

Presentation Title	Place in Schedule
Applying Total Work Health® Approaches in the dynamic construction industry	Plenary Session 4 <i>Day 3 – Thursday May 10th, 2018 11:15 – 12:00pm</i>
Description of Presentation	Presenter Name(s) And Credentials
<p>Problem Statement: The construction industry has specific challenges making Total Worker Health® (TWH) approaches both necessary and innovative. Specifically, the industry is a highly dynamic work organization with significant physical hazards. Construction workers have high rates of musculoskeletal disorders (MSDs), poor health behaviors and are at higher risk for all cause mortality compared to workers in other industries. The projects vary from large multi hundreds of million dollar projects to small residential projects where resources are very different. Workplace-based programs will have challenges affecting worker safety and health as workers come and go on a worksite as their skills/trade is needed for short periods of time. In addition, workplaces are multiple employer worksites with different companies and their employees working next to each other under the overall direction of a general contractor and owner. Several of the TWH Centers of Excellence have research projects in the construction industry documenting and addressing these challenges, each examining different aspects of the industry.</p> <p>Contrasting Prevalence of Health and Safety Risks and Controls between Residential and Commercial Construction Apprentices</p> <p>Ann Marie Dale, PhD, OTR/L, Healthier Workforce Center of the Midwest, Washington University School of Medicine, Saint Louis ,MO</p> <p>We conducted a cross-sectional survey among apprentice construction workers enrolled in a union training program, in order to test the hypothesis that apprentices employed by residential contractors would report higher safety and health risks, fewer</p>	Anne Marie Dale, PhD <i>Washington University School of Medicine</i>
	W. Kent Anger, PhD <i>Oregon Health and Science University</i>
	Jack Dennerlein, PhD <i>Northeastern University</i>
	Justin Manjourides, PhD <i>Northeastern University</i>

supports, and poorer health outcomes than apprentices in commercial work. 951 apprentices completed surveys; 44% were recently employed on residential projects. Preliminary results showed health outcomes were generally poorer among residential apprentices when compared to commercial. Residential workers more frequently reported missing days of work due to an injury (19% versus 11%; $p=0.001$), the presence of low back symptoms in the past month (70% versus 57%; $p<0.001$), and poorer mental health and physical health than commercial workers.

On scales from the Job Content Questionnaire, residential apprentices reported higher job demands (35 vs 33; $p<0.001$) and lower job skill scores (29 vs 30; $p=0.003$), but similar scores for supervisor support (12.5 vs 12.7; $p=0.24$) and job control (30.9 vs 31.5, $p=0.18$). Some traditional safety controls were less common on residential projects, for example required hearing protection (35% vs 66%; $p<0.001$) and ventilation controls (15% vs 38%; $p<0.001$). Safety climate scores using the Zohar scale were poorer on residential projects (68.4 versus 71.9; $p=0.009$). Nontraditional health risks showed higher rates of daily smoking among residential apprentices compared to commercial apprentices (31% vs 25%; $p=0.02$), and workplace restrictions on smoking were less common on residential projects (41% versus 67%, $p<0.001$). Some aspects of work organization were better on residential projects. Mandatory overtime was less common (6% versus 15%; $p<0.001$), worker commutes were shorter (34 versus 52 miles; $p<0.001$), and more residential apprentices reported having a daily work hour limit (46% versus 30%; $P<0.001$).

Early results show residential apprentices perceive their health as poorer and working conditions as more demanding with less

support from their employer, compared to commercial construction apprentices. Longitudinal follow-up of these cross-sectional study findings is ongoing. Our preliminary findings show disparities within an already hazardous industry, and highlight the need for interventions to target the high rates of traditional and non-traditional workplace hazards.

Organizational and Individual Intervention Methods that improved Total Worker Health® in Construction Workers

W. Kent Anger, PhD, Oregon Healthy Workforce Center, Oregon Health & Science University, Portland, OR

A 14-week Total Worker Health® (TWH) intervention was designed for construction supervisors and their work crews. The

intervention, conducted with participants from four companies, had two main components: (1) supervisor training to effect

organizational change and (2) scripted training to increase healthy lifestyles (12 topics) at the individual level. A sample of 22

supervisors completed computer-based training intended to increase interactions with and improve supervision of employees. This

was supported by practice applying the training through self-monitoring, or recording on an app, their team building and work-life

balance interactions, and their social reinforcement of targeted safety and lifestyle behaviors. The self-monitoring was conducted

for the 12 weeks following supervisor training with instructions to first apply the team-building comments and later the

reinforcement comments. The individual change methods were employed with 22 supervisors and 13 employees.

