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Promoting Adoption of Fall Prevention Measures Among Latino Workers and Residential Contractors: Formative Research Findings

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Background *Falls from heights remain a concern in construction, particularly for foreign-born Latino construction workers employed by small residential contractors. The social ecological model provides a framework to assess the individual and contextual factors influencing the risk for falls.*

Methods *Five focus groups and thirteen in-depth interviews with workers, small residential contractors, and key informants were conducted in 2012 in San Francisco and Philadelphia. Data were analyzed with qualitative methods.*

Results *Economic conditions in residential construction, coupled with a lack of enforcement and vulnerabilities of the foreign-born workforce, are principal contributors to risk for falls. Small contractors perceive strong economic disincentives for implementation of fall protection and foreign-born Latino workers experience a variety of social, cultural and occupational pressures impeding its use.*

Conclusions *Increased adoption of fall protection cannot be accomplished solely by targeting Latino construction workers. Research is needed on incentives to influence contractor behavior and facilitate adoption of fall protection measures.* Am. J. Ind. Med. 58:870–879, 2015. © 2015 Wiley Periodicals, Inc.

KEY WORDS: construction; Latino immigrant workers; falls in construction; small residential; social ecological model

BACKGROUND

The construction industry has one of the largest workforces in the United States and is also one of the most dangerous; an estimated 20% of all occupational deaths occur in construction [US Bureau of Labor Statistics 2012]. Falls are a major cause of death among construction workers. Between 1992 and 2006, falls increased 370% in construction; by 2006 falls were, and currently remain, the number one cause of death [BLS, 2006; BLS, 2013]. Latino workers, who make up one in four construction workers, are particularly at risk [US Bureau of Labor Statistics, 2012b]. Between 2003 and 2006, Latino construction workers were 1.5 times more likely to die from a fall than their White, non-Latino, counterparts. Moreover, foreign-born Latino construction workers are significantly more likely to die from falls than their U.S.-born Latino counterparts [Dong et al., 2009]. It is estimated that there were approximately 1.6 million foreign-born Latino workers in the U.S. in 2009 [Dong et al., 2010].

A broad range of factors increases the risk of construction jobs for foreign-born Latino workers. These

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include language barriers, low literacy, lack of health insurance, workplace discrimination, lack of training or familiarity with programs to protect workers, and fear of "speaking up" [Faucett et al., 2001; Pransky et al., 2002; WISH, 2002; Magana and Hovey, 2003; Brunette, 2004; Ruttenberg and Lazo, 2004; Acosta-Leon et al., 2006; Dong et al., 2009]. Latino workers also feel a disincentive to address safety and health issues with supervisors for fear of adverse effects on employment and/or because of immigration status [Brunette, 2004; Roelofs et al., 2011; Arcury et al., 2013]. Two studies found that foreign-born Latino workers who took action about problems met with responses including "job loss, employer indifference, or employer retaliation" (De et al., 2006; Saucedo and Morales, 2010). Cultural factors may also influence workers' perceptions of risk and work culture [WISH, 2002; Brunette, 2004; Thompson and Siddiqi, 2007; Kramer et al., 2010; Saucedo and Morales, 2010; Roelofs et al., 2011; Arcury et al., 2013; Hung et al., 2013]. It is suggested that foreign-born Latino workers have strong perceptions about how men should behave that motivate men to accept more dangerous work and view expressing concerns about safety as not masculine (Thompson and Siddiqi, 2007).

Latino workers are more likely to work for small contractors and typically have varied employment with multiple small contractors [Dong et al., 2010]. From 2003–2008, 47% of work-related deaths among Latino workers were among small contractors [Dong et al., 2010]. Fatalities from falls are more likely to occur among workers employed by small contractors [Dong et al., 2009; Dong et al., 2010; Dong et al., 2013]. Small contractors face pressing cost considerations, often-viewing occupational safety as a prohibitive expense to an already tight budget [Hung et al., 2011] and do not always recognize the productivity benefits of improved worker safety [Kramer et al., 2010]. Deadlines, pressure to produce and potential bonuses for early completion of jobs all contribute to a mindset that pits production against safety, and time and cost are often cited as factors in decisions about the use of safety equipment [Roelofs et al., 2011; Arcury et al., 2013].

