



USE 2017

Understanding Small Enterprises Conference

Worker Well-being and Sustainable Business Health: From Ideas to Achievable Reality

Abstracts

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Ann-Beth Antonsson, PhD

IVL Swedish Environmental Research Institute

Lessons learned from good examples on how to improve occupational health and safety in micro and small enterprises

As a part of the European Sesame-project commissioned by the European Agency for Safety and Health at Work, good examples of policies, programmes, tools and strategies that have successfully contributed to improvement of occupational safety and health, OSH, in micro and small enterprises, MSE, have been described. The 45 good examples identified come from twelve European countries. The examples illustrate how different actions can be used to contribute to improvement of OSH in MSE. The good examples include: orchestrated actions, using complementary actions to encourage and support compliance with OSH regulations, increasing interest in OSH and awareness of OSH, strengthening the OSH infrastructure, through structures for provision of personal OSH support, OSH training for MSE, use of the value chain e.g. in order to use customer OSH demands as a lever for OSH improvements, integration of OSH with other business activities of MSE, different kinds of OSH tools, economic support to OSH improvements, OSH information and campaigns, authorities' methods for supervision of MSE. The good examples have been described and analyzed in order to answer the question: What works, for whom and under what circumstances (Pawson, Tilley 1997). It is discussed how actions to improve OSH can be adapted to the sector, the work practice, the size of the enterprises, the business relations such as B2B-market and B2C-market and education. It is discussed what kind of support is best fitted to support MSEs in improving their OSH conditions and OSH management. The analysis is ongoing and a report will be presented during the spring. The results will be further developed and discussed at the USE Conference. The results will discuss the following topics: how can policies, programmes, strategies, tools etc. be tailored in order to improve OSH in MSEs and fit different national contexts, fit different sectors, use the value chain and how this can be adapted to the conditions in different sectors. The analysis will also discuss what MSEs are reached by the good examples and which are not reached.

Cristina G. Banks, PhD

Interdisciplinary Center for Healthy Workplaces

Strategies for increasing participation rates in wellness programs

A project was undertaken to investigate how participation rates in wellness programs may be increased in small and medium-sized organizations. Numerous studies have revealed that participation rates in wellness programs are typically quite low (below 30%) and as such, the impact of wellness programs on overall employee health and well-being is disappointingly limited even when a wellness program generates significant improvement and an impressive ROI. The focus of

this project is to understand, based on scientific theories and proven techniques, what organizations need to do to obtain commitment to behavior change and secure high and long-lasting participation rates in wellness programs. The focus of this project is further sharpened by understanding how commitment to behavior change can be best achieved in small and medium-sized organizations where resources are scarce yet the problem is no less relevant. This work is a continuation of an initial project sponsored by the Transamerica Center for Health Studies in collaboration with Johns Hopkins University and the Institute for Health and Productivity Studies. That project examined scientific findings and best practices supporting the mitigation of 10 individual risk factors such as stress management, smoking cessation and physical activity which pose serious challenges to employee health and well-being today. By addressing the problem of participation rates, particularly for small and medium-sized organizations, we hope to increase the impact of promising wellness programs for all organizations, but most particularly to the widest segment of our economy. We will present the details of this project including (1) the results of two literature reviews – one on theories and principles of behavior change and determinants of decision to participate and the other on practices in real organizations that resulted in substantial participation rates and commitment to behavior change; (2) the results of focus groups conducted at small and medium- sized organizations where determinants of participation and commitment to behavior change are explored; and (3) general recommendations for small and medium-sized employers derived from this investigation.

Anca Bejan

HealthPartners Institute

Working successfully with small business owners: results and lessons from the Collision Auto Repair Safety Study (CARSS)

Objectives: CARSS was designed to assist small business owners to understand and improve safety and health conditions in their shops.

Methods: Workplace health and safety evaluations were conducted at baseline, after 1 year, and after 2 years. Assessment was done using a 94-item survey. The results were communicated to shop owners in a written report. Strategies to help owners accomplish their goals included: written shop improvement plans, quarterly check-in by phone, shop visits, periodic reminder postcards, newsletter, and on-going safety and health assistance with questions related to regulatory compliance. Owners had access to a study website that include narrated training modules on hearing and eyesight protection, respiratory protection, isocyanates, respirators, solvents and acids, and fire safety. Owners could choose to assign these on-line modules to their employees or request a hands-on training session conducted by a study industrial hygienist.

Results: Forty-nine shops received baseline assessments, and 33 were visited

for both the 1- and a 2-year follow-up. At baseline, these 33 shops had 40-81% items present (mean=55% items, SD= 10%). After 1 year, shops had 60-81% items present (mean=73% items, SD= 11%). After 2 years, shops had 63-89% items present (mean=73% items, SD= 9.5%). The largest improvements were in the following areas: respiratory protection (baseline-- 43%; year 1-- 81%, year 2-- 75%), safety in the shop (baseline-- 40%; year 1-- 70%, year 2-- 65%), and personal protective equipment (baseline-- 60%; year 1-- 81%, year 2-- 75%). All improvements from baseline to year 1, or baseline to year 2 were statistically significant ($p < 0.05$). The only significant changes between year 1 and year 2 were in the areas of personal protective equipment, respiratory protection, and compressed gasses.

Conclusion: Results indicate that most business owners were able to implement and maintain health and safety improvements during the CARS study. Keys to the success of this intervention were: establishing a partnership with the local business association; conducting preliminary activities to gain insight into shop owners' and workers' knowledge and attitudes towards safety, building relationships with owners, employees, and regulatory authorities; and, being creative in designing and offering incentives throughout the study.

Eileen Betit

The Center for Construction Research and Training (CPWR)

Leveraging an Evidence-Based Approach to Communicate Safety and Health Information to Small Employers and their Employees

Construction contractors and workers are notoriously difficult audiences to reach. The industry is complex, hazardous, and decentralized. The majority of construction employers are small business with 10 or fewer employees. Those employees are diverse and highly mobile, frequently working for more than one employer in a given year. Small construction employers are more likely to have limited resources and occupational safety and health knowledge, making it more difficult for them to provide appropriate training to their employees. Further, safety and health knowledge shared and work practices used on one jobsite may not be transferred or reinforced on the next. These industry conditions create challenges for communicating critical safety and health information to contractors of all sizes, but particularly to small employers and their employees, who are often at greatest risk. Toolbox talks that are easily accessible and responsive to the needs of both large and small contractors have been identified through industry surveys as a valuable mechanism to better communicate safety messages to construction employers and their employees. Early research on toolbox talks conducted by NIOSH identified a format responsive to the industry's needs, and dissemination efforts undertaken by CPWR-The Center for Construction Research and Training in collaboration with NIOSH have documented their potential reach and influence. New research is building on these early efforts to increase our understanding of how toolbox talks,

both alone and when used in conjunction with an innovative adjunct training tool, impact OSH knowledge among employers of vulnerable workers.

Colleen Brents

Colorado State University

Application of inertial measurement units to evaluate low back kinematic demands of keg handling tasks in microbreweries

A 3D motion capture tool assessed low back kinematic demands in keg maneuvering tasks of microbrewery workers. Workers were studied directly in the field using wireless inertial measurement units (IMUs), with each sensor containing a tri-axial accelerometer, gyroscope, and magnetometer. Linear and angular acceleration data from the sensors, subject-specific anthropometrics, and a biomechanical model generated a full 3D kinematic model of the worker.

Low back pain is responsible for 40% of occupational musculoskeletal disorders annually. Discrepancies between spinal measurements conducted in a lab versus the field exist due to logistics and equipment limitations. IMUs present an opportunity to record low-back motions in either environment. Field measurements are crucial for studying occupational health and safety and understanding how the body responds to the actual work conditions. The researchers collaborated with a local, independently owned microbrewery in northern Colorado. Between 1983 and 2016, the number of craft and microbreweries increased 400-fold (from 20 to 4000) with 20% of this growth happening within the last three years. To keep up with production demands from rapid growth, workers are exposed to high physical demands in breweries by handling kegs, a beer transport device. Breweries often implement a keg- reuse-recycle system with distribution partners. Kegs are returned from distributors with different amounts of residual beer. Workers who repeatedly lift and handle the kegs are exposed to unpredictable weights, which can pose a risk for developing musculoskeletal disorders, especially in the low back. It is hypothesized that low back kinematics and production efficiency will differ with respect to keg weight. To the authors' knowledge, this is the first study to assess low back kinematic demands during keg maneuvering tasks in a microbrewery. This work is supported by the MAPERC. There are no conflicts of interest.

Kultida Bunjongsiri

Griffith University, Australia

The critical success factors to Eco-industrial park projects in Thailand: a case study of Saha Group Industrial Park, Sriracha, Thailand

The Eco-industrial park (EIP) emerges from the concept of industrial ecology concept. This theory compares industry with natural ecology: a linkage between

partnerships enables each partner to use the others' by-products and waste products. Most industrial parks in Thailand are at a very early stage of development of a sustainable approach. The Ministry of Industry through the Department of Industrial Works (DIW) developed indicators for an Eco-industrial development, covering the 5 dimensions of an effective industrial part, namely physical, economic, environmental, social and managerial. Although the development of EIPs is a good sign that Thailand is moving toward industrial ecology, the EIP concept mentioned above focuses strictly on a few factors only such as by-product exchange and waste management, leaving out the other factors in the environmental pillars. Unfortunately, there has been no action plan to achieve progress in developing sustainability in an EIP in Thailand. In this paper we look at using health and safety from the environmental pillar to evaluate the effective implementation of EIP in a potential industrial park (Saha Group Industrial Park, Sriracha). Data was collected by survey questionnaire in the occupational health and safety sections of the 44 businesses in 2014. Four critical success factors to succeed in EIP projects were found. First, Policy and political factors: incentives-based regulatory framework and continual improvement in environmental performance are two of the most valuable motivations to be considered. Second, personal factors: commitment and support from top management of IP plays an important role in influencing the success in almost any initiative within an organization. Third, Community/Local Government agencies factor: as a support agency, local government has a key role to realize the national government policies in local communities and enterprises in the service area but it still has some difficulty to achieve the goal of sustainability: limited manpower, funding and technical support. Fourth, Technical and knowledge factor: technical training in EIP is a part of good practice and should include training staff appropriately. The purpose of training is to improve knowledge, skills and attitudes that encourage the IP to increase their ability to reach the EIP target.

Garrett Burnett, MS, MBA

National Institute for Occupational Safety and Health (NIOSH)

Improved safety tools for small enterprises through lean startup

Five major attributes combine to define small enterprises as “small.” Beyond mere employee head counts, smallness often reflects a dearth of slack resources that can be committed to safety, the dominant role of the owner, a sense of newness and lack of entrenched safety culture, isolation from peer networks, and a distorted perception of risk. Small businesses can be subdivided and targeted for interventions based on industry-related or economic demographics. They can be surveyed for readiness to adopt different tools or interventions.

However, an understanding of small business needs and niches or even a business that is primed for adoption doesn't guarantee the successful transfer of an. When adoption and impact are the end goal, health and safety entities can implement a variety of models for ensuring that a product or solution meets a business's needs.

This presentation describes the application of Lean Startup methodologies to the creation of a digital tool designed to improve safety and health practices among small construction businesses: The Virtual Safety Consultant.

The Virtual Safety Consultant was born from the need to make research generated by the National Institute for Occupational Safety and Health accessible to small enterprises, which tend to be more vulnerable than their larger counterparts. The project involved collecting NIOSH's body of research and iteratively validating the product with actual users—small enterprise owners. The minimally viable product we created allowed us to regularly test our assumptions of customer needs before committing full resources toward building features that users did not truly want. This case study provides a real-world approach to developing OSH products for niche markets using modern entrepreneurial approaches.