Participants

completed scripted safety and health education in small groups of 3-7 participants, with practice activity sheets that all individuals

could complete and return for a gift card incentive.

There were statistically significant improvements in knowledge following computer-based training (effect size, Cohen's $d=2.92$),

and scripted lifestyle training also produced increases in knowledge ($d=0.18 - 1.59$ for the 12 scripted topics); reaction measures revealed that the intervention components were considered excellent and useful. In standardized self-report surveys, supervisors reported increasing their family-supportive supervisory behaviors significantly ($p<.05$); the effect size was large ($d=0.72$). Other significant improvements included reported frequency of exercising 30 minutes/day ($d=0.50$) and muscle toning exercise (0.59), co-worker ($d=0.53$) and family healthy diet support ($d=0.59$), increased team cohesion ($d=0.38$), reduced sugary snacks ($d=0.46$) and drinks ($d=0.46$), increased sleep duration ($d=0.38$), and reduced objectively-measured systolic blood pressure ($d=0.27$). The results demonstrate that a comprehensive TWH intervention designed for construction crews can improve safety, health and wellbeing.

A Cluster Randomized Controlled Trial of a Total Worker Health® Intervention on Commercial Construction Sites

Jack Dennerlein, PhD, Harvard T.H. Chan School of Public Health, Center for Work, Health, and Wellbeing, Northeastern

University, Boston, MA,

We developed and evaluated a worksite based TWH program through a cluster randomized controlled trial on five pairs of construction worksites. The worksite program consisted of a six week ergonomics program addressing work practices used in accomplishing daily tasks followed by a five day Health Week consisting of health education and the ergonomics program. The ergonomics program trained both foreman and workers on simple ergonomic solutions for construction and implemented task preplanning procedure that generated solutions for avoiding soft tissue injury hazards. This was followed by a five day Health Week

that included on-site health education and encouraged workers to participate in free health coaching to change health behaviors.

Monday's messages was about making plans for improving health through health coaching, Tuesday's was about completing task

preplans and ergonomic simple solutions. Wednesday's was about diet and energy balance, Thursday's was about tobacco

cessation. Friday's messages returned to health coaching.

At follow up workers on intervention sites reported fewer new incidences of 12-month pain ($p=0.011$), increased physical activity (p

$= 0.0036$), and increased consumption of fruits and vegetables ($p= 0.044$) when compared to workers on the control sites. No

changes were observed for the conditions of work ($p = 0.18 - 0.30$). The qualitative data collection indicated that while health

week was successful in engaging workers and foremen, the implementation of the ergonomics program did not change work

practices. Key barriers identified included the capabilities of the subcontractors to implement ergonomic solutions and buy-in from

management including support by site supervisors and project managers.

While a one-week work-site health intervention appears to improve worker health behavior outcomes, the integration with a six

week program to change the conditions of work faced challenges. In the construction industry, exploring methods to change the

conditions of work and full integration needs to be further explored in order to overcome the challenges observed in this study.

Evaluating programs on dynamic construction sites: The effect of workforce mobility on intervention effectiveness estimates.

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Little is known about how mobile populations of workers may influence the ability to implement, measure, and evaluate health and safety interventions delivered at worksites. Using simulation models the Harvard Center has examined the effects of evaluating interventions on worksites where workers come and go, which may create a bias towards the null in these studies. A simulation study objectively measured both precision and relative bias of six different analytic methods as a function of the amount of mobility observed in the workforce. Those six methods re-analyzed a previously conducted cluster-randomized control trial involving a highly mobile workforce in the construction industry. As workforce mobility increases, relative bias in treatment effects derived from standard methods to analyze cluster-randomized trials also increases. Controlling for amount of time exposed to the intervention can greatly reduce this bias. Analyzing only subsets of workers who exhibit the least amount of mobility can result in decreased precision of treatment effect estimates. We demonstrate a potential 59% increase in the treatment effect size from the reanalysis of the previously conducted trial. When evaluating organizational interventions implemented at specific worksites by measuring perceptions and outcomes of workers present at those sites, researchers should consider the effects that the mobility of the workforce may have on the estimated treatment effects. The choice of analytic method can greatly affect both precision and accuracy of estimates.