Many small contractors operate in the residential construction sector (CPWR 2008), which has specific challenges that compound the risk for falls and where it is less likely that there are adequate fall protection plans [Lipscomb et al., 2004; Lipscomb et al., 2008; Hung et al., 2013]. The challenges include jobs that are often short and experience high worker turnover, the rapidly changing nature of the work environment, and specific barriers such as difficulty in securing anchorage sites for personal fall arrest systems [Kaskutas et al., 2010]. In addition, OSHA's compliance policy on fall protection in the residential sector has varied over the years. Between 1995 and 2011, OSHA allowed various alternative procedures for residential fall protection due to industry concerns over feasibility. Only as recently as 2011 did OSHA issue a new directive that required all residential contractors to meet the same fall protection requirements as originally written (OSHA, 2015).

Given the complexity of the issue, interventions are needed at multiple levels to improve the safety and health of Latino construction workers. The social ecological model suggests programs should consider a holistic approach to health, working at the intrapersonal, interpersonal, organizational, community/society, and policy levels [Breslow, 1996; Linnan et al., 2001; Campe et al., 2011; Baron et al., 2013]. This model posits that focusing solely on worker knowledge or attitudes without addressing the way work is organized or interactions with supervisors and others who influence behavior will not result in long lasting change [Baron et al., 2013]. Much of the research to date on occupational outcomes has focused on intrapersonal factors or factors aimed at changing worker attitudes and practices. However, there is less research on interpersonal factors, particularly the relationship between workers, supervisors, and contractors and the resulting impact on worksite safety and health. At the organizational level, research has identified the need to address safety and health issues by targeting contractors, particularly small contractors, to create positive worksite change [Dong et al., 2009; Roelofs et al., 2011; Menzel and Shrestha, 2012; Dong et al., 2013; Arcury et al., 2013].

APPROACH

This article describes formative research conducted by two organizations to inform interventions promoting the adoption of fall prevention measures in residential construction, with a focus on reducing the incidence of falls among foreign-born Latino workers. The socio-ecological model was used as a framework to assess the individual and contextual factors that influence the risk for falls and use of fall protection. Our goals were to explore effective ways to influence workers and employers, and to identify organizational partners that could leverage influence to promote safer conditions.

The Labor Occupational Health Program (LOHP) in California focused specifically on residential roofing in the San Francisco Bay Area because of research indicating that a large proportion of Latino construction workers who died from falls worked in roofing [Dong et al., 2009]. The Philadelphia Area Project on Occupational Safety and Health (PhilaPOSH) in Pennsylvania targeted workers and contractors in Philadelphia's Redevelopment Zone where there had been a dramatic increase in residential construction. The Center for Construction Research and Training (CPWR) funded both projects and facilitated a collaborative research process through regular phone and in-person meetings.

A preliminary literature review informed the development of the focus group and key informant interview research instruments. Consent was obtained through an oral consent process delineated in each organization's Institutional Review Board application, which was approved for LOHP by UC Berkeley and the National Institute for Occupational Safety and Health, and for PhilaPOSH, by CPWR.

Focus Groups

In 2012, a total of five focus groups were conducted by LOHP in San Francisco and PhilaPOSH in Philadelphia (see Table I). Focus groups were conducted in Spanish at an accessible community location, and participants received food and/or gift cards. The interview guides included questions pertaining to: experiences working at heights; perceptions and attitudes about risk of falls, causes, and fall protection; factors that influence risk; intervention ideas; and, potential partners who could influence worker and contractor behavior.

LOHP conducted two focus groups, one with union roofers and the other with nonunion roofers. Four workers attended each focus group, although at least eight had been expected at each based on outreach. Union roofers were recruited through the union. Nonunion roofers were recruited through street outreach in a neighborhood where many residential roofers are hired. PhilaPOSH conducted two focus groups with a total of 14 nonunion workers, as well as a joint worker-contractor focus group with nine nonunion workers and eight contractors. To recruit participants, PhilaPOSH used existing contact lists from previous training programs.

Key Informant Interviews

LOHP conducted eleven key informant interviews with contractors, contractor and union representatives, and safety and health professionals, including researchers, practitioners, and enforcement staff. PhilaPOSH interviewed two trainers from their program as key informants. The question categories for these interviews were similar to those for the focus groups.