Jaime Butler-Dawson

Center for Health, Work & Environment, Colorado School of Public Health

A Longitudinal Evaluation of Kidney Function and Sustainable Indicators in Small Brazilian Metallurgical Enterprises

Background: Observed rates of chronic kidney disease (CKD) have been increasing in Central America over the past two decades. Rates have been highest among younger male sugarcane workers. The disease and associated risk factors have not been thoroughly studied. **Objective:** To investigate specific behaviors and exposures, including dehydration and heat stress, related to sugarcane work and their association with acute kidney injury (AKI) and CKD, among sugarcane workers in Guatemala. **Methods:** Kidney function of 521 sugarcane workers was measured across three daily work shifts during a six-month harvest. In addition, urine samples and occupational and non-occupational risk factors were collected. Multivariate regression analyses were used to assess predictors of AKI and a decline of estimated glomerular filtration rate, eGFR, during the work shift and across the harvest. **Results:** At the first data collection time-point, 8% of the workers experienced an AKI and 11% of the workers were dehydrated at the end of the work shift. We will present our findings on risk factors for having an AKI and reduced kidney function. We will also present our recommendations that were provided to the sugarcane company as a result of this study. **Conclusion:** The study advances our knowledge of risk factors for reduced kidney function and identifies factors that put individuals at risk for the development of CKD. Findings will potentially lead to future interventions designed to reduce morbidity and mortality from CKD in vulnerable populations around the world.

Sandrine Caroly

Pacte Laboratory, University of Grenoble, France

Coordination between stakeholders to improve the risk prevention in MSEs: case studies in transport and construction programs

Objectives: The aim is to describe the coordination between OSH advisors and professional organizations to develop good practices in risk prevention in MSEs, which they are often not demanding. The business market is a higher priority. The problematic is how the motivation of owner- managers can be developed to have an integrated OSH management in real activity. We will explore a determining factor: the role of the coordination of stakeholders in the network to create program.

Method: This study in French context is part of the work package 3 (WP3) of the Sesame study, financed by the EU- OSHA. We compare two networks with different OSH intermediaries that developed risk prevention actions in MSEs adapted to both sectors (road transport and construction). We made collective interviews (2) with the leader of each program, completed by individual interviews (4), the redaction of a case study (2). We did also discussion groups during the dialogue workshop (1).

Results: The program of the Social security and its OSH strategy in France defined the target group to reach. The program is to creating tools related to the needs of MSEs. In the road transport program, the network is issued from the coordination of public OSH institutions, a regional prevention service and several partners. OSH advisors have difficulties to directly contact owner-manager. The kind of support offered by the network is the training of counselors, information about an online risk assessment tool, financial subventions about material's equipments, e-learning for training tutors of young apprentices. The construction sector program is directly composed by a research and professional association. It was initiated by representative of both professional associations. The collaboration between different partners offer various support to help MSEs: advices for safer equipment, tools to make the risk assessment, an online training about safety.

Conclusion: In both cases, the promotion of advices is given by professional partners. Their contribution is a key factor to develop OSH practices in companies. The cooperation between professional organizations and OSH advisors is necessary to develop a proactive approach. Furthermore, the required written risk assessment document determines the dynamics of MSEs in risk prevention.

Danièle Champoux, PhD

Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST)

Building a case for SB-specific OHS research and intervention priorities in Québec

Approximately 95% of the 255,989 business locations counts in Québec were small businesses (SB) with 49 employees or less in 2015. These businesses employed 33,1% of the active labor force of 4,448,300 in 2016. International research has documented a relatively higher rate of accidents and illnesses and difficult return-to-work (RTW) in SBs. OHS compensation and RTW data in Québec do not document business size however, and the influence SB employers and employees on priorities, services and interventions is limited. Meeting pertinence and priority criteria required for planning and funding prevention and RTW intervention within Québec's OHS system requires other data and other strategies. The cumulative results of quantitative and qualitative research to put together a picture of SBs are first summarized. Selected results from the secondary analysis of a provincial survey data confirming significant differences between employees of SBs and larger businesses for work conditions, indicators of job quality, as well as limited documented health effects, are presented. In addition, new results from qualitative research reveal the compounded difficulties faced by vulnerable workers in the RTW process, particularly in SBs. Despite the limits of the data, selected subgroups of SBs workers are shown to be overexposed to various hazardous conditions, and non-unionized, immigrant and linguistic/ethnic minority workers faced with difficult RTW processes are disproportionately found in SBs. Employment and work conditions in the businesses themselves, characteristics of the workers, and conceptions and practices within public OHS agencies are found to be common denominators for prevention and RTW research perspectives. The results and limits are discussed in relation to international research on intervention in SBs. While recognition for the particular needs of SBs has progressed significantly within Québec's OHS system, efficient and sustainable strategies for both prevention and RTW are sought. In addition to a continued search for innovative quantitative data, strategies targeting internal and external factors for prevention and RTW interventions in SBs are considered. Collaborative efforts in putting together a SB-specific research and intervention funding program, as well as in building support from partners and parties, are described.

Laurie Cluff, PhD

RTI International

Understanding small enterprises from the workplace health in America survey

The Centers for Disease Control and Prevention (CDC) launched the Workplace Health in America Survey in late 2016 to measure a broad range of employer health-related programs, policies, and environmental supports from a national sample of employers representing all sizes and industry groups. We designed the

sample to include 90 percent small employers (10-99 employees) so that it would be representative of the percentage of small employers in the U.S. economy. We will present early findings describing the organizational structure, capacity, and design of worksite health promotion programs in small enterprises across the U.S. This presentation will directly address the extent to which these small enterprises are investing in worker well-being and how they are prioritizing their efforts. The Workplace Health in America Survey covers programs and evidence-based strategies addressing physical activity, nutrition, weight management, tobacco, lactation, musculoskeletal disorders, and the emerging issues of substance use, stress management, and sleep. The survey includes work-life policies, barriers to program implementation, occupational health and safety, and the integration of health and safety initiatives. Employers are also asked about level of leadership support for health promotion, use of data to inform planning, and the extent to which their worksites have a culture of health. We will present national estimates describing the prevalence of workplace health programs and evidence-based strategies in small enterprises. We will describe the barriers small enterprises rated as the most challenging to implementing health promoting initiatives. We will also share the training and technical assistance topics small enterprises selected as being most useful to promoting employee wellness and safety.

Thomas R. Cunningham, PhD

National Institute for Occupational Safety and Health (NIOSH)

Assessing the potential for occupational safety and health assistance among small construction firms

Small construction businesses (SCBs) account for a disproportionate share of occupational injuries and fatalities among industries in the US and other modern economies. Compared with larger firms, SCBs have limited time, personnel, and financial resources available for occupational safety and health (OSH) activities. In firms with fewer than 10 employees, owner managers' OSH related values and practices are key drivers of safety and business outcomes (Hasle et al 2011, Warren 2009). The purpose of this study was to examine small construction business owner/managers' language in terms of both its referential or designative 'content' and with an eye to its more constitutive- enactive effects to discern and compare differing standpoints or positions along a continuum of safety consciousness and practice. In depth semi-structured interviews elicited 30 SCB owner manager accounts of 1) the role and meaning of occupational safety and health within their trade and company, 2) injuries, incidents, or near misses experienced and the reaction to those, and 3) attitudes and inclinations towards improving or enhancing business safety practices. Respondents' self-ratings of safety program activity on a 5- point scale from unaware or ignorant ("haven't thought about it at all") to actively vigilant ("well-functioning safety and health program for at least 6 months") were examined for similarities and differences in safety-language use across the 5 levels. Focusing

on the ways in which safety talk constitutes its objects (error, agency, responsibility, risk, etc.) and enacts safety-related rationalities and positions within different interview-conversational and discursive contexts, and borrowing from normative and stage theories of safety culture and behavioral change [Categorization of Value for Safe Work Environment (Hasle et al 2011); Attitude towards regulation (Vicker et al 2005); Safety Culture Formulation (Hudson, 2007); Stage of Change Formulation (Prochaska & DiClemente, 1983)], we categorized these sometimes contradictory discourses and utterances along a safety culture continuum. Results indicated clear differences in concordance between self-rating of safety activity and researcher-derived ratings of safety culture based on interview content. There is potential value in assessing readiness for OSH assistance among SCBs; however, more work is needed to develop assessment methods that accurately reflect small enterprise decision-makers' assistance needs.

Kelsie L. Daigle

Colorado State University

Parental leave and return to work: understanding decisions to take parental leave, breastfeed, and return to work among working parents

Working pregnant women have to decide when they will take parental leave, how much time they will take off, whether and how much work to engage in while on leave, and when to return to work, if they choose to do so (Fisher, Valley, Toppinen-Tanner, & Mattingly, 2016). There are many workplace factors that affect these decisions and experiences of pregnancy, motherhood, and worker well-being (Fisher et al., 2016; Spitzmueller et al., 2015). In this presentation, we will describe the development, execution, and results to date of a new longitudinal study called the Working Parents Longitudinal Study. This study is comprised of one survey among pregnant working women and their spouse/partner conducted during pregnancy and up to four surveys post-partum. Results will inform how and why work events and experiences shape women's breastfeeding intentions and continuation, their decisions to engage in work-related behaviors while on leave, their sleep, and the process of whether, when and how to return to work. We will also examine whether their spouse/partner will take parental leave and their experiences with combining work and parenting roles. Additionally, our study will examine how organizational size is related to parental leave policies and practices because workers in small enterprises are less likely to have access to formal family-friendly benefits and policies. This study is most relevant to the topic of Workers and Their Families. It is important to improve pregnant women's health while simultaneously sustaining businesses by ensuring that women who are valuable workers are supported enough to return to work and remain with the organizations post-leave. This research could inform the development of practical interventions appropriate for small business settings, such as those related to supervisor training and human resource practices pertaining to parental leave, in addition to community

public health efforts, such as breastfeeding education. The results will also have implications for public policy reform related to family/medical leave policies at the organization, state, and federal levels. We will integrate our results with extant occupational health literature and aim to inform the future of occupational health and worker well-being practice and research in small businesses.

Ann Marie Dale, PhD

Washington University School of Medicine in St. Louis

Exploring self-reported availability and use of workplace policy and health supports among employees of small and large businesses in many industries

Purpose: Small employers have few resources to provide health-related policies and programs. This study explored the availability and utilization of workplace policies and health supports in small and large businesses across a variety of industries in Missouri.

Methods: Interview data from 2,015 Missouri workers included information on availability and use of 16 workplace supports related to health education, wellness initiatives, environment, and policies. We defined three employer size groups by overall company size and work location, with “small” defined as fewer than 100 employees: small company/small location (SS); large company/small location (LS); large company/large location (LL). We used Poisson regression models to examine the prevalence of supports (availability and use) by employer size, industry, and demographics (age, gender, BMI).

Results: Employer size groups (company/location) were: 20% SS, 28% LS, and 53% LL. Supports were more often offered in large companies (23%-92%) than LS (13%-68%), and least often offered in SS (8%-52%). There was no difference in availability of workplace policies by employer size (breaks for physical activity; flextime for breaks). When offered, small business employees used supports more often than those in large locations, particularly some environmental supports (indoor exercise 53% vs 37%; and shower facilities 30% vs 18%) and wellness initiatives (free/reduced gym memberships 49% vs 22%). Some industries offered few supports (food service, blue collar trades, and other services). Regression models showed use of supports was often associated with company size. Models showed differences by industry and demographics for some supports.

Conclusion: Employer size is strongly associated with availability (greater for large companies) and use when offered (greater for small businesses) of workplace health supports. Small business employers may see greater health benefits for their workers by increasing the number of supports offered. Interventions designed for small business should be tailored to the industry and demographics of the workforce as well as considering the limited resources in time and money of most small businesses. Large companies with small work locations may benefit from the

social networks of small businesses backed by resources of large companies.

Hilde De Raeve, MD, PhD

Groep IDEWE

Safety visits to small private day care for babies and toddlers

Background: Many parents rely on child care when they go to work. They can opt for small private day care i.e. family care in which childminders take care of babies and toddlers in their own home. These childminders and their homes must meet minimal requirements which are evaluated by the childminding service 'Vlaams welzijnsverbond'. In this study the childminding service collaborated with Group Idewe, a Belgian external service for prevention and protection at work, to execute the safety visits.

Methods: In 2016 childminders were visited by trained prevention experts. They used the online risk-assessment tool "BRIE (i.e. Better Risk Inventarisation and Evaluation) which guided them during the visit in scoring 142 predefined items regarding: outside area (n= 10 items), toy safety (n=11), sleeping room (n=15), safe operations (n=8), nursing room(n=7), indoor play area (n=14), kitchen (n=22), stairs (n=8), storage/ basement /garage (n=10), indoor climate (n=5), access to the house (n=6), sick child policy (n=12), miscellaneous (n=14). All assessed items were scored with OK or NOK. After each visit, the childminder received an overview of the main risks and preventive measures to reduce them. Descriptive statistics summarized the data with SPSS statistics v19.

