Stock
- Compliance in a Can
- A variety of individual parts

In-Store Catalog
- Anchors
- Carabiners
- Compliance in a Can [Variety]
- Cross Arm Strap
- Fall Limiters
- Harnesses
- Lanyards
- Ladder Climbing Safety Systems
- Permanent Horizontal Lifeline System Kits
- Rope Grabs
- Self-Retracting Lifelines
- Suspension Trauma Safety Strap
- Tie-Off Strap
- Vertical Net Debris Containment System

Other Fall Prevention Equipment Outlets

A & A Industrial Supply
792 Main Street
Tewksbury, MA 01828
(978) 658-9656
Website: www.AAindustrialsupply.com/

Contact:
Ted Morang
978-375-4793-Cell
E-Mail: ted@albeco.com

R.G. Mearn Company
157 Hampden Street
Boston, MA 02119
(617) 445-8665
Website: www.Mearn.com/

Mike Gardner
617-719-8531-Cell
E-Mail: mike@mearn.com

Safety Source Inc.
29 Gillespie Road
Charlton, MA 01507
508-248-4265

Website:
www.Safetysourcenortheast.com/
Bruce Kingman
617-407-9650-Cell
Email: brucekingman@verizon.net

Guardrails in place during re-roofing activities.

7

Other Resources

National Institute for Occupational Safety and Health
1-800-CDC-INFO (1-800-232-4636)
www. cdc.gov/niosh

Occupational Safety and Health Administration (OSHA)
138 River Rd, Suite 102
Andover, MA 01810 / (978) 837-4460
www.osha.gov/stopfalls
www.osha.gov/doc/topics/residentialprotection

OSHA Consultation Program
Free and voluntary assistance for employers
MA Department of Labor Standards
(617) 969-7177
www.mass.gov/dols

The City of Lawrence Inspectional Services
City Hall (978) 620-3130

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APPENDIX A. Principles of Collaboration (English and Spanish version)

Lawrence Construction Safety Partnership:

Principles for Collaboration

Use approaches that go into good personal relationships: be respectful, considerate.

Use métodos que se usan para construir buenas relaciones personales: sea respetuoso, considerado.

No one is more, no one is less.

Nadie vale más, nadie vale menos, que los demás.

Be open; listen to other perspectives.

Sea abierto; escuche otras perspectivas.

Show commitment to sustainability: the work and partnership should continue beyond the end of the grant.

Demuestre su compromiso a la sostenibilidad: el trabajo y la asociación deben seguir después que acabe el proyecto financiado.

Respect the processes and structures of the project.
Respete los procesos y las estructuras del proyecto.

Respect processes and structures that already exist in the community.

Respete los procesos y las estructuras que ya existen en la comunidad.

Be flexible: we can change, modify, and improve our processes and structures as we go.

Sea flexible: podemos cambiar, modificar, y mejorar nuestros procesos y estructuras mientras avancemos.

Make sure that if somebody wants to put something on the table, they can: include New Business on every agenda.

Asegúrese que todos tengan la oportunidad de plantear lo que quieran: incluya Nuevos Asuntos como parte de cada agenda.

All partners: share goals, funds, leadership, flexibility.

Todos los socios: compartan metas, fondos, liderazgo, flexibilidad.

Taken from "Tools for Research Partnerships in Lawrence, MA" A project of the Mayor's Health Taskforce Research Initiative:

1. *Research Is helpful to community development.*
2. *Working with community members makes better science.*
3. *Researchers and members of the Lawrence community can and should create good partnerships based on fairness & positive exchanges.*

Principles for Collaboration (con't)

"Differ without rancor": we need to be free to be open about our differences, rather than try to hide or suppress them, and argue through them without getting personal.

"Expresar distintas opiniones sin resentimiento": tenemos que tener la libertad de ser francos sobre nuestras diferencias, en vez de tratar de esconderlas o contenerlas, y discutirlas sin comentarios personales.

"Share our snack": do things together to build community, camaraderie, conviviality.

"Comparta nuestros refrigerios": colaborar para construir comunidad, compañerismo, cordialidad.

Support each other's efforts, including those outside the project.

Apoye los esfuerzos de los demás, incluyendo los fuera del proyecto.

Leave external divisions outside.

Deje afuera las divisiones externas.

Don't make assumptions about people, or just point at them to do things.

Evite suposiciones sobre otras personas, y no les encargue con tareas basado en sus suposiciones.

If someone isn't doing what they're supposed to, don't write them off – work with them to get back on track.

Si alguien no está hacienda lo que debería de hacer, no lo descarte – colabore con la persona para que vuelva al buen camino.