Analysis

The focus groups and interviews were audio-recorded, and recordings and notes were reviewed and analyzed in the original language by bilingual researchers from each organization for theme identification. An initial set of themes was identified based on the research questions. Researchers from each organization then reviewed notes from their focus groups to identify additional themes that emerged from findings, which were then shared and discussed jointly. Researchers then used the commonly identified themes to track frequency and comments for each theme. Our process was informed by analysis strategies described in Crabtree and Miller [Crabtree and Miller, 1999].

RESULTS

Worker and Contractor Characteristics

Workers

All the worker participants were foreign-born, Latino, and worked in the residential sector. The San Francisco

TABLE I. Research Participants

Sector represented	Location	Number of participants
Focus Groups		
Nonunion workers (roofers)	San Francisco	4
Union workers (roofers)	San Francisco	4
8 workers	Philadelphia	8
6 workers	Philadelphia	17
8 contractors & 9 workers	Philadelphia	6
Total		31 workers and 8 contractors
Key informant interviews		
Sector represented		Number of interviews
Worker and labor organizations		4
Employers and employer representatives		4
Occupational safety and health agency		2
Occupational safety and health experts/researchers		3
Total		13

roofers had all worked in roofing for over 10 years; half had done so for almost 20 years. Non-union roofers were always hired "by the day" or "by the job," and by small contractors. Roofers reported carrying out a range of tasks to install or repair roofs. The Philadelphia workers worked as carpenters, roofers, painters, and laborers. They carried out a range of tasks including painting houses and installing sheetrock, walls, doors, and roofs.

Contractors

The roofing contractor participants were union contractors who worked in both commercial and residential roofing. The Philadelphia nonunion contractors worked in a variety of trades within residential construction. There was a mix of seasoned contractors and those who were new. All Philadelphia contractors were Latino (the majority Puerto Rican); the San Francisco roofing contractors were White, Non-Latino.

Findings

The findings are presented using the framework of the social ecological model. Common themes emerged about risk factors driven by the broader economic and social context, and how these translate into on-the-job attitudes and behaviors. Expert key informants stated there are few technical challenges impeding the use of fall protection, citing the increased availability of options readily available on the market. The challenge is in the translation to practice, or achieving broad-based implementation and use of available alternatives given the perceived disincentives to safety.

Intrapersonal level

Five themes identified at the intrapersonal level for workers are overconfidence, sense of personal responsibility, viewing harnesses as cumbersome, the belief that a rope is protective, and the pressing need for work and fear of speaking up.

Overconfidence. When asked to name the causes of falls, workers frequently mentioned the role of overconfidence. Roofers stated that workers can be too confident in their abilities to walk safely on the roof and instead rely on their experience, believing that they don't need to wear a harness. Union roofers also commented, "*We are trained to walk up on roofs, and know how to do it safely.*" The respondents mentioned that younger workers often see work as an adventure and are overconfident.

Personal responsibility. Workers' described a perception of individual responsibility for their safety, reflected in comments like "*if you are careful, you will be okay*" and "*if you get injured, it's your fault.*" A key informant described how workers tend to blame themselves and take full responsibility for their well-being at work. Though workers were aware that their employers were not complying with the required training and fall protection measures, workers emphasized their own responsibility for working safely and being careful. Even in cases when harnesses were provided to the Philadelphia workers, the decision of whether or not to use them was left to the workers.

Workers view harnesses as cumbersome. Workers described deep-set attitudes and concern about harnesses delaying their work. "*The reason to not use one is speed. You don't have agility with a harness*." One roofer described his brother's experience as a way of demonstrating this attitude. His brother had fallen three stories, and by luck a tree broke his fall and he did not suffer any serious injuries. "*Yet even with that experience, to this day, he doesn't wear a harness. He is very stubborn*."

Contractors also talked about workers' resistance to using harnesses. Some of the contractors stated that workers often choose not to wear the equipment even after they are asked to do so. In Philadelphia, contractors often said, "*I buy the equipment, I tell them to put it on, and as soon as I leave, they take it off.*"

A few expert key informants challenged the notion that using a harness results in slowing down the work, especially if workers were encouraged to wear them for a long enough period to become accustomed to them. "*The workers may be slower at first, but they have to get over the learning curve.*" Some workers seconded this approach, describing that at times workers did not wear harnesses, if provided, because they are not used to them. In Philadelphia, workers were not accustomed to personal fall arrest systems since the practice was not common in their countries of origin. A few workers suggested that there is a need to promote ongoing use of the harness until wearing them becomes a norm. "*It's like wearing a seat belt. They need to get used to it to see that it won't slow them down.*"

Belief that rope will protect them. Still, some of the same workers described times when they tied off using a rope, believing that would be protective. A couple of roofers described having a rope around their waist, which they attach to the roof with a nail. Another worker described a situation where he felt that the roof was too steep and dangerous, so he refused to do the work until the contractor brought him a bigger ladder and planks. Yet he then used a rope to tie off against falls and completed the job. These

examples may reflect workers' lack of knowledge about a rope's inability to handle the force of a fall.