Results: 657 childminders were visited in 2016. They scored OK in 78.4 % of the items regarding outside area and in 72.9 % of toy safety items. The following table shows all assessments.

Assessment % OK

1. Outside area (10 items) 78,4
2. Toy safety (n=11) 72,9
3. Sleeping room (n=15) 77,8
4. Safe operations (n=8) 88,2
5. Nursing room (n=7) 79,6
6. Indoor play area (n=14) 86,0
7. Kitchen (n=22) 75,8
8. Stairs (n=8) 73,7
9. Stor/bas/gar (n=10) 71,1
10. Indoor climate (n=5) 89,2
11. Access to house (n=6) 79,3
12. Sick child policy (n=12) 87,1

Conclusion: Although the safety of toys and living quarters in small private day care

scored good, there is room for improvement since we are evaluating items that can compromise safety of children. Therefore, after detection of the problematic items with BRIE, they will be addressed with targeted preventive actions.

Caitlin DeClercq, MS

Interdisciplinary Center for Healthy Workplaces, University of California, Berkeley

Designing the healthy office: user perceptions and solutions

Research in architectural programming and environmental psychology has illuminated the rich and complex relationship between people's psychological states and the built environments with which they interact. Further, a burgeoning literature about healthy office design (c.f., Singh et al., 2010; Gray & Birrell, 2014) has attempted to identify ambient environmental factors most closely associated with positive employee health outcomes. Informed by interdisciplinary research, the Healthy Workplaces Model (ICHW, 2015) articulates nine essential psychological states that underpin worker well-being. Central to this model is the idea of positive emotions, which "broaden the scopes of attention, cognition, and action and... build psychological, intellectual, and social resources" (Frederickson, 2001, p. 220). The Interdisciplinary Center for Healthy Workplaces (ICHW) articulates seven drivers—psychological or physical conditions in workplace environments—that foster employee need satisfaction: comfort, connection, equity, flexibility, predictability, privacy, and safety. To elaborate these drivers, we facilitated focus groups on the UC Berkeley campus comprised of undergraduate students, who represent the youngest generation in today's workplaces. First, we asked participants to define each driver in their own terms in order to elicit a range of personal meanings and psychological associations. Then, we asked them to articulate, using words and images, the qualities and elements of built office settings that would promote these multi-faceted associations. For example: What does it mean for an office to be predictable? How would it look and feel? By asking participants to leverage their experience and creativity toward envisioning new ideas for office design, we identified a range of design hypotheses that can inform workplace evaluation and programming.

In this oral presentation, I will present our findings regarding: (1) the associations that people have with a given element of office design—such as access to nature or the use of vibrant colors—which can complement and extend what we know from the literature about the positive implications of these elements; and (2) proposed operational and design interventions that can aid small organizations in creatively and successfully ensuring occupational health and safety.

Josefina Flores Morales

University of Wisconsin – Madison

Legality and ways of reconciling health (in)access among Mexican migrant micro-entrepreneurs in a Los Angeles flea market or “swap-meet”

A large portion of the undocumented community is overtly excluded from the Affordable Care Act (Sommers, 2013). Not surprisingly, undocumented migrants have lower odds of visiting the doctor and having a usual source of care (Bustamante et al., 2012) and thus, show signs of being under or uninsured. Might migrants with such circumstances take their health into their own hands? Little is known about how those who are self-employed and of varying legal statuses gain or reconcile the lack of regular healthcare access. The present study interrogates: a) How Mexican migrant micro-entrepreneurs in flea markets or “swap meets” of varying legal statuses access healthcare, and/or other well-being services? b) How do they perceive their healthcare access? and c) Does this vary by legal status? This population is especially fitting for exploring healthcare access because of the lack of formal employment-based insurance.

I will conduct an ethnographic study during the summer of 2017 by conducting bi-weekly visits to a swap meet in Southern California as a vendor. My intent is to continue these visits throughout the next couple of years. I utilize Brofenbrenner's (1979) ecological framework in order to understand how micro-systems (interactions), meso-systems (families, work), and exo-systems (institutions, policies) act and influence the healthcare access but also the alternative options individuals choose to care for their health. Additionally, this study will use Yosso's (2005) concept of community cultural wealth, a response to conceptions of social capital that portray communities of color as deficient in capital, to acknowledge the resilience and strength of individuals in order to engage the ways in which Mexican migrants that might be uninsured or underinsured make up for such their potentially precarious healthcare access. Last, I will explore the occupational histories of individuals as well as their past health status, a strategy that is underutilized. It is important to note that, similar to how legality is not fixed (Abrego, 2014), health insurance may not be either. Thus, individuals may carry histories of employment, legality as well as health access that may provide rich in-depth detail to workplace and healthcare access of Mexican migrants. Moreover, exploring individuals' health and employment retroactively may bring to light the inextricable nature of past health access and job history. Last, this study holds critical implications for healthcare access as well as alternative sources of care among the Mexican workforce.

Michael Flynn

National Institute for Occupational Safety and Health (NIOSH)

Identifying and addressing overlapping vulnerabilities in small business

The U.S. workforce is undergoing dramatic shifts that place some workers at an increased risk for occupational illness and injury. Companies must face the challenges associated with these changes to remain effective, competitive and safe. Social dynamics such as race, class, and gender; economic trends such as the growth of the temporary workforce and the increased reliance on immigrant workers; and organizational factors such as business size can all contribute to the greater vulnerability of some workers to workplace illness or injury than others. This presentation explores how the combination of risk factors may result in overlapping vulnerabilities for workers such as young immigrants in the construction industry. It presents a conceptual model for understanding how the vulnerabilities interact when a worker belongs to multiple vulnerable groups and discusses the efforts needed to address and reduce the pervasive and persistent occupational health disparities experienced by vulnerable workers. As such, it represents a more comprehensive approach to understanding different risk for exposure to occupational hazards. It relates to the conference theme of “Sustainable Business Health: from Ideas to Achievable Reality” it that the model provides us with the ability to better account for and address the multiple social factors that contribute to increased rates of injuries and illnesses among workers from certain groups. This is especially important for small businesses as they frequently employ workers with multiple vulnerabilities and do not have the same level of resources as larger firms to address these complex social dynamics. Researchers and safety professionals will be better able to effectively assist small business owners in protecting workers if they are aware of and account for these factors when they design and implement safety programs and OSH interventions.

Yesuneh Gizaw

Wolaita Sodo University

Assessment of the relevance and impact of promoting marketable skills for the informal sector implemented in Addis Ababa, Ethiopia

Concern World Wide Ethiopia (CWWE) received a grant from European Union (EU) to implement Promoting Marketable Skills for the informal sector in selected Woredas of Addis Ababa City Administration. Six Woredas from three sub-cities were selected to assess the performance of the project using evaluation criteria; relevance and impact. Survey, Key Informant Interview (KII) and Focus Group Discussion (FGD) were conducted to gather primary data and reports of the project were utilized for desk review. The study indicated that the project was found relevant in addressing the identified needs of the target group. Over 60% of the participants responded that the project was relevant to their interests, previous

experiences and the demand of the labor market. 86% of the study participants indicated that the skills acquired through the training were relevant to the job market. The result of the study revealed that the impact of the training on the trainees was very positive. Over 91 % of the study participants indicated that their competence has improved as the result of the training. Over 61% of the survey participants indicated that their life has been changed as the result of the training. Furthermore, 55% of the study participants indicated that they were employed or manage their own business.76% pointed out that there is significant income difference after the training. Their income ranged from Birr 500 – 2000 per month.

Katie Haas, MPH

Eagle County Public Health and Environment

Healthy communities are good business – a public health approach for leveraging worksite wellness to tackle community health challenges

Eagle County Public Health and Environment (ECPHE) has identified worksite wellness as one avenue for improving broader community health goals. ECPHE led the development of regional partnerships, currently called the WorkWell Collaborative, to bring a coordinated approach of support for employers on the topic of worksite wellness to the communities in Colorado’s Economic Development Region 12, which is comprised of Pitkin, Eagle, Summit, Grand and Jackson Counties. The primary economic drivers in Region 12 are recreation-based tourism, hospitality, construction, and agriculture. Worksite wellness was prioritized due to the many challenges employees across the region face, including long commutes, a high cost of living, and limited growth opportunities. Employers have cited challenges with employee retention and low morale, as well as high insurance costs. The WorkWell Collaborative is dedicated to reducing these barriers by increasing the capacity of employers to support the unique health needs of their employees through Health Links Advisor support, local trainings and developing strategic partnerships. In addition, ECPHE and WorkWell Collaborative partners have been dedicated to broadening the definition of worksite wellness to include a more comprehensive and holistic approach, which includes bringing awareness to employers for how to better meet the wellness needs of the most underserved employees in organizations. This session will describe 1) the development of key partnerships to across a five county region to support employers with worksite wellness, 2) how ECPHE leveraged relationships and partnerships with the business community to help meet community health goals such as mental health and substance use, and 3) how it made the business case to organizations that healthy communities are good for business.

Brenda Jacklitsch

National Institute for Occupational Safety and Health (NIOSH)

Total Worker Health in childcare centers: preliminary results from a community-based model

This ongoing study conducts parallel community-based activities in two geographically-close regions. Preliminary results from one region and sector, the Northern Kentucky childcare centers, will be presented. The study collected and analyzed data about the perceived cost/benefits of the Total Worker Health (TWH) approach using a two-level (community organizations, employer), pre-test/post-test measurement method. Data were collected from community organizations that work with or serve small business childcare centers assessing their perceptions of the TWH approach as a potential service for them to offer. Community organizations collected and analyzed data about the perceived cost/benefits of TWH as perceived by childcare centers (employer level) in Northern Kentucky. Sample TWH information and services were used to incentivize employer participation. Perception data were collected and analyzed after a period of provided wellness and safety and health services. The study will use this analysis and others to develop a model for TWH diffusion to small businesses. Based on this research, NIOSH will work with community organizations and small businesses to design a model for implementation of TWH services, using a Diffusion of Innovations approach that takes into account the motivations and resources of both small businesses and community organizations. While data analysis is still in process, preliminary results will be presented from our interactions with community organizations and their interactions with childcare centers in Northern Kentucky.

Brenna Keller, MPH

National Institute for Occupational Safety and Health (NIOSH)

Overlapping vulnerabilities and immigrant safety training in small construction firms

Introduction: Collaborative efforts between the National Institute for Occupational Safety and Health (NIOSH) and the American Society of Safety Engineers (ASSE) led to a report focusing on overlapping occupational vulnerabilities, specifically small construction businesses employing young immigrant workers. Following the report, an online survey was conducted by ASSE with construction business representatives focusing on training experiences of immigrant workers. The results, which highlight some of the challenges a vulnerable worker population faces in a small business, can be used to better focus intervention efforts.

Results: Results were grouped by business size (50 or fewer employees or more than 50 employees). Smaller businesses were less likely to employ a supervisor who speaks the same language as immigrant workers ($p < .001$). Immigrant workers in

small businesses received fewer hours of both initial safety training ($p=.005$) and monthly ongoing safety training ($p=.042$). Immigrant workers in smaller businesses were less likely to receive every type of safety training identified in the survey (including pre-work safety orientation [$p<.001$], job-specific training [$p<.001$], OSHA 10-hour training [$p=.001$], and federal/state required training [$p<.001$]).

Discussion: Among businesses represented in this sample, there are deficits in the amount, frequency, and format of workplace safety and health training provided to immigrants working in smaller construction businesses compared to those working in larger businesses. The types of training conducted for immigrant workers in small business were less likely to take into account the language and literacy issues faced by these workers. The findings suggest the need for a targeted approach in providing occupational safety and health assistance to smaller businesses.

