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Abstract

Small construction establishments are defined as those with fewer than 20 employees experience a disproportionate share of fatal work injuries and increasing rates of fatal-injuries. Reaching and engaging small establishments, and the vulnerable workers they employ, remain a challenge. To address this need, a community-based process targeting CPWR's Environmental Career Worker Training Program (ECWTP) was developed and tested in four U.S. metropolitan areas. At-risk individuals, including those working in small construction businesses, were surveyed regarding their specific safety needs. This process and related findings can be used to test and adapt evidence-based safety solutions developed by the CPWR Research to Practice Roundtable on Small Employers at Disproportionate Risk, as well as to expand the communication and

Key Findings

- x The process of using ECWTP community and organizational networks was not successful in reaching small construction businesses directly but was effective in reaching individuals from disadvantaged and

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and the workers they employ was developed and implemented to gain a greater understanding of their

Figure 1. Multiple Stakeholder Approach for Community-based Process to Reach and Engage Small Construction Establishments

Review of Study with r2p Roundtable

The r2p Roundtable regularly convenes to share study findings regarding the usefulness of various methods to recruit and engage small construction contractors. As an initial step, the study was presented to the r2p Roundtable prior to collection of data. With support from CPWR's Research to Practice Director, the study team met with the r2p Roundtable to formally present an overview of the study, including purpose, objectives, methodology, and potential synergy with r2p research efforts with small construction businesses and at-risk workers. The r2p Roundtable members served as subject matter experts and provided suggestions for improving study design and instrumentation. Individual meetings were conducted with Roundtable members who expressed interest in discussing the study in greater depth.

Two outcomes emerged from the r2p Roundtable discussions and individual meetings. First, based on suggestions from the members, minor modifications to the wording and format of the surveys were made (e.g., employee survey was revised from a short answer to checklist format; see Appendix A). In addition, r2p Roundtable members suggested three additional outreach meetings with colleagues.

Presentations and Recruiting with ECWTP Community Advisory Committees (CAC)

The ECWTP has its own extensive network of partners representing government (including workforce investment boards), community-based organizations, faith-based organizations, labor unions, potential employers, transportation departments, and other organizations, which assist in core functions of the ECWTP. The ECWTP has separate CACs, comprised of approximately eight to ten representatives, in each of its four communities. Each CAC has regularly scheduled board meetings in which members discuss community needs and ECWTP progress. With the support of the ECWTP Program Coordinators, formal presentations and discussions of the study, including purpose, objectives, methodology, and potential benefits of enhancing workplace safety in their communities, were conducted with CACs in each community. As detailed below, the process used to conduct each meeting varied slightly across the four CACs.

Problems Encountered and Changes to Study Methods

The COVID-19 pandemic impacted the program activities of the ECWTP, including the regularly scheduled in-person meetings with CACs. To follow COVID-19 protocols and ensure safety, in-person meetings were transitioned to virtual format, which caused scheduling delays. A formal extension of the study timeline allowed additional time to meet with the CAC members and resulting referrals in each city.

The CAC meetings for the ECWTP in Boston and East Palo Alto, California, were held using virtual technology (Zoom). The programmatic delays and interruptions due to the pandemic also resulted in restructuring the original process for presenting and gathering information from the advisory committees. Newly developed materials helped Program Coordinators follow up with CAC members to encourage participation (i.e., an additional round of outreach and personal contact with the CAC members via emails and telephone calls). While increasing complexity and time needed, the revised process produced additional interactions to gain support and trust often required for referrals to small construction establishments.

As conditions surrounding the pandemic improved, training centers began returning to in-person meetings, allowing for site visits and in-person presentations. Changes in COVID-19 protocols allowed for site visits and face-to-face meetings for the two remaining cities, New Orleans and Flint, Michigan. The session with CAC members in Flint was also live streamed to enable participation for CAC members not able to attend in person. The different meeting formats allowed for comparison of the virtual and in-person formats.

Regardless of format, no small contractor referrals were provided by the ECWTP CACs in any of the four cities. While the outreach did not generate referrals to the small construction businesses, the in-person sessions

Survey Administration to ECWTP students and program graduates

While the community-based process was not successful in gaining access to the small construction businesses, it proved quite effective in gathering information from the current and graduated ECWTP students who are training for and/or working in construction. The students who come to the ECWTP are unemployed and underemployed workers from underserved communities and are representative of at-risk workers from vulnerable populations typically employed by the small construction companies in their communities. The ECWTP students attending the final 2021-2022 training cycle (March 2022 through June 2022) were surveyed using an anonymous online evaluation regarding current worker safety needs: (Bost) 128906d02 6.12 0]TJ0.rE (i)-4.7 (o20 Tw-2 (g)6 (i)-4.6 (ho(n)10.9I

Years Worked in Construction

Respondents also provided information regarding their tenure working in construction (see Figure 3). The vast majority reported that they had worked in construction fewer than three years (84%). Several respondents had a slightly longer tenure of three to six years (9%), with a few indicating six to nine years (3%).

Figure 3. Years Worked in Construction Reported by Participants

To further examine these results, a one-way ANOVA was performed to determine if statistically significant differences existed between respondents' ratings of safety importance by ECWTP location (see Table 1). Results revealed there were no significant differences in mean ratings based on location of the ECWTP [$F(3, 66)=0.283$, $p=0.837$], suggesting shared perceptions of the high importance of safety to the average worker in construction nationwide.