Need to work and fear of speaking up. Workers described the fear of job loss as a motivator to accept risks. Workers see themselves as competing for highly valued jobs, which leads them to tolerate risk and poor working conditions. They aim to meet the speed and production demands in order to be selected for a crew again. "*Everyone needs a job. They know the dangers, but they need their jobs.*" In this context, workers are not likely to ask for fall protection and make any demands that could result in not being hired back. Workers expressed a feeling of powerlessness in being able to enact change, especially "*before they have their papers*" and while they are working casually for a variety of contractors. An expert key informant described, "*People are scared to speak up to get what they need*" *and* "*they are going to do whatever it takes to keep it [their job].*" This also results in falls often going unreported, "*They may have a hurt arm or back, but they don't want to say anything about it. They don't have documents.*"

The concern about speaking up is not solely characteristic of nonunion workers or those who are undocumented. Union roofers described how some foremen do not follow safety policies, but workers who question this would get asked, "*You want to come to work tomorrow?*" When prompted about why this is not reported to the union, workers stated, "*We don't want to create problems. The foreman would know who called, and then later not call you to work.*"

Interpersonal

Themes at the interpersonal level revolved around workers' perceptions that are influenced by their relationships with contractors. These include the perception that contractors are concerned about speed over safety, and workers' view of themselves as "exceptional workers."

Contractors convey that they want speed over safety. Workers believe that contractors do not want them to wear harnesses because the equipment prevents them from working faster. As one nonunion roofer stated, "*If you want to use one, you get fired. It is better to risk than not work at all.*" A Philadelphia worker describes, "*The boss wants greater production and he wants all the workers working and producing [and not setting up fall protection].*" Most of the nonunion San Francisco roofers described contractors' attitudes as not valuing or seeing the benefit of safety. Even union roofers described that they sometimes disconnect themselves or decide not to wear the harness, "*if they feel pressured to rush*." While union roofers felt confident that their contractors had strong safety programs, they described the pressure to take short cuts once they are at the job site, from foremen who do not consistently follow established safety policies.

Exceptional worker status. An important aspect of the foreign-born experience relates to how workers view their role in the job market compared to that of American workers. Roofers expressed pride in being reliable, hard-working, and capable of enduring hard physical labor. As one roofer stated, "*I am used to heavy work*." Both union and nonunion Latino roofers commented on their ability to carry out work that Americans would not be able to do as an asset and source of pride, viewing this as giving them an edge in the competition for jobs.

Philadelphia workers expressed concern that asking for additional equipment, like harnesses, might make them fall into the category of "*lazy American workers*." They also expressed concerns about complaining, as this could jeopardize their status as the "*preferred employee*." A key informant commented that Latino construction workers express feeling pressured to take risks that "*Anglos*" are not pressured to take. "*Bosses think that because some workers are more desperate for work or undocumented, that they'd take more risks and as a result there is differential pressure applied on them.*" Another key informant described that this has served to drive a wedge between low-wage workers, as employers use the stereotypes of hard-working Latinos and lazy Americans to their advantage.

Institutional

At the institutional or organizational level, themes emerged related to worksite conditions that contribute to a lack of safety culture or hinder adoption of fall protection. These include limited safety programs, lack of fall protection equipment, lack of training, and the resulting normalization of risk.

Limited or non-existent safety programs. Workers and contractors both described the need for contractor leadership in safety planning. Union contractors described the level of commitment needed for fall prevention, which involves site-specific planning, assessment and follow through. They stated this is only achieved if leadership invests in safety and promotes a positive safety culture. Workers concurred, describing that the most important factor for working safely at heights is contractors' consciousness about safety and providing safety equipment and training.