Rachel Kramer

Center for Community Health, University of California, San Diego

Eat well at work: improving the healthy food and beverage landscape with San Diego businesses

The UC San Diego Worksite Wellness initiative has partnered with the business community throughout San Diego County for over ten years to address food access disparities among the working population who experience disproportionately high chronic disease and obesity rates. The initiative helps businesses establish or enhance comprehensive worksite wellness programs to improve employee health through strategic policy, systems, and environmental change strategies. The main goal of this session is to illustrate replicable strategies for improving businesses' food environments through policy adoption that increase access to healthy food and beverage options for employees, which ultimately strengthens our local economy and improves worker health. This session will describe methods for engaging businesses in the adoption of healthy food environment strategies including: 1) Execution of healthy employee cafeteria makeovers to feature more fruits and vegetables and healthy menu items; 2) Implementation of healthy vending policies to include food and beverages following nutrition standards; 3) Adoption of healthy meeting policies to improve food and beverages served at work-sponsored meetings and events; 4) Installation of hydration stations to improve access to fresh drinking water; 5) Establishment of on-site community supported agriculture (CSA) produce box programs; and 6) Integration of local procurement practices to highlight San Diego grown fresh fruits and vegetables. The UC San Diego Worksite Wellness initiative will share best practices and lessons learned from partnering with non-traditional and traditional public health partners in implementing healthy food and beverage standards.

Lisa Krefft

On-Site Health & Safety Solutions

The three p's of musculoskeletal prevention programs: prevent injuries, promote health and produce positive ROI

Implementing structured pro-active prevention programs that include triage, early intervention first aid, education, ergonomic intervention and job coaching, can prevent or significantly reduce the human and economic cost of injury and illness. Prevention programs are scalable to the size of the employer with many employers choosing to implement proactive prevention programs for aging employees, even in the absence of recordable injuries. Per OSHA, “work-related musculoskeletal disorders in the United States account for over 600,000 injuries and illnesses (34 percent of all lost workdays reported to the Bureau of Labor Statistics (BLS)). These disorders now account for one out of every three dollars spent on workers’ compensation. It is estimated that employers spend as much as \$20 billion a year on direct costs for MSD-related workers’ compensation, and up to five times that much for indirect costs, such as those associated with hiring and training replacement workers.” While traditionally early intervention programs targeted Occupational complaints, employer focus shifted to include response to both occupational and non-occupational symptom reports. This trend is related to several factors including but not limited to under reporting of occupational complaints, non-occupational symptoms converting to occupational claims, a desire to promote overall well-being of employees as well as reduce costs associated with injury and illness such as health insurance premiums. Employer programs that promote early reporting of occupational and non-occupational symptoms prevent injuries, promote return to work, stay at work create positive return on investment (ROI) along with an atmosphere of caring that supports employee well-being.

Elise Lagerstrom, MS, AEP

Colorado State University

A mixed-methods analysis of logging injuries in Montana and Idaho

Background: Despite advances in mechanical harvesting equipment, logging continues to be one of the most dangerous occupations in the United States. Logging in the Intermountain region is especially dangerous due to steep terrain, weather conditions, and remote work locations.

Methods: We implemented a mixed-methods approach to identify risks associated with injuries and fatalities in the logging industry of the Intermountain West. Injury claim data were obtained for the years 2010-2014 from two workers’ compensation providers which cover companies active in the logging industry of Idaho and Montana. Focus groups were conducted with professional loggers currently working across the Intermountain and Pacific Northwest regions. The

purpose of the focus groups was to elicit workers' perceptions of relevant workplace factors that may have led to the injuries documented in the workers' compensation analysis.

Results: The results of the mixed-methods approach point to lack of experience and dangerous work conditions as barriers to safe work practice. Of the 801 workers' compensation claims, nearly 26% of claims occurred to employees with less than 6 months of experience. Focus group discussions highlighted communication, culture, training, and use of personal protective equipment as possible topics to address in order to improve safety.

Conclusions: Injury prevention efforts should be focused on early training, engineering controls, and administrative controls designed to promote a climate of safety, communication, and shared responsibility. Recommendations include development of a safety training program specific to the challenges and risks of logging in the intermountain region. Additionally, continual evaluation of a leading indicator of safety, such as safety perceptions and behaviors, would provide a more reactive and sensitive metric rather than relying upon workers' compensation analysis as a surrogate for industry safety.

Hans Jørgen Limborg, PhD

TeamWorkingLife

Prevention of dust exposure by implementing a culture of prevention in the demolition sector

The Demolition Sector in Denmark with mostly SME's has in a decade changed from a hazardous, polluting and unregulated line of business to a sector with high standards of environmental protection. However, health hazards from dust exposure containing silica are still prevalent. In cooperation with the Sector (organized as a subgroup of Danish Construction Employers) a research project aims to develop a 'tool' that enhances planning and auditing of a 'new prevention culture' in relation to dust exposure. The tool is tested and evaluated in 8 companies during 2016 and 2017. The tool is developed as a plan of the specific demolition job with focus on the dust producing activities, equipment etc., which is transferred to an audit tool developed as an App for an I pad. The audit is performed by the local foreman and/or in-house OHS professionals. The research project presented here has developed and evaluates the results of the tool, assessed as changes in prevention strategies and workplace culture. Preliminary findings have uncovered different motivation to develop and use the tool from the different involved stakeholder. Managers finds the tool relevant to reduce competition on OHS and to put the cost of Health and Safety on the costumers. The OHS – professionals see the tool as another instrument for them to develop their position. The foremen and leaders find it an easy way to stay on the right side of regulation and provide necessary control. The most difficult task is to make sure all workers are

following the safety plan. The fact that employees in many companies are Polish or Rumanian and don't speak Danish adds to the complexity. The tool and its strengths and weaknesses to improve prevention culture in a very complex sector will be presented.

Marc Malenfer

National Institute of Scientific Research (INRS)

The assets of online interactive tools to improve OSH in MSEs

Objectives: 98% of firms coming under the French general social security scheme employ fewer than 50 employees. Although small enterprises do not see risk prevention as a priority, the statistics show without doubt that the majority of occupational accidents occur in such small businesses in many sectors of activity. Micro companies ask for support to deal with health and safety issues, but individual support cannot be envisaged by prevention institution to all companies. The development of more and more online interactive and digital tools is an opportunity to face this challenge.

Method: Many occupational health and safety actors have already shown interest in the possibilities offered by these new technologies and have over the last years developed such e- tools. Those tools: - Help "empower", foster the autonomy of micro and small companies when it comes to risk assessment or managing OSH in general. - Are easy to disseminate through Internet to a huge number of companies. Two examples of e-tools used in job-specific national programmes will be presented: OiRA (Online interactive Risk Assessment), a European platform developed by EU-OSHA to help small companies to deal with their risk assessment obligation. In France 4 OiRA tools have been developed, with more than 15 000 users and a good feedback. MAVImplant which is an online tool for building a 3D mockup workplace. 3 sectorial applications have been developed to help creators of companies to design a healthy workplace.

Conclusions: The communication will focus on the key aspects of that kind of projects and provide feedback on those two experiences:

- How those tools met the needs of micro companies,
- How to disseminate them with partners,
- Importance of promotion actions,
- How to use data they provide.

Norvil Antonio Mera Chu

Universidad de Piura

Occupational health and safety practices in a small metal mechanic company in Piura, Peru

Background: Participatory programs for occupational risk reduction, adapted to the particular reality of each enterprise are becoming more important in small workplaces in developing countries as Peru. The current legislation on occupational health and safety (OH & S) in Peru is more focused on occupational exposure in big companies. But there are several small enterprises whose workers have significant high-risk occupational exposure. These companies provide services to mining, construction and oil companies which increase the probability to suffer accidents and diseases. Most of them are looking for suppliers aligned with their OH & S system. The purpose of the present study was to describe the implementation of the OH & S System and its progressive improvement during 3 years in a small metal mechanic company in Peru and to show how it turned in a good investment and a competitive advantage.

Methods: This research was a case report study. The unit of study was the economic indicators of expenses and income of a small metal mechanic company, related to OH & S activities as training programs, involving workers in safety inspections, performing medical examinations for workers, performing internal audits to the system, among others. Besides, it was analyzed the impact of the system on the frequency of accidents and illnesses in workers, on absenteeism, on labor inspections, on competitions organized by big companies seeking suppliers, etc. The instrument used was Data collection sheet. A database was created in Microsoft Excel 2007. SPSS software package, version 17 was used.

Results: After 3 years with the OH&S system the frequency of accidents was reduced in 22%. Absenteeism was reduced in 33%. The enterprise got its OH&S system homologated which let it get more clients for being suppliers with good OH&S standards and this represented more economic gains and made a difference with the rest of companies.

Conclusion: It was a good investment to implement and improve the OH & S system in this small metal mechanic company. It is necessary to implement studies for assessing the effect of OH & S system in other small enterprises in developing countries.

Norvil Antonio Mera Chu

Universidad de Piura

Sleep habits and frequency of excessive daytime sleepiness in shift-work security agents from an agency in Piura-Perú

Background: There are no research studies in Peru about sleep disorders or other occupational health issues in security guards. However, the importance of carrying out the present investigation is that they are a vulnerable group, with significant exposure due to the rotation system of shift work, the length of the working day, the responsibility of their work to protect company personnel. Preventing sleep disorders and promoting adequate sleep habits in this group, we will improve their performance at work as well as their quality of life. The purpose of the present study was to describe sleep habits and the frequency of excessive daytime sleepiness in rotating security guards of a security agency in northern Peru to implement prevention measures in this work group.

Methods: This research was an observational, descriptive and transversal study. Unit of analysis was watchmen of the security agency of Piura and the unit of sampling was the questionnaires solved by them. The instruments used were: Data collection sheet, Sleep Hygiene Index, and Epworth Sleepiness Scale. A database was created in Microsoft Excel 2007. SPSS software package, version 17 was used. Descriptive statistics were used through frequencies and percentages in the case of categorical variables, and means and standard deviations for numerical variables.

Results: 360 shift-work security guards responded, of which 62.4% were between the age of 30 and 50 years old. 68% of shift-work security guards shifted from day to night shift each week. Sleep habits were reported as fairly good in 45.3 % and fairly poor in 33.8%. Poor sleep habits were significantly associated with daytime sleepiness and going to bed Sleep feeling stressed, upset, sad or nervous. The frequency of excessive daytime sleepiness in rotating security guards was 38%.

Conclusion: Shift-work security agents had poor sleep habits and more excessive daytime sleepiness during their daily activities. It is necessary to implement studies for assessing the effect of such alterations in their working performance.

Cheri A. Miller, MS

The Christ Hospital Employer Solutions

Beyond safety: expanding the message

Purpose: To explore the benefits of combining safety, wellness and health initiatives across an organization. Although many small businesses have safety initiatives mostly mandated, many do not incorporate overall health into these initiatives. We will explore previously collected Total Worker Health data as well as data related to developing an organizational strategy that encompasses well-being. Review of

data regarding employee engagement, retention, productivity and financial benefits of combining safety, health and wellness efforts to move towards a Total Worker Health model. Along with the data, practical strategies for developing organizational strategies, goals and communication that combine health, wellness/well-being and safety will be presented. A step by step gap analysis worksheet will be used for discussion and to help individuals identify initiatives and resources that a company has that can be used to expand goals and communications. Participants will walk away with a plan and resources to be able to easily implement a combined health and wellness initiative.

Jiro Moriguchi

Kyoto Industrial Health Association

Occupational health nurse as an alternative resource in a small-scale enterprise in Japan

Background: According to the Industrial Safety and Health Law in Japan, employers of enterprises with less than 50 employees (i.e., small-scale enterprise [SSE]) are not obligated to appoint occupational physicians (OPs). Therefore, occupational health (OH) services, including health guidance and workplace inspections, are usually not enforced. In general, the salaries of OH nurses are lower than those of OPs in the setting of an SSE. To improve OH services in SSEs, an OH service organization in Japan recently started placing OH nurses in these enterprises. In this presentation, the results of OH nurse-related activities in an SSE are reported.

Methods & Results: In 2012, one OH nurse started to provide basic OH service monthly for an enterprise with 36 employees. The OH nurse offered health guidance to employees, and workplace inspections. She also made recommendations to the employer regarding improvements in the work environment based on the results of a health questionnaire survey and the observations through workplace inspection. At this enterprise, the OH nurse elucidated from the health questionnaire results that the rating for the questionnaire item “full recovery after sleep” was low. The OH nurse provided health guidance on proper sleep habits for all employees and informed the employer that this sleep problem was related to overtime work. The employer realized that the overtime working conditions for some employees was problematic and hired several non-regular employees. After offering health guidance to employees and reducing overtime work requirements, the responses to the questionnaire item “full recovery after sleep” improved significantly (from 34.8% in 2012 to 68.0% in 2014; $P < 0.05$ by Chi-square test).

Conclusions: These results suggest that the activities of OH nurses can improve employees' health conditions in SSEs. The communication between employers and OH professionals is important for the development of successful OH activities.