3

1. *Las investigaciones científicas son útiles para el desarrollo comunitario.*
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A partir de los grupos de enfoque y la encuesta a la comunidad, aprendimos que en los lugares de construcción donde trabajan los latinos hay tanto ***escasez de equipos de seguridad como poco conocimiento sobre seguridad.*** Especialmente los trabajadores, pero también los contratistas y supervisores, consideran ***que no hay apoyo para plantear sus preocupaciones sobre la seguridad,*** así como también ***mucha presión para terminar el trabajo rápido.*** Usualmente, parece que los supervisores tienen problemas para comunicar los temas de seguridad y requieren ***herramientas para lograr un "clima de seguridad" positivo*** en las obras de construcción.

Lo que hicimos

Estos resultados nos dieron orientación para mejorar las condiciones de seguridad en las obras de construcción. Sabíamos que teníamos que brindarles a los supervisores y trabajadores herramientas para iniciar conversaciones sobre la seguridad. Líderes en Seguridad en Construcción (LISC) es el programa de entrenamiento que hemos creado para ayudarle a los contratistas y supervisores a:

- aprender sobre los requisitos de seguridad
- mejorar su comunicación en seguridad
- establecer respeto mutuo, y
- planear para tener lugares de trabajo más seguros

Hemos entrenado a más de 120 supervisores y contratistas para convertirse en líderes en seguridad. Estos cursos de capacitación se realizaron en inglés y español. Ahora estamos entrenando instructores locales para impartir el programa de formación LISC, de tal manera que el entrenamiento en liderazgo en seguridad esté disponible incluso después que nuestro proyecto finalice. La Oficina de Seguridad Pública de Massachusetts ha aprobado el programa LISC para ofrecer créditos de educación continua para supervisor de construcción.

Además del entrenamiento LISC para supervisores, también hemos iniciado un programa de capacitación para trabajadores, elaboramos un folleto sobre seguridad en la construcción residencial para la Ciudad de Lawrence, publicamos artículos sobre protección contra caídas en Rumbo, trajimos a OSHA y otras agencias a Lawrence para hablar con los trabajadores y contratistas (en español y e inglés), distribuimos un catálogo de equipos de seguridad en las oficinas para permisos de construcción locales y realizamos demostraciones sobre equipos de seguridad en las instalaciones de Jackson Lumber y Laborers Local 175.

Más por hacer

Esperamos que usted nos ayude a continuar mejorando las condiciones de seguridad para los trabajadores de la construcción de Lawrence. Aquí está una lista de las cosas por hacer:

- **Líderes comunitarios**: Invítenos a sus reuniones para discutir este proyecto y cómo su organización puede hacer la diferencia.
- **Supervisores y contratistas de construcción**: Tome nuestro entrenamiento para Líderes en Seguridad en Construcción.
- **Trabajadores:** Póngase en contacto con nosotros para aprender sobre la prevención de caídas.
- **Propietarios de viviendas y arrendadores**: Obtenga nuestro folleto Seguridad en la Construcción Residencial en la oficina de Servicios de Inspección de la Ciudad de Lawrence.

Para obtener mas información y entrenamiento, llame a:

Lawrence Community Connections
www.lawrenceworksafe.org

Protección en Construcción: The Lawrence Latino Safety Partnership incluye la Unidad a Beneficio de la Salud de la Alcaldía de Lawrence, el Sindicato de Trabajadores Laborers International Union of North America - LIUNA Local 175, Lawrence Community Connections, la Universidad de Massachusetts Lowell, y participantes de la comunidad.

Protección en Construcción está financiado por el Instituto Nacional de Seguridad Ocupacional y Salud (NIOSH) R01OH008750

APPENDIX E. Fall prevention equipment catalog

Aramsco
23 Northwestern Drive
Salem, NH 03079
(603) 890-6400
Website: www.Aramsco.com/

In Stock

- 3 Point Harness
- Lanyard

In-Store Catalog

- 3' Tie Adapter [Pass through design makes attaching to anchorage quick and easy]
- Aerial Lift Kit
- Anchors
- Base Plate
- Cable Choker
- Carabiners
- Compliance in a Can [Variety]
- Concrete Anchor Strap
- Cross Arm Strap
- Harnesses
- Horizontal Lifeline System
- Lanyards
- Ladder Extension System
- Ladder Leveler
- Ladder Jack
- Lifeline Assembly
- Retractable Lifelines
- Rolling Scaffold
- Rope Grab
- Safety Rail System
- Scaffold Choker Anchor
- Sliding Beam Anchor [Horizontal]