However, smaller contractors were consistently characterized as not having the resources to provide all the necessary equipment or training and lacking advanced planning. Union roofers and contractors expressed the belief that falls are more of a concern in the nonunion sector, where there is a lack of safety programs. Philadelphia workers said

they are often exposed to risks because a contractor did not plan, for example ignoring power lines until they are setting up scaffolding, or working close to these lines with aluminum ladders. One union roofing contractor described, "*What gets you are the things you aren't prepared for. Only a handful of contractors do what is needed. Ten to fifteen percent of them might have a safety program.*" One expert key informant stated, "*Smaller guys keep fingers crossed that nothing is going to happen. They know the risk.*"

Lack of fall prevention equipment. Roofing contractors agreed that technology exists for adequate fall protection equipment, and that advances have resulted in a variety of options for appropriate anchors and harness systems. However, workers described the absence of personal fall protection equipment at the worksite. Some Philadelphia workers had never seen a personal fall arrest or guardrail system. One roofer described that contractors only provide harnesses so they are on site in case an inspector shows up. As one key informant described, "*Many small contractors are often not equipped to work at heights because they lack fall protection and yet, they engage in projects that require such equipment.*"

Lack of Training. Contractors and workers both described a lack of training. One union contractor stated, "*It is the Wild West with small contractors….they are not making investment in training.*" Workers stated that experienced workers are often asked to train new workers and "*show them the ropes*." Philadelphia workers described how the lack of training or familiarity with fall protection equipment made it less likely they would use it. While most Philadelphia workers knew what a harness was, they did not know that the harness had to be used with a lanyard with a shock absorber and an anchor point that would withstand the pressure of a fall. Other key informants stated that the reliance on day laborers results in an untrained workforce since contractors are not providing any training for what they view as short-term jobs.

Moreover, smaller contractors themselves may not have knowledge of fall prevention. In Philadelphia, many of the small contractors had no knowledge of labor law or their duty to provide a safe workplace. Two factors contribute to this. One is that a number of people functioning as contractors do not have a construction background, but instead were drawn to the business because of redevelopment funding opportunities. The other is the existence of small or micro operations in which someone hires others to carry out work, but does not view himself as a contractor or perceive that he has a formal role as an employer. This same person may then work as a worker on another contractor's crew the next day. In this setting the distinction between a worker and a contractor can be marginal. One expert cautioned that contractor training is essential in order for contractors to effectively conduct site assessments and develop an appropriate fall protection plan.

Normalization of risk. The lack of emphasis on safety, coupled with the emphasis on productivity over everything else, results in a normalization of risk. This is evidence by workers' and contractors' attitudes towards falls. As risk becomes normalized, and falls are seen as "*just part of the job*," workers develop pride in knowing short cuts, which are viewed by both workers and contractors as mastery of the craft and being skillful. There is a sense of complacency that develops and short cuts are seen as a positive since they often speed up the work. The San Francisco roofers, in particular those in the nonunion sector, described falls as a regular and expected occurrence on the job. They said they see many workers who slip and fall off roofs, and several mentioned knowing of someone who had died falling off a roof. However, they also described how workers fall many times without a serious injury. "*They (workers) joke about it and go back to work, it's seen as part of the normal work day.*"

Expert key informants described, "*They [workers] do it every day all day, [they] become accustomed, see themselves as good working in these postures and believe it [a fall] is not going to happen to them.*" Other key informants referenced similar attitudes in roofing. "*It's an accepted deal in roofing, you will fall. Most of the time, you get up and walk away. [Contractors/workers] feel invincible maybe.*" A key informant described that contractors are working in a competitive environment that encourages them to avoid safety measures. When there are no negative implications or consequences motivating a different approach, they may ultimately ignore safety altogether.

Community

The strongest theme that emerged from all research participants is about the economic conditions and tight profit margins in the residential sector that result in a primary concern for cost and the bottom line. This theme is at the community level, which refers to the political, social and economic forces that influence local industry patterns and practices [Baron et al., 2013].

Cost and bottom line. Employer representatives described how current cost practices, pay structures, completion periods, low-profit margins in residential construction, and the competitive bidding processes serve as disincentives for safety. Roofing contractors, often paid by square foot, push for more speed. Respondents indicated that "*other contractors are not factoring fall protection into their bids, and this only serves to encourage all contractors to ignore it*." Worker and contractor representatives described

the emphasis on the bottom line and indicated decisions based on profitability have been magnified in recent years due to the struggling economy. All contractors in Philadelphia repeated the refrain "*time and money*" as the reason for a lack of safety culture and fall protection use on the job.