Cameron Mustard

Institute for Work & Health

Occupational health and safety vulnerability in Canadian small enterprises

Objectives: Occupational health and safety vulnerability is often defined by demographic characteristics, such as young, new or immigrant workers. In this presentation, we describe a novel conceptual approach to define OHS vulnerability, based on four characteristics of the enterprise: 1) workers' exposure to OHS hazards, combined with 2) the adequacy of OHS policies and practices, 3) workers' awareness of their rights and responsibilities and 4) workers' perceptions of empowerment to participate in injury prevention. We characterize how the prevalence of these dimensions of OHS vulnerability differs by employer size.

Methods: We administered a 27 item questionnaire to 1,835 working adults in the Canadian provinces of Ontario and British Columbia. The survey instrument contained 9 items on OHS hazard exposure, 7 items on organizational policies and practices, 6 items on awareness and 5 items on empowerment. Instrument sub-scales had very strong internal consistency.

Results: Exposure to one or more of nine OHS hazards was reported by 54% of the overall sample. Inadequate organizational policies and procedures were reported by 46% of the sample, inadequate awareness of rights and responsibilities was reported by 25% of the sample and inadequate empowerment was reported by 34% of the sample. Relative to large enterprises (500 or more employees, 24% of the sample), respondents in organizations with 5 to 19 employees (21% of the sample) were more vulnerable due to inadequate policies and procedures (odds ratio 3.35, 95% CI: 2.25-4.99) and more vulnerable due to inadequate awareness (odds ratio 1.79, 95% CI: 1.09-2.94). There was no difference in empowerment-related vulnerability between workers in the smallest and largest employers.

Conclusion: This study recruited respondents from a wide range of occupational categories, employment relationship and workplace sizes. Applying an approach to measuring three distinct categories of OHS vulnerability has highlighted important areas of priority focus for strengthening working health protection in small enterprises.

Constanze Nordbrock

Berufsgenossenschaft Nahrungsmittel und Gastgewerbe (BGN)

The role of leadership as a success factor in the establishment of a preventive culture in SMEs in the food industry

Currently, the German Statutory Accident Insurance (DGUV) prepares a prevention campaign, which is aimed at implementing a preventive culture also in small and medium-sized enterprises (SMEs). The campaign comprises several so-called

“fields of Action”. These are factors which influence the establishment of the preventive culture. The promotion of a preventive culture can only produce lasting effects, if the perspectives of the experts (company advisors/supervisors) and the clients (entrepreneurs, insured employees) are taken into account, adequately. The SRH Hochschule Heidelberg, the ASD*BGN and the Berufsgenossenschaft Nahrungsmittel und Gastgewerbe (BGN) have started the research project “Prevention culture 360°”, which elaborates on these different perspectives. The project focuses on selected industries in the food industry, also from SMEs. The aim here is to establish a basic understanding of prevention culture which is shared by both target groups, the experts and the clients. The following surveys are carried out: In half-structured depth interviews, the ideas of entrepreneurs, managers and employees on a preventive orientation on health and safety at work will be worked out as well as possible organizational cultural factors. The ideas of the supervisory staff of the BGN and of the business consultants of the ASD represent the expert perspective. When analyzing the collected data, the following objectives will be considered: 1. Identification of dimensions by which the prevention culture can be assessed in the industry, 2. Identification of options for action by managers in micro-enterprises and possible restrictions, 3. Options for counseling by occupational safety experts by means of target group-specific offers. The organizational cultural influencing factors are then combined in a questionnaire. The aim is to develop an instrument that considers the central aspects of an occupational prevention culture. First results of our analysis reveal that leadership plays an important role in the establishment of a preventive culture in the company. Depending on the results of the surveys, suitable products for the assessment and promotion of a preventive culture will be suggested (e.g. a guide for the establishment of prevention culture for entrepreneurs, measures for the qualification of employees, a guide for safety specialists on counseling).

Ulrike Ott, MSPH, PhD

Rocky Mountain Center for Occupational and Environmental Health

Opioid use: case-control analyses of workers' compensation data

Objective: Working-age adults are disproportionately impacted by opioid misuse. Factors associated with opioid misuse in people with workers' compensation claims (WC) are not well studied. WC in some states is a 'captured' market making it a more efficient site for researching the opioid epidemic. A pilot study was conducted to identify factors associated with opioid use using a large WC insurer's claims in Utah.

Methods: This was a case-control study using a large WC insurer's databases. We conducted secondary data analyses of a de-identified dataset originally obtained from the WC insurer. Cases were defined as claims with a morphine equivalent dose (MED) $\geq 50\text{mg/d}$ in the 30 days after the claim was filed while controls = 0mg/d .

Results: A total of 76 patient's claims (28 cases and 48 controls) were included in the

final data analyses. The majority of claimants were male (N=50, 65.8%), worked full time (N=58, 76.3%) and had a mean age of 37.0 ± 11.4 years. The majority of controls filed medical only claims (N=40, 83.3%) while the majority of cases filed indemnity claims (N=19, 67.9%). Cases were prescribed a mean MED of 126.4 (SD=93.3) within the first month after filing the claim. Most cases visited >3 medical providers (N=13, 46.4%) in the first month after filing the claim while the majority of controls only visited one provider (N=28, 58.3%). Remarkably, the mean number of providers visited within the first month for the cases was 3.8, which was 2-fold greater than the control group. Exploratory multivariate analyses showed that cases were 4.6 times more likely to have visited 2-3 medical providers ($p=0.025$), and 41.8 times more likely to have visited more than three medical providers ($p<0.001$). Cases had 3.6 higher odds of having been prescribed NSAIDS within the first month as compared to controls ($p=0.014$).

Conclusion: This pilot study assessing risk factors of opioid use among WC claimants found risk factors, some of which may be modifiable. We aim to conduct a large study using existing WC data to create a scoring system that identifies those claimants at higher risk of adverse opioid-related events that may have preventive applications.

Helena Palmgren, DSc, MA

Finnish Institute of Occupational Health

Developing new models of occupational health services for entrepreneurs and small enterprises

Introduction: In Finland, most of the medium and large scale enterprises are covered by statutory occupational health services (OHS) that help promote and maintain health and safety at work. In small enterprises (SEs) the coverage of OHS is 75 %. For entrepreneurs OHS is voluntary, and 15 % of them are covered. Based on the earlier knowledge about the reasons for not arranging OHS, Finnish Institute of Occupational Health in cooperation with The North Karelia Center for Public Health started an EU funded project that develops new models of procuring and organizing OHS for entrepreneurs and SEs. The project is a part of a larger project “Co-operation and competence network for promoting occupational health, safety and well-being at work”.

Material & Methods: The national project (15.9.2015 -15.9.2018) is conducted in cooperation with regional cooperation and competence networks that build up the national network of workplaces' well-being actors. Joint development processes aiming to create the new models were set up in 7 regions in Finland, including three workshops in each region. Entrepreneurs, SEs and OHS providers were invited to take part in the processes in which quantitative and qualitative data were accumulated. Utilizing the principles of cooperative learning the participants identified preconditions for procuring and producing OHS and developed further

different procurement and organizing models outlined earlier.

Results: The preconditions for procuring OHS were easy access, little bureaucracy, low costs, and answering to the customer needs. These could be met by enabling entrepreneurs and SEs to procure services as a group to which an OHS provider produce the services. Two models were seen as relevant: the consulting-competitive procurement model and the procurement organization model. The former would inform the customers about OHS and invite to tender for their OHS contract. The latter would also take part in planning the content of OHS and act as a representative of the customer group.

Implications: The models will be tested in one-year intervention study within a before-after research frame. Based on the results, the models will be developed further to enable entrepreneurs and SEs to better utilize OHS.

David L. Parker, PhD

HealthPartners Institute

Measuring safety climate in small business: is it worth the effort?

Background: Safety climate is defined as workers' shared perceptions of safety policies, procedures, and practices as well as the overall importance attributed to safety within an organization. Factors influencing safety climate may include management's commitment to safety, return-to-work policies, post-injury administration, and safety training. Although safety climate is widely regarded as a useful indicator, there have been few studies of safety climate within small enterprises, and fewer still which have inspected workplaces to determine if safety climate is correlated with hazards and their control.

Methods: The National Machine Guarding Program (NMGP) was a small business intervention carried out in 221 businesses in 31 states. Safety climate surveys consisted of 9 constructs with two questions each as well as basic questions on demographics. Insurance consultants carried out a detailed, on-site assessment of machine safeguarding on 12 randomly selected machines at each shop, as well as a 33-question evaluation of business safety management practices.

Results: Safety climate surveys were completed by 132 businesses. Analysis was completed on responses from 2,161 employees (86%) and 341 owners or managers (14%). Shop level summaries were created for safety climate, machine safeguarding, and safety management. Owners consistently rated safety climate more favorably than did employees. As business size increased there was a consistent trend towards lower safety climate measures. Using multiple regression, there was no correlation between any of the safety climate constructs and outcomes of the audit of machine safety and safety management practices. The presence of a safety committee was significantly associated with an increase in the safety management audit score.

Discussion: Safety climate perceptions collected from a large number of workers and worksites were not predictive of workplace hazards or safety management practices such as safeguarding equipment, training programs, or written programs. In contrast, the presence of a functioning safety committee appears to be a strong proxy for safety management practices observable on-site. Further, the presence of a safety committee is easily assessed and provides a clear basis on which to make recommendations with regard to how it functions (e.g., frequency of meetings, membership), whereas measures of safety climate fail to provide any actionable information.

David L. Parker, PhD

HealthPartners Institute

Safety Management Intervention Among Small Metal Fabrication Businesses: The National Machine Guarding Program

Introduction: Small manufacturing businesses often lack access to occupational safety and health (OSH) expertise. Development of effective OSH interventions widely applicable to smaller firms remains a persistent challenge. The National Machine Guarding Program was a research initiative to address these issues among small (3 - 150 employees) metal fabrication businesses.

Methods: A partnership was formed with workers' compensation insurers to enroll metal fabrication businesses in an intervention designed to comprehensively improve machine safety. Technical checklists were developed for assessment of safeguarding equipment for 26 different types of metal fabrication machinery. An additional checklist was used to assess business-wide safety management practices such as safety committee activities, lockout/tagout (control of hazardous energy), and job hazard analyses (JHAs). Each participating business received four on-site visits from insurance safety consultants trained in study protocol: a baseline safety evaluation; intervention delivery visits at 3 months and 6 months; and a follow-up safety evaluation at 12 months.

Results: Among the 160 businesses that completed the intervention, mean safety management audit score improved from 43% to 59% ($p < 0.0001$) and mean machine safeguarding score increased from 73% to 79% ($p < 0.0001$). Businesses that added a joint management-labor safety committee during the intervention made the greatest improvements (44% to 68% for safety management, $p < 0.0001$; 74% to 84% for machine safeguarding, $p < 0.0001$), with particularly strong performance in lockout/tagout (increase from a mean of 54% to 87%; $p < 0.0001$).

Conclusions: The National Machine Guarding Program represents a new model for widespread outreach to small industrial firms. Insurance safety consultants were highly effective at intervention delivery and data collection. Establishment of a joint management-labor safety committee was an important factor in improving safety

programs even in the smallest businesses (3 - 10 employees), demonstrating the central role of worker participation and representation.

Filip Pelgrims

Groep IDEWE

Assessment of psychosocial policies in small and medium-sized enterprises

Aim: The detection of psychosocial policies in small and medium sized enterprises

Background: A well elaborated occupational safety and health (OSH) policy is crucial, yet small and medium scaled (SME's) enterprises often fail to implement a good prevention program. Online risk-assessment tool such as "BRIE (i.e. Better Risk Inventarisation and Evaluation) have been developed to guide occupational health nurses during company visits. Brie provides, 1/ a list of important sector specific OSH issues (e.g. psychosocial), 2/ advice regarding good practices, legal information and preventive actions and 3) an evaluation of sector specific occupational risks.

Methods: BRIE risk-assessments were performed in a convenience sample of SME's during the period 2013 - 2014. A selection of psychosocial factors (n=7) was assessed and scored with yes or no. Examples are: 1) Has a psychosocial risk analysis been performed?; 2) Has the company formalized a resolution regarding unacceptable behavior in the workplace?; 3) Is there a policy addressing undesirable behavior?. Only the SME's where all psychosocial factors were assessed and scored were included for analysis. Frequencies were calculated.