Table 1. ANOVA of Safety Importance Ratings by Participants' ECWTP Location.

Respondent's ECWTP Location	N
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Greatest Challenges to Worker Safety

Respondents also identified all challenges to safety that construction workers face in their communities. As shown in Figure 8, the most often cited challenge to safety was **time pressure and emphasis on production** (60%) at the worksite. More than half of the respondents reported that **lack of safety training** (54%) was a challenge to safety for construction workers in their community. Respondents also cited **lack of support by coworkers** (28%) and **supervisors** (25%), **safety not being recognized as a priority** (25%), **lack of available equipment** (18%) and **difficulty in enforcement** (18%) impeded their safety. Interestingly, a small but meaningful percentage of respondents indicated the belief that “**construction is dangerous and nothing can be done to change that**” as the greatest challenge facing workers in their community.

Figure 8. Percentage of Challenges to Safety Reported

Note. N=70. Respondents could indicate more than one response.

Familiarity with CPWR

In addressing these challenges, respondents were asked to indicate their level of familiarity with CPWR. This question is particularly important given the importance of CPWR in the construction industry.

Interest in Learning More about CPWR

Overwhelmingly, the respondents indicated that they were interested in learning more about safety information and resources that CPWR provides (86%) (see Figure 10). It should be noted that this percentage includes those who already are familiar with the CPWR (i.e., respondents indicating familiarity with CPWR as shown in Figure 9). These results suggest an opportunity to share CPWR resources to enhance safety for both workers who have knowledge of existing CPWR information and resources as well as those who are unfamiliar with that material.

Figure 10. Percentage of Participants Indicating Interest in Learning More about CPWR

Note. N=71.

Additional Comments and Suggestions

The findings from the descriptive and comparative analyses provide evidence of the worker safety needs of the ECWTP students in their communities. To gain a more thorough understanding of why these results occurred, qualitative data were gathered.

Respondents were asked to comment about safety in construction businesses in their communities. Several themes emerged from the responses, and categories and comments are presented in Table 2 in order of frequency.

Respondents described specific examples about the importance of **safety knowledge and safety training** particularly for apprentices. The competing priorities of **emphasizing productivity versus safety** was also highlighted, with one respondent pointing out that “safety should be more important, because working in a safe area we can be more productive.” The **general importance of safety** for construction workers was also identified as a critical issue, ihig w

However, this process was effective in reaching at-risk individuals in underserved communities to assess their safety needs because the ECWTP has direct access to current and graduated students. Respondents to a survey of graduated and current ECWTP students in the four communities found that they were generally new to the field of construction (3 years or less), most often worked on sites with fewer than 20 workers, and were representative of the targeted, at-risk worker subpopulation. The respondents reported, on average, “ Extremely

Important”

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safety-related information (Sarpy & Stachowski, 2020; CPWR 2019b). This analysis could also examine the extent of outreach to those employed in small construction establishments. Related, tailored strategies for disseminating this information, such as safety nudges derived from behavioral economics, can combat critical safety challenges and related managerial decisions (e.g., prioritizing productivity over safety) (Sarpy, et al., 2022). Because these techniques are simple and cost-effective, they are a useful enhancement for resource constrained organizations in underserved communities such as those associated with the ECWTP.

A final consideration for future use of this study's process can be found in recent research on use of occupational safety training to assist in addressing the impact of climate change and accomplishing sustainability development goals (Burke, Sarpy, & Valenzuela, 2023). Working populations are often overlooked in the research studying the impact of climate change on human health, and as such, workers are aptly described as "the climate canaries in the coalmine" (Roelofs & Wegman, 2014; Levy & Roelofs, 2019). In response, frameworks have been advanced that describe several priority areas for enhancing worker health and safety in response to emerging climate challenges (e.g., greater understanding of impacts of exposure to extreme temperatures); (Schulte & Chun, 2009; Schulte, et al., 2016). Critical training needs of at-risk worker populations from low-income and disproportionately impacted communities are a priority area. Occupational health and safety trainings are a primary prevention strategy to address their emerging needs (Kiefer et al., 2017). Recently, an assessment of existing occupational health and safety trainings with respect to these emerging climate-related occupational hazards was conducted to identify critical training needs for at-risk workers, including those in construction (NIEHS, 2022). The process established by the current study offers a novel approach for systematically examining the training needs of this vulnerable worker population and tailoring effective community-based initiatives for addressing these needs. It should also be noted that the NIEHS ECWTP consortium is comprised of five other NIEHS grantees (Western Regions Universities Consortium; OAI, Inc.; Sustainable Workplace Alliance; Deep South Center for Environmental Justice/Texas Southern University; New Jersey/New York Hazardous Waste Materials Training Center) that also serve at-risk workers in underserved communities. There are

Dr. Sarpy, Mary Vogel (Program Coordinator, Boston ECWTP) and Steve Surtees are preparing a submission, which will present the findings of the present study as part of a larger presentation discussing enhancing retention of women in the trades (Town Hall Meeting), to the 2023 National Brownfields Training conference.

Dissemination plan

As previously described, the multi-stakeholder approach advanced by the present study was driven by a participatory closed-loop system (see Figure 1) to create synergy among practice and research partners, with each phase of the process relying on pa

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