Workers stated contractors are most concerned about finishing the job as quickly as possible, with roofers describing how contractors underbid jobs by estimating an unreasonable number of workdays. "*With these contractors you work more than 10 hours a day, they want production, you are rushed. They just want to cash their check.*" Union roofers employed by companies that work in both residential and commercial roofing described the marked differences in the two sectors. In their view, commercial projects, which are longer jobs and have a general contractor, always promoted safety. In residential jobs, they felt the pressure to rush and take short cuts. "*In residential, you have to work faster to get more houses done. . .it's house, house, house, go, go, go.*"

Expert key informants concurred that cost factors are very influential in decisions made around fall protection. Several noted that the competitive marketplace pushes safety into last priority. "*Even if contractors know it's necessary, they are bidding jobs against people who aren't doing it, so [their] costs are a lot higher. . .. The bids are so close now, almost working for nothing.*" The cost of purchasing fall protection equipment itself is not the barrier, but rather the perceived additional labor costs that will result from using it. Several expert key informants described contractor and worker perceptions that safety systems slow down workers and the process. "*Given the nature of cut throat business, you don't want anything that may represent additional costs – and most fall protection systems are seen as slowing workers down.*"

Policy

At the policy level, the main theme is lack of enforcement, especially in the residential sector; another is inconsistency in safety regulations and OSHA policies in enforcing regulations.

Lack of enforcement. Workers and contractors described a general sense that no one is enforcing labor laws or making sure contractors follow regulations. Workers described that in addition to not providing safety training or equipment, contractors have not paid them on time, do not always pay minimum wage and do not offer rest breaks. Lack of enforcement allows contractors to operate with an emphasis solely on production, without feeling any pressure to follow safety guidelines or labor laws in general. San Francisco roofers described, "*There is no one to make sure that supervisors are complying. They get away with anything they want. Some of the contractors are fair and responsible but the majority is not. They don't even let us rest.*" Key informants described the benefit seen when OSHA targeted contractors for inspections in Philadelphia. Those who were cited were referred to PhilaPOSH for training as part of their settlement. These contractors later described that they had changed the way they work at heights because of OSHA's enforcement. Several said they had never heard of OSHA until the day they were cited, and expressed the belief that "*contractors are more concerned when OSHA is watching.*"

In the absence of a strong enforcement presence, contractor respondents stressed the importance of a "*strong stick*" to enforce basic requirements. They suggested partnering with workers' compensation carriers to establish specific requirements, such as a written fall protection plan or training, before insurance could be renewed.

Inconsistent safety regulations. Expert key informants agreed that regulations and enforcement impact use of fall protection. One noted that loopholes in existing regulations and changes in OSHA's enforcement practices deter its use. For years, residential contractors engaged in certain activities were exempt from conventional fall protection requirements. Under California's state plan, some trades have different trigger heights for the fall protection requirement. For example, roofers have a trigger height of 20-feet. When questioned about this, most expert key informants expressed that this was more of a historic artifact and not a valid protective measure.

DISCUSSION

Our findings indicate that workers, contractors and expert key informants identify economic and social factors as principal contributors to the risk of falls. The economic conditions in residential construction, coupled with a lack of enforcement and vulnerabilities of the foreign-born workforce, influence worksite conditions and contractor and worker attitudes about falls and their prevention. The social ecological model, which involves an analysis of factors that influence behavior at the intrapersonal, interpersonal, organizational, community, and policy levels, provides a useful framework to identify root causes and contributing factors. Our findings add to the understanding of how these factors shape attitudes and behavior on the job, help inform the types of changes needed at each level, and help explain why the use of fall protection is still not widely adopted in residential construction, despite the availability of evidence-based measures to prevent falls and the wide variety of fall protection alternatives available. In particular, the findings highlight the need for the development of interventions that target contractors who not only have the power to decide

what happens at the worksite but also the responsibility to follow safety regulations.