Results: Data was available from 8100 SME's (response = 35%). About 93% of the companies, did not yet perform a psychosocial risk analysis. A resolution and a policy regarding unacceptable behavior were available in 41,5 % and 32 % of the SME's. In 39,5 % of the SME's the employees know who the confidential counsellor is. In 18,5% of the SME's there was no register for unacceptable behavior and in 49% there was no alcohol and drugs policy.

Conclusion: Brie risk-assessments reveal that assessments and policies regarding psychological risks or unacceptable behavior are non-existing in a significant number of SME's. SME's therefore need additional support and information. A well-instructed prevention expert, such as a OSH-nurse, can use a BRIE assessment as a first step to assess company policies.

Paulo Pereira

UNIFAE-Centro Universitário das Faculdades Associadas de Ensino

Examination of Corporate Social Responsibility and Sustainable Indicators in Small Brazilian Metallurgical Enterprises

Concern and commitment to social and environmental issues aren't restricted to large corporations, but also involve small and medium-sized enterprises. From this perspective, this paper maps Corporate Social Responsibility (CSR) and Sustainability practices in metallurgical segment of cutting and mechanical conformation of metals in Brazil. Methods: In this exploratory study, quantitative survey data were obtained using a self-administrated questionnaire of Ethos Indicators for Sustainable and Responsible Business. The questionnaire was applied at four enterprises among seven located at São João da Boa Vista- SP region of Brazil. The selection criterion was based on the region, market segment, number of employees (less than 100 for small enterprises) and companies' willingness in participating in the survey. Results: enterprises demonstrated adoption of some Ethos indicators. They are positioned at initial stage of practices implementation, known as "obey the legislation" or "Initial Dealings". The implemented practices pointed out an initial stage of maturity for the four enterprises, far behind leader enterprises in Sustainability, according to Ethos Institute' diagnosis report guidelines. The results showed that managers are interested in incorporating CSR and Sustainability practices, but also indicated insufficient knowledge and resources to develop these practices in their enterprises. However, they believe these practices will help their external marketing, as socio-environmental enterprises, after they adopt more of the guideline practices. Conclusion: There is interest, need, and opportunity to help small enterprises improve their CSR and Sustainability practices.

Kristina Rajala, MHS

The Finnish Institute of Occupational Health

Occupational health cooperation between small enterprises and occupational health services

Introduction: Cooperative planning, follow up and evaluation of occupational health services (OHS) are rare in most of the Finnish small enterprises (SEs) covered by OHS. Furthermore, risk management in micro-enterprises is uncommon and the utilization of OHS in occupational safety management is poor. OH personnel find the cooperation with SEs challenging because of the large amount of these clients. To answer to these challenges Finnish Institute of Occupational Health is conducting a research project focusing on occupational health cooperation practices of SEs and OHS. The project examines also the impact of the cooperation on working conditions, work environment, work community, and the maintenance of work ability at the workplace.

Material & Methods: The project is carried out between 15.9.2015-31.12.2018 as a field experiment with a before-and-after, and a case-control design. 48 SEs with their OHS teams from 17 different OHS providers participate the study. Half of the enterprises with their OHS teams form case units that take part in an intervention developing occupational cooperation in risk assessment and planning the OHS of the company. Every case unit has a control unit that is as similar as possible in terms of the company's business sector, size and OHS provider but the OHS team is different. For the control units there are no interventions; they continue their collaboration as usual. The research data is collected by questionnaires examining occupational health and safety practices in participating SEs and thematic group interviews exploring the occupational cooperation. The questionnaires are sent to all actors of the research units. The participants of the group interviews are the representatives of the OHS and the SEs (including employees). The first measurements were conducted in the beginning of the project. After that the interventions were carried out in case units. The measurements are repeated after one year and again after two years.

Discussion: Occupational health cooperation is the backbone of effective OHS that provides the context for promoting health and work ability also in SEs. The results of this study will be utilized in creating new occupational health cooperation practices for SEs and OHS.

Kaylee Rivera, MPH

Center for Health, Work & Environment, Colorado School of Public Health

Social media influence: messaging and marketing Total Worker Health® to engage small businesses and their millennials

The business landscape is shifting dramatically as a result of a new generation entering and becoming the majority of the workforce. 73% of millennial workers are involved in decisions to use or purchase services for their company (Jenkins, 2016). Messaging and marketing Total Worker Health® (TWH) to engage both organizations and their workers therefore, significantly relies on strategies that reach millennials in the workplace. A 2014 survey of 350 small businesses found that 53% actively engage in social media (Clutch, 2015). Furthermore, Pew Research Center reports that 63% of Twitter and Facebook users say that each platform serves as a source for news and events outside the realm of family and friends (2016). Health Links™ (HL) is a signature program of the Center for Health, Work & Environment at the Colorado School of Public Health that collaborates with employers to build a culture of health and safety in the workplace using TWH strategies. HL promotes health and safety to businesses and individuals through a variety of social media platforms as a priority to disseminate TWH evidence and best-practices. Our approach is based in passive and interactive communication methods to create content that is educational, engaging and inspiring.

Methods: We engaged in a mixed-methods approach to disseminating TWH information and HL campaigns through social media posts and email marketing. We delivered 54 targeted emails to 3,044 contacts through Mail Chimp and posted to over 2,374 followers over 12 months.

Results: Social media posts reach an average of 420 individuals per day and 12,600 per month. In 12 months, we had 57,143 unique website users and 102,556 visits. Of these visits, 2,537 were directly from our social media posts and targeted emails. 61% of users were under 34 years of age. Conclusions/Future

Implications: Social and digital media is an effective way to market and message the benefits of TWH to a wide audience including millennials in the workplace. As small businesses start hiring and promoting more millennials to leadership roles in the coming years, it is imperative to stay on trend and message in a way that meets our audience's needs.

Diane Rohlman, PhD
Healthier Workforce Center

Discovery and dissemination of Total Worker Health® practices among Midwest small employers

We conducted site visits with 28 small employers (<250 employees) throughout the Midwest, many of whom had won safety or health awards. The goal was to characterize their safety and health programs, policies and practices, and to disseminate innovative ideas to other small employers. We were particularly interested in the adoption process including how they made decisions to make changes, what obstacles they encountered, and how they overcame barriers. We were also interested in the whether these workplaces were adopting Total Worker Health. These interviews were coded for the inclusion/exclusion and examples of NIOSH's Essential Elements of at Total Worker Health® program. Furthermore, we used open coding to determine additional factors influencing adoption. NIOSH defines Total Worker Health® as policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being. These themes were identified and used in the formation of the Total Worker Health Essentials (<http://TotalWorkerHealthEssentials.org>) – a series of eight short videos, in which business industry leaders discuss their approach to designing, implementing, and evaluating Total Worker Health programs, practices, and policies. The series is designed to help small businesses utilize innovative techniques to incorporate programs, practices, and policies that can be tailored to their workplace. An iterative approach was used to evaluate the videos. The videos were reviewed by Total Worker Health researchers and practitioners, including Midwest employers. The completed videos were subsequently rated by 27 individuals, 19 of whom completed the evaluation of the entire series. These participants included human resource directors, wellness directors/managers, safety directors/professionals and CEO's/Presidents. The

videos received overall positive reviews. Comments such as “Positive message-with some encouraging ideas to take further”, “Good practical information” and “Great information...like the checklists” were typical. Negative comments primarily addressed the production quality (music too loud, didn’t like the music) and not content. Since public release in August 2015, the series has had over 4000 views. Of those views, the majority have been in Iowa (46%) however, they have been viewed in 46 states and DC as well as 43 countries outside of the United States. Many small businesses are incubators for ideas and practices relevant to total worker health. Web-based video provides a low cost, accessible method for dissemination.

Alexis Rydell, PhD

Dalarna University, Sweden

Increased efficiency of work environment investments

Work environment investments (WEI) can lead to better work conditions such as decreased concentration of air contaminants and improved work ergonomics as well as enhanced productivity (Abrahamsson 2000). However, there may be some challenges in achieving optimal effects of the investment, whereas the real outcomes of the investment may not always meet the intended criteria when deciding on the investment. This study focuses on follow-ups of WEI in small and medium sized enterprises (SMEs) through six step intervention process including worker involvement, measurements and joint discussions with management. Three different WEI cases have been analyzed: (i) educational center for welding, (ii) a paint station in furniture manufacturing, (iii) a joinery in furniture manufacturing. Together with the workers, adjustments of the investments have been evaluated. The results from the different cases show drastic decrease in exposures such as welding fumes, solvents and wood dust. In addition, the results from the intervention show that it is important to educate the workers about how to use and handle the investment and make systematic follow-ups. The study also reveals that the managers were willing to make investments to improve workers’ safety, but they did not have enough knowledge regarding work environment issues. This could be one explanation to the missing worker education of how to use the new equipment, and why investment evaluation was not conducted.

Yumi Sano

The Institute for Science of Labour

Facilitating good practices against heat stroke in small-scale workplaces

Objectives: In Japan, heat stroke is one of the most urgent issues in occupational health. Every year, around four to five hundred workers are reported to suffer from serious heat stroke with about twenty fatal cases. In 2013, Japanese government developed a special project against heat stroke as the national program. As the

working environment differs in these cases, it is necessary to develop flexible case-based approaches especially in small or medium-sized enterprises.

Methods: From the reports at the National Industrial Safety and Health Convention, 87 good practices on heat stroke prevention were extracted. We analyzed these examples in terms of four elements: machines/devices, workers, work systems and environmental control. The selection of approaches taken for these elements were supervised by and discussed with five well-experienced researchers and practitioners of occupational safety and health. The key trends that may help concerned workplaces implement appropriate improvements were extracted.

Results & Discussion: Although the size and industry of the corresponding companies were different, several key trends in dealing with the four elements of heat stroke prevention could be extracted from these good practices. Of 87 examples, 43 were about machines/devices, 21 about workers, 15 about work systems and 8 about environment control. Many of the practices had been undertaken at the initiative of workers, not experts or owners. Low-cost and easy-to-apply measures were seen in most cases. These measures were adjusted to each situation of individual workplaces. Typical examples included reducing heat effects, breaks, drinking routines, resting facilities and training in multifaceted measures. They were implemented as part of improvements addressing multiple elements. It was noteworthy that most examples focused on primary prevention of heat stroke, rather than secondary prevention. As keys to achieve successful workplace practices in terms of improvement against heat shock, the application of locally adapted low-cost measures is suggested learning from good practices in heat stroke prevention.

Stephanie K Sayler, MIH

Department of Environmental Health Sciences, University of Michigan

Promoting health and safety in nail salons through the Michigan Healthy Nail Salon Cooperative (MHNSC)

This presentation will summarize the results of efforts by members of the recently founded Michigan Healthy Nail Salon Cooperative (MHNSC) to improve working conditions, sustainability, and wellbeing among regional nail salon workers and owners. Nail salon workers are regularly exposed to chemical and biological agents and ergonomic stresses that may lead to adverse chronic and acute health effects. Since many are immigrants (predominantly Vietnamese) that are independent contractors, they may not benefit from labor regulations afforded to permanent employees. These factors increase their vulnerability, invite exploitation, and can increase turnover and reduce small-business sustainability. Building on published studies and interventions, most notably in California (e.g., California Healthy Nail Salon Collaborative), the MHNSC has mounted a multifaceted effort to characterize exposures and working conditions, organize and educate owners and workers, and promote health and safety in nail salons throughout Michigan. Our group includes

industrial hygiene graduate students and faculty at the University of Michigan (UM), undergraduates in the UM Vietnamese Student Association, and members of the NGO Workplace Health Without Borders. To date, we have collected and analyzed area and personal air samples of VOCs at 13 salons in 3 cities in Michigan, distributed multi-lingual flyers and gathered preliminary information from 35 salons, and scheduled the first of our quarterly organizing meetings to promote awareness, education, and empowerment among the stakeholders. Air monitoring results revealed a predominance of ethyl acetate and propyl acetate, significant concentrations of methyl methacrylate, low concentrations of toluene, and significant differences in VOC concentration profiles among salons in 3 different cities. This work is on-going. In consultation with other researchers, we developed and piloted a 50-question survey that we plan to administer in the spring. We have developed a comprehensive presentation detailing hazards of nail salon work geared toward workers and owners. To learn about and assist local salon owners with regulatory compliance issues, we submitted a FOIA request to the State of Michigan for copies of infractions among nail salons in 2016, which we will assess. MHNSC is also formulating a culturally-appropriate online health/safety training module for distribution to salon owners and workers in the region.