Guardian Fall Protection
Rental Program

Tel. Number: 800.767.6933

Website:
www.Guardianfall.com/about/rental-program

Fastenal Company / Website: www.Fastenal.com
3 Locations

101 Brick Kiln Road Chelmsford, MA 01824 (978) 970-3278	106 Marston Street Lawrence, MA 01840 (978) 681-7666	106 Marston Street Lawrence, MA 01840 (978) 681-7666

<u>In Stock</u>

- Compliance in Can
- Harnesses
- Lanyards

<u>In-Store Catalog</u>

- Anchor Strap
- Anchorage Connectors
- Beam Anchor
- Body Belts
- Carabiners
- Compliance in a Can [Variety]
- D-Ring Extensions
- Harnesses
- Lanyards
- Lifelines
- Retractable Lifelines
- Trauma Safety Trap

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Grainger Industrial Supply / Website: www.Grainger.com/
121 Marston Street
Lawrence, MA 01841
(978) 794-4773

In Stock
- A variety of individual parts
- Compliance in a can

In-Store Catalog
- Anchorage Connectors
- Body Belts
- Cab-Mount Bracket
- Carabiners
- Compliance in a can [Variety]
- Connector Devices
- Fall Distance Indicator
- Fall Limiters
- Guardrails
- Harnesses
- Horizontal and Vertical Life-lines
- Lanyards
- Rope Grabs
- Self-Retracting Lifelines
- Vacuum Anchor Systems

Jackson Lumber,
215 Market Street
Lawrence, MA 01843
(978) 686-4141
http://www.jacksonlumber.com/

In Stock
- Compliance in a can

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Lowe's Home Improvement
2 Locations:

541 S Broadway
Salem, NH 03079
(603) 681-4218

50 Lowes Way
Lowell, MA 01851
(978) 677-5679

In Stock
Compliance in a can

The Home Depot / Website: www.HomeDepot.com/
72 Pleasant Valley Street
Methuen, MA 031844
(617) 989-9025

In Stock
- Aerial fall protection in bag [body connector, connector]
- Anchors
- Compliance in a bucket
- Harnesses
- Ladder hooks
- Ladder jack rung
- Pump jacks
- Pump jack brace
- Roofing brackets
- Staging brackets
- Ultra jack
- Vertical life lines
- Work benches

The Home Depot
289 South Broadway
Salem, NH 03079
(603) 894-1900

In Stock
- Compliance in a bucket
- Lanyard
- Lifelines
- Pump jacks
- Roof brackets
- Work benches

The Home Depot
85 Main Street
Tewksbury, MA 01876
(978) 640-0400

In Stock
- Roof brackets
- Workbenches
- Pump jacks
- Compliance in a bucket
- Staging brackets
- Ladder hook, w/ wheel
- Vertical lifelines

Wise El Santo Company
28 Pelham Avenue
Methuen, MA 01844
(978) 557-9070
Website: www.Wisesafetyenv.com/

In Stock
- Compliance in a Can
- A variety of individual parts

In-Store Catalog
- Anchors
- Carabiners
- Compliance in a Can [Variety]
- Cross Arm Strap
- Fall Limiters
- Harnesses
- Lanyards
- Ladder Climbing Safety Systems
- Permanent Horizontal Lifeline System Kits
- Rope Grabs
- Self-Retracting Lifelines
- Suspension Trauma Safety Strap
- Tie-Off Strap
- Vertical Net Debris Containment System

Other Fall Prevention Equipment Outlets

A & A Industrial Supply
792 Main Street
Tewksbury, MA 01828
(978) 658-9656
Website: www.AAindustrialsupply.com/

Contact:
Ted Morang
978-375-4793-Cell
E-Mail: ted@albeco.com

R.G. Mearn Company
157 Hampden Street
Boston, MA 02119
(617) 445-8665
Website: www.Mearn.com/

Mike Gardner
617-719-8531-Cell
E-Mail: mike@mearn.com

Safety Source Inc.
29 Gillespie Road
Charlton, MA 01507
508-248-4265

Website:
www.Safetysourcenortheast.com/
Bruce Kingman
617-407-9650-Cell
Email: brucekingman@verizon.net

Guardrails in place during re-roofing activities.

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Other Resources

National Institute for Occupational Safety and Health
1-800-CDC-INFO (1-800-232-4636)
www. cdc.gov/niosh

Occupational Safety and Health Administration (OSHA)
138 River Rd, Suite 102
Andover, MA 01810 / (978) 837-4460
www.osha.gov/stopfalls
www.osha.gov/doc/topics/residentialprotection

OSHA Consultation Program
Free and voluntary assistance for employers
MA Department of Labor Standards
(617) 969-7177
www.mass.gov/dols

The City of Lawrence Inspectional Services
City Hall (978) 620-3130

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