Workers describe job security as a primary concern. Other important themes were a sense of overconfidence, a personal responsibility for safety, the need to work harder and faster as immigrants, and a fear of speaking up. Although these attitudes are at the intrapersonal level, they are shaped by factors at the other levels, including the lack of positive safety culture at the worksite, contractors' demands for faster work, contractor retaliation, and the economic pressures in this work. Workers acknowledged that they find harnesses cumbersome, but they are also keenly aware that contractors are pushing for speed and that raising concerns about safety could result in not being hired again. Contractors stated that workers do not use fall protection, even when it is provided, but most of the non-union workers described not seeing fall protection equipment on their jobs. Findings suggest that there are times when contractors may provide the equipment, or have it in their truck, but they do not require or expect workers to use it.

Workers described falls as being an accepted outcome of their work, and yet the same workers talked about being able to avoid falls by being careful and having confidence in their abilities to work at heights. Some workers even described using a rope for protection. This may reflect a tension they experience in trying to justify or make sense of their situation at work, while also seeking protective measures that they view as realistic and within their control.

Small residential contractors perceive strong economic disincentives for providing and encouraging the use of fall protection, with a resulting lack of safety culture and safety messages on job sites, including little-to-no training or fall protection equipment. They are influenced by the narrow profit margin in residential construction, and the lack of enforcement of regulations provides an environment in which they can opt of fall protection measures with little consequence. There is a need for enforcement and other strong incentives to counteract the forces and attitudes driving contractors' behavior. The findings also point to the need for increased contractor training and resources, particularly for those very small contractors who may not recognize their formal role as employers.

Our findings are consistent with other studies that have found the need for work, production pressures, and foreign-born workers' vulnerability contribute to work environments that lack a positive safety culture or climate [Brunette, 2004; Dong et al., 2010; Roelofs et al., 2011; Arcury et al., 2013; Hung et al., 2013]. In this context where workers are not able to advocate for increased safety measures, studies have acknowledged the importance of reaching and influencing contractors [Ruttenberg and Lazo, 2004; Roelofs et al., 2011; Menzel and Shrestha, 2012; Arcury et al., 2013], yet very few interventions targeting small contractors have been developed.

LOHP and PhilaPOSH used the findings to guide interventions, focusing on exploring and developing partnerships with organizations that could provide incentives to address factors at the policy, community and institutional levels. Potential incentives suggested in this study include enforcement (fines and citations) and economic incentives (a discount in workers' compensation premium or rebate, or recognition for a strong safety program). Contractor participants said insurers could require certain measures before establishing or renewing policies, and/or provide rebates for those who comply with best practices. The role of workers' compensation carriers, contractor associations, and homeowners as third party influences is worth exploring. Two European studies have looked at the role of intermediaries to reach small businesses, including economic incentives through workers' compensation carriers. They conclude these are promising and reasonably effective [Hasle et al., 2009; Elsler and Eeckelaert, 2010].

Further research is needed on the impact of different types of incentives on residential contractors, as well as on the potential role of partnerships in the unorganized sector. There is a lack of research on the relative impact of incentives or of potential intermediaries in a construction setting, though there is evidence that partnership models promote increased effectiveness in dissemination and adoption of recommended behaviors [Coughlan et al., 2006; Wallerstein et al., 2008; Kreuter and Bernhardt, 2010]. Enforcement is an effective motivator to increase employer compliance with safety standards [House of Commons Work and Pension Committee, 2004; James and Walters, 2005; Baldock et al., 2006]. However, our respondents indicated that enforcement could be challenging on a broader scale with shortages of inspection staff and changing interpretations of regulations in the residential sector. An additional challenge in California is that even if there were adequate levels of enforcement, the existing trigger heights for fall protection in some trades, such as 20 feet for roofing, may not be as protective.

It is compelling that LOHP and PhilaPOSH's collaborative research yielded similar findings in different regions of the country. Study limitations include differences in participants, such as geography, union and nonunion, and sub-industry type. Focus group data collected from small residential union-contractors cannot be assumed to also represent the experience of their nonunion counterparts. We did not reach a level of data saturation that would allow for generalizability, and qualitative data drawn from focus groups has limited generalizability to larger groups. However, the themes that were generated support findings from other research with similar populations.

Increased adoption of fall protection measures in residential construction cannot be accomplished by solely targeting Latino construction workers. Further research is needed to better understand the relative effectiveness of

different types of incentives targeting contractors, the role of organizational partners such as workers' compensation carriers and contractor associations in engaging and influencing workers and contractors, and messaging to address worker and contractor concerns. Additionally, research is needed on the potential interest and role of homeowners as consumers to provide an economic incentive to contractors.

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