Juliann C. Scholl

National Institute for Occupational Safety and Health (NIOSH)

Developing dissemination products to prevent WMSDs in aging construction workers in small construction firms

Over the last decade the average age of construction workers has increased from 36.0 to 41.5 years old. As the proportion of older workers in the U.S. increases, understanding the health and safety needs of an aging workforce is critical, especially considering the hazards and physical demands of the construction industry. WMSDs are a significant portion of non-fatal injuries and are a major cause of functional impairments, disability, and lost productivity among construction workers. Aging workers in small construction firms are especially vulnerable. Small businesses make up 80% of all construction enterprises, but often do not have adequate access to resources on worker safety. According to the Center for Construction Research and Training (CPWR), small construction firms tend to lag behind larger companies in maintaining safety measures. This gap has implications for the inability to meet the safety needs of older workers, who represent an at-risk group in the construction industry. The National Center for Productive Aging and Work (NCPAW) at NIOSH is developing educational products to reduce workplace musculoskeletal disorders (WMSDs) among aging construction workers. As part of the overall project, the purpose of this study is to learn from employees and employers the most pressing needs of aging construction workers in small enterprises regarding the reduction of WMSDs. This paper reports on the project's first phase, which analyzes Ohio Bureau of Worker Compensation (OBWC)

data on WMSDs from manual materials handling in construction. This phase also involves collecting focus group feedback from construction employers and workers of diverse ages to understand their experiences with construction-related WMSDs. This study utilizes Silverstein's healthy aging model of four dimensions for meeting aging workers' needs: physical work environment, organization of work, employees' needs, and social support. In addition to providing a framework for generating new interventions and educational materials, the information gathered will also reveal the specific needs of aging construction workers employed by smaller companies, and lead to the development of educational products that are cost-effective and accessible to small companies, who lag behind larger firms in managing workplace safety and wellness in their environments.

Paul Schulte, PhD

National Institute for Occupational Safety and Health (NIOSH)

Toward a strategy for improving occupational safety and health messaging to small businesses

Public health organizations that strive to enhance Occupational Safety and Health (OSH) practices in small businesses often lack effective communication strategies for doing so. In this paper we identify various factors involved in OSH messaging that could be candidates for research to improve approaches for communication with small businesses. Following extensive evaluation of the literature from 1997-2017, we attempted to deconstruct the small business concept, on the premise, that not all small business are similar regarding OSH matters. It may be helpful to have a research and communication strategy which defines small business beyond merely number of employees (e.g. sector, age of business, volatility, profit margin, management structure, etc.). Two approaches have been described in the literature: direct messaging and indirect messaging through intermediaries. In direct messaging the challenge for public health agencies is to communicate with small business decision-makers (owner, manager, safety manager) in a way that such messages are given consideration. The key components for research on these approaches are qualities of the message, channels of communication, and receptivity or absorptive capacity of the firm or recipient. The concept of "stickiness of information" can be drawn from the knowledge management field to describe both the content and comprehensibility of the message as well as the extent of effort including cost for the recipient decision-maker to access and consider it. There is a known relationship between stickiness of information and the absorptive capacity of the firm that is mediated by firm size. The concept of communicating and influencing small firm decision-makers through intermediaries is gaining prominence. Research could be conducted which could inform more effective OSH messaging. This research would entail pilot testing of the effect of variation in information stickiness of different messages on absorptive capacity across various samples of industry. This effort could also be combined with assessments of delivery of similar or refined versions of the same messages through intermediaries. Based

on the results of these studies messages could be revised and sent to the full target sector audiences.

Natalie V. Schwatka, PhD

Center for Health, Work & Environment, Colorado School of Public Health

A case study of a public/private partnership to bring worksite wellness to small business

The literature supplies evidence on the impact of employee health on productivity and traditional health care costs, but does it impact workers' compensation (WC) costs and claims? Additionally, health promotion programs may succeed in mid- to large-size companies, but what can be done to reach the small enterprises where the majority of Americans work? This session will examine the nexus of WC, health promotion, productivity and small businesses. First, we will describe the interaction between work organization, workers' personal health, and productivity and WC claims and costs to provide rationale as to why small businesses should adopt health promotion, in addition to health protection, policies and programs. We will describe our analytical efforts to develop predictive models of WC claims and costs and productivity using baseline health risk assessment data and WC claim data (N=16,926). Second, we will describe the impetus for promoting worker well-being from the perspective of Pinnacol Assurance, Colorado's major WC carrier. When this program was initiated, there was no precedent in the literature for a worksite wellness program (WWP) in a WC arena. A description of the program and the successes and challenges of implementing the program will be given. Third, we will present data from a five-year initiative to determine the feasibility and impact of this worksite wellness program. Three-years of data (N=5,766) from employees participating for at least two-years in the program was analyzed to determine changes in health and productivity by size of business (small, small/medium, medium and large). We will highlight that not only were small business workers more likely to participate, but they demonstrated greater improvements in health than workers from large businesses. Finally, we will highlight this work as a useful model for translating research into practice via a public/private partnership. The collaborative work between members of the research advisory committee and Pinnacol Assurance's worksite wellness and safety services teams has ensured that the research findings described above are translated and communicated to policyholders. An example of this is an innovative health risk calculator web application, which educates businesses on how employee health impacts workers' compensation claims.

Joshua Scott, MS

Center for Health, Work & Environment, Colorado School of Public Health

The organization of well-being

Most small businesses that use a fully funded health insurance model have experienced double digit rate increases annually for the past decade. Increased spending, regardless of employee health status, discourages businesses from utilizing proactive approaches aimed at protecting and promoting worker well-being. When organizations move to self-insured they have more control over healthcare expenses, but also assume the health risk of their employees. The Total Worker Health® (TWH) framework promotes an integrated and inclusive approach to worker protection and health promotion. Larger self-funded organizations have been leading the way in TWH through population health management strategies that reduce occupational injuries and illnesses and provide wellness programs that use data to target chronic disease. Although small businesses account for nearly 92% of all private sector firms in the U.S., many have been unable to adopt the TWH framework due to the availability of relevant programming and a flexible model that addresses economies of scale. Health Links™ (HL), a signature program in the Center for Health, Work & Environment, partnered with Flood and Peterson (FP), Colorado's largest privately held insurance broker to bring TWH to small businesses. FP is at the center of the small business community providing employee benefits, workers compensation, and property and casualty coverage. HL, assesses, advises, and connects small businesses to resources for implementing sustainable TWH programming. This partnership relies on a modified framework designed from the hierarchy of controls applied to TWH and will educate Colorado businesses through direct outreach, referrals, and community based trainings. The collaborative engagement and intervention strategies used pre and post training allow for tracking of organization level changes in TWH programming and employee level health and safety outcomes. This presentation will highlight partnership strategies and training results – i.e., satisfaction, inspiration, improved understanding, intent to change and organizational level change, and also motivation for small businesses to engage in TWH. This partnership positions us to expand small business access to TWH resources, improve health and safety outcomes, and prove a return on investment for small businesses that embrace a TWH approach.

Noah S. Seixas, PhD

University of Washington

Understanding precarious work: defining the intersection of vulnerability and work organization

There is a growing interest in how various aspects of work organization affect the health of working populations and contribute to health disparities. However, the ways in which the work organization is described is highly variable. Concepts

such as the fissured workplace, job insecurity, contingent employment, the 'gig-economy', 'work organization', and a more holistic concept of 'precarious work', have all been used to try to identify the health implications of the changing nature of work. While each of the terms used have overlapping attributes, and each have been associated with changes in work exposures and health risk, their lack of clear conceptual definitions hampers our ability to explain the apparent health risks with which they are associated. This paper describes the various concepts addressed with the work organization terminology, and offers a critique of current usage. We describe an alternative multidimensional approach using latent class cluster analysis to develop job typologies, based on how people describe various dimensions of their work arrangements. This approach is implemented in the US-based General Social Survey (GSS), and the typologies identified in these data are compared to those previously published for the European Survey of Working Conditions (ESWC). This typological approach overcomes the limitations of characterizing the impacts of work organization on health and safety based on single dimension work characteristics, and offers a new framework for understanding the intersection of work organization characteristics with social attributes of vulnerable populations to better understand the variety of precarious work arrangements.

Kadiri Shamusdeen

Executives Partnering to Invest in Children (EPIC)

Healthy Work Environment: Promoting Good Work Practices Through Workplace Design and Wellness Programme Among Artisans (Informal Workers) in 'Mechanic Village' (Automobile Repair Garages) in Abeokuta, South West, Nigeria

Zub Chord Technical Ventures

Introduction: Workplace health risks are higher in the informal sector and small industry which are key arenas of action on poverty alleviation, where people can work their way out of poverty; safe workplaces contribute to sustainable development, which is the key to poverty reduction; these benefits are greater for low-paid workers in high risk occupations and settings, and in this way occupational health interventions can reduce inequities. The International Labor Organization (ILO) showed that informal sector workers in industrially developing countries are exposed to poor working environments, low safety and health standards, and environmental hazards. WISE is Work Improvement in Small Enterprises is a training programme that empowers small and medium enterprises to take practical and low-cost action to improve working conditions.

Methods: The study used the approach in Work Improvement in Small Enterprises (WISE) by ILO in providing solution to the identified problems of poor working condition and awareness on healthy workplace. One hundred and thirteen (113) participants were involved in the study consisting (44) auto mechanic artisans, (27) auto electricians artisans, (7) vulganizers artisans, (15) automobile body repair artisans, (8) battery chargers, and (12) food vendors. During the participatory

learning activities that were presented in this study, the informal-sector workers engaged in the group discussions and identified the OHS problems in their own sector. They subsequently attempted and accurately understood work related safety issues, and collectively proposed and implemented safety measures.

Results: The OHS knowledge, attitude and behavior of these workers were increased after the training. The capacity building process enabled the workers to recognize risks associated with their occupation, learning about safety improvement concepts, and therefore implement safety measures by using PPE and improve workplace hygiene.

Conclusion: Our findings suggest that positive attitudes toward promoting safe working conditions and practices can be fostered among the informal-sector workers by raising their knowledge and skills regarding issues related to OHS through a capacity building process.

David Shapiro

Executives Partnering to Invest in Children (EPIC)

An assessment for family-friendly workplace best-practices: implementations and lessons learned

Today one of the greatest demands a small enterprise faces is creating an environment that supports employees and their families. Flex-time, accommodating new and nursing mothers, and parental leave are all part of an on-going conversation about improving employee health and wellbeing through supportive work environments. Addressing the demands of work and family will be a benchmark of success for businesses in the next generation. EPIC (Executives Partnering to Invest in Children), Health Links™, and Colorado's Department of Public Health and Environment (CDPHE) have formed a strategic alliance to lead Colorado's conversation about the family-friendly workplace. This alliance launched two initiatives to understand and strengthen family-friendly employment practices. Together EPIC and Health Links convened an advisory group of key stakeholders from business, public health, and government to identify evidence-informed best practices to develop the Family-Friendly Workplace Assessment (FF+). Businesses of any size benefit by utilizing the assessment to strengthen family-friendly policies and accommodations offered and practiced by employers. EPIC worked closely with CDPHE to create Colorado's Family-Friendly Workplace Toolkit. The toolkit provides guidelines, resources and examples of corporate best practices. The presentation highlights case studies of employers throughout Colorado that are using FF+ to inform their efforts on how to support employees and their families.

Adelyn B. Shimizu
Colorado State University

Psychological health and meaningful work among brewery workers

Introduction: A growing body of occupational health psychology (OHP) research emphasizes the importance of positive psychology by addressing occupational health from a holistic perspective (Macik- Frey, Quick & Nelson, 2007). One significant application of positive psychology within the work domain is that of meaningful work, described as the appraisal of work as positive and significant (Rosso et al., 2010). An increasing number of studies support meaning and purpose at work as integrative aspects of worker's well-being and health (e.g., Steger & Dik, 2010). In fact, meaningful work has been incorporated by NIOSH as part of the definition of well-being and Total Worker Health[®]. Meaningful work is related to job satisfaction (e.g., Kamdrön, 2005), job commitment (Bunderson and Thompson, 2009), stress (Elangovan et al., 2010), as well as decreased mental health concerns (e.g., low self-esteem and anxiety; Deci et al., 2001). Despite the high importance of meaningful work and other psychosocial factors for worker health, most research on workers within the brewing industry focuses on physical health issues (e.g. Thygesen et al., 2005; Godnic Cvar et al., 1999). This study's aim, in concordance with Chen's (2016) call for future OHP research to study more diverse worker populations, is to provide an initial study to understand brewers' psychological health, sense of meaningful work, and work- related well-being.

Methods: Participants (N = 96) were brewers (71.9% male; 88.5% Caucasian) recruited via an online brewer forum.

Results: Descriptive statistics of psychological factors will be examined to determine concerns unique to brewery workers. Meaningful work will also be regressed onto these psychosocial factors to determine if there is incremental value to studying the construct of meaningful work in addition to other, more traditional factors. Preliminary analyses demonstrate that this sample found their work to be highly meaningful (M = 4.20, skewness = -0.83) and that meaningful work was significantly correlated ($p < .01$) with turnover intentions, job and life satisfaction, organizational commitment, supervisor and coworker support, and burnout.

Erin Shore, MPH
Center for Health, Work & Environment, Colorado School of Public Health

Health-related predictors of workers' compensation claims

Much of the literature on predictors of workers' compensation (WC) claims has focused on organizational level predictors such as government involvement, organizational safety programs, industry/occupation, and demographic factors like

age and gender. Recent research suggests that health factors are predictive of the occurrence of WC claims. The purpose of this study was to assess the impact of past claims, chronic health conditions, and physical and cognitive difficulties at work on the occurrence of a WC claim by size of business. De-identified, linked health risk assessments and WC claims data were obtained. A two-part multivariate regression model was utilized to first predict the occurrence of a closed WC claim costing more than \$0 (using logistic regression), and, if such a claim occurred, then to predict the cost of such a claim (using generalized linear regression). The main predictor variables considered were a past WC claim within the last year, chronic health conditions, and difficulty at work (none, cognitive difficulty, physical difficulty, or both). The two-part model was then stratified by company size (small=<100 employees, medium=100-499 employees, and large=500+ employees). 16,926 workers completed a health risk assessment between May 1, 2010 and December 31, 2014. 563 (3.3%) of those individuals had a closed claim costing more than \$0 that occurred in the year after completing their health risk assessment. Analyses for this study are still ongoing, but preliminary results from the un-stratified logistic regression model indicate that having a past claim (OR=3.47, 95% CI: 2.44-4.93) and socio-emotional health conditions (OR=1.19, 95% CI: 0.97-1.45) were predictive of having a future claim, controlling for other health, demographic and work- organization factors. Results of the stratified logistic regression model indicate that the past claim variable had a stronger effect on future claim among smaller businesses. The OR among businesses with <100 employees was 4.59 (95% CI: 1.92-7.22), compared to 3.11 (95% CI: 2.00-4.84) among those with 100-499 employees, and 2.60 (95% CI: 1.30-5.19) among those with 500+ employees. This presentation will highlight the impact of health-factors on the incidence and cost of WC claims in general, and discuss variation in these relationships by size of business.

Tonia Smith, CHES, RS, TTS

City of Cincinnati Health Department

Total Worker Health®: overcoming the barrier of perceived cost for a small business' small budget

While engaging approximately 25 small businesses in the Cincinnati-area on the topic of Total Worker Health (TWH), a theme emerged: Cost. Perceived cost. A team which consisted of dedicated members from NIOSH, Cincinnati Health Department, The Christ Hospital, and a Safety Consultant reached out to small businesses (50 employees or less) in three priority communities with the goal of introducing the idea of Total Worker Health to their small workforce. The owners and managers of these small businesses agreed to sit for initial (Time 1) interviews and were provided with \$50 grocery (Kroger) gift cards in appreciation for their time and attention. Many of the small business representatives showed interest in the concept, but expressed that a lack of time and/or financial resources would most likely pose a barrier. These concerns were expressed by most. Over the span of 12-16 months, some of the business received some type of service from our Total

Worker Health team. Services ranged from a lunch-and-learn event to a health fair. In the final months of 2016, the small businesses who were initially engaged were asked to participate in a final (Time 2) interview on TWH, whether or not they had received a TWH service (event). Again, businesses were offered a \$50 gift card for their time. A total of eleven businesses agreed to sit for a Time 2 interview. Most of the business owners and managers had not implemented additional policies/practices centered around workplace safety AND wellness since their initial interview. Many interviewees expressed that cost was their primary barrier. After conducting interviews, it is clear that simplistic, specific, and inexpensive techniques must be provided to small business owners/managers. If small businesses can use materials, supplies, and daily activities, with specific ideas provided by a consultant, implementation of a TWH program would most likely be better received and met with greater success.

Ilonka Sommen

Groep IDEWE

IDEWE's General Prevention System (iGPS) to implement and manage occupational safety, health and well-being in small enterprises

Introduction: Serious accidents are most prevalent in small and medium sized enterprises (SME's), most likely because of their poorer performance using risk assessment and risk management systems. Despite of all their efforts, SME's often don't possess the knowledge required to secure occupational safety, health nor wellbeing (OSH). How can we guide SME's during their risk management and the development of subsequent preventive measures?

Method: As the largest Belgian external service for prevention and protection at work, IDEWE provides service to 35.000 enterprises and their 600.000 employees. To lead the SME towards OSH, IDEWE developed a document management tool, named GPS: "IDEWE's General Prevention System". For the purpose of this abstract we focused on the use of GPS in SME's during the period 2011-2016. IDEWE trained 1903 new users in a six-day practical course to implement GPS in their SME's. 1031 users followed the yearly reunion day to keep track of new developments and changing legislation. Since 2014 GPS trainings were given to 53 new users in a two-day course for very small enterprises (< 20 employees). Furthermore 1052 prevention experts in SME's are supported one-on-one to implement GPS and to realize customized preventive measures.

Results: Feedback from these users supplemented GPS to a pragmatic and coherent risk management tool were all relevant documents can easily be found. The GPS strategy translates into a cohesive modular structure that allows organization and execution of OSH tasks and assignments. Model documents are provided along with a section to manage enterprise specific reports. By using GPS, the enterprise complies with the Belgian OSH law.

Progression: Based on these results, IDEWE decided to digitalize the document management tool and make it an on-line platform: iGPS. Extra benefits for the users will be an automatic back up securing the latest versions of all their documents and an easy access from any workstation, including tablet or phone. Notifications can be send to the user when new (model)documents are shared. Hence, iGPS grows to be a practical tool, which can be used by prevention workers to guide SME's in their OSH policy.

Shayln Stevens

Colorado State University

Family-Supportive Supervisor Behavior (FSSB): Implications for Small Enterprises

Increasing work-family conflict, due in part to changing demographics, the evolving nature of work via technology, and global economic shifts, has led to a need for family- friendly workplace solutions. One such solution of growing interest among researchers and practitioners is family- supportive supervisor behavior (FSSB), which includes a supervisor's acknowledgment and help in balancing employees' work and family responsibilities. These behaviors are especially relevant in small business settings, where formal family-friendly policies and benefits may not be readily available to employees. The current presentation aims to provide background on the concept of FSSB, the current state of this literature, and practical implications for small enterprises.

FSSB is a multidimensional construct, involving four types of behaviors. The first dimension, emotional support, includes supervisory communication and sensitivity regarding employees' family-related issues. Role modeling behaviors, the second dimension, is the demonstration of strategies and behaviors by a supervisor that reinforce work- family balance. Instrumental support represents a daily management style that also facilitates this balance. Lastly, creative work-family management involves supervisors taking the initiative to creatively restructure work in ways that simultaneously support employee needs and the organization's productivity goals.

FSSB has been examined in relation to several important health and safety outcomes including cardiovascular disease, safety compliance, sleep measures, and well-being. Antecedents of FSSB include organizational as well as supervisor characteristics, such as perceptions of a family friendly culture and leader membership exchange quality. Interestingly, FSSB has also been found to have a beneficial impact on employees regardless of familial status, suggesting that these behaviors have widespread organizational benefits.

Although there is still more to learn about FSSB, particularly in relation to strategies supervisors can use to maintain this behavior and sustainable intervention designs, understanding FSSB can have significant practical implications for small enterprises

as these behaviors can be learned via training. Beyond positive health outcomes for employees, additional implications include decreased turnover intentions and increased job satisfaction and performance, which are important for small businesses given the high cost of employee recruitment and replacement. Thus, FSSB may be an important key to sustainable small business health.

Analia Romina Stormo

National Institute for Occupational Safety and Health Office for Total Worker Health

Applying fundamentals of Total Worker Health® approaches: essential elements for advancing worker safety, health, and well-being

Total Worker Health® (TWH) explores opportunities to both protect workers and advance their health and well-being by improving the conditions of their work, primarily through workplace policies, programs, and practices. An emerging body of evidence now supports what many safety and health professionals, as well as workers themselves, have long suspected: that risk factors in the workplace can contribute to health problems previously considered unrelated to work. NIOSH's Fundamentals of Total Worker Health® Approaches: Essential Elements for Advancing Worker Safety, Health, and Well-being is a newly released workbook of relevance to employers and other professionals interested in implementing workplace safety and health programs aligned with TWH approaches. The workbook was developed with stakeholder input from small and medium-sized businesses and focuses on five Defining Elements of TWH: 1) Demonstrating leadership commitment to worker safety and health at all levels of the organization, 2) Designing work to eliminate or reduce safety and health hazards and promote worker well-being, 3) Promoting and supporting worker engagement throughout program design and implementation, 4) Ensuring confidentiality and privacy of workers, and 5) Integrating relevant systems to advance worker well-being. The workbook provides a variety of resources and tools to help businesses conduct a baseline needs assessment of their organization, identify initial steps to improve workforce health and well-being, and help measure progress towards the implementation of TWH approaches. The goals of this presentation are to familiarize employers with the workbook content and layout; provide examples of policies, programs, and practices that incorporate each of the five Defining Elements of TWH; and provide tailored step-by-step guidance on how to utilize featured tools and resources to assist with planning and implementation efforts. TWH approaches are of particular interest to small- and medium-sized businesses facing challenges in staffing, time, and resources and it avoids a one-size-fits-all perspective. TWH's integrated concepts call for early worker participation in program design and encourages customization of interventions for greatest health impact. With its unique organizational, rather than individually-focused approach, TWH provides small enterprises with an opportunity to protect and promote the health of what many consider to be their greatest asset: their employees.

Jennifer Tellis, MPH
Tri-County Health Department

How local business networks are connecting the dots on wellness

Health and safety programs and policies have long been recognized by large corporations as a way to minimize injury risk and maintain a healthy workforce. More recently, employee wellness is being embraced by smaller enterprises as a way to recruit and keep valuable talent and as a strategy for stemming the tide of rising health care costs. In this session, a business community from Aurora, Colorado will share their role in a regional initiative that connects employers of all sizes to resources and trainings in the current best practices of employee health and wellness. This session also describes the valuable role that local employers, public health professionals and Chambers of Commerce partnerships can play in addressing the health and safety of the workplace and improving the overall health of their community. Through community-based employer networks (Coalitions), many learning and networking events have provided these employers with the knowledge and encouragement to start and strengthen their own employee wellness initiatives. Research shows, that community members collaborating for common goals are effective at driving environmental and behavioral changes that can improve community health. Increasingly, public health advocates are shifting focus to worksites as a valuable opportunity to focus their population health improvement efforts. These business community partnerships are providing extra support to employers to overcome challenges and build sustainable wellness cultures. With the training and support provided through local Chamber Coalitions, business communities are heightening their knowledge and perceived value of health and safety policies and programs. We are starting to see an evolution of Coalition employers as they implement health and safety initiatives and begin to see the benefits associated with a healthy workplace culture. The Coalition leaders from each of the three Chambers have initiated a monthly conference call to share ideas for recruiting and engaging more employers. These monthly calls are leading to a larger discussion of collective strategies to expand the scope of their work to improve the health of their local communities in a sustainable and meaningful way.

Tommaso Tempesti, PhD
Department of Economics, University of Massachusetts Lowell

Is there a health establishment-size premium?

I use data from a large representative cross-sectional survey of the U.S. population to study how the health of the workers varies with the size of the establishment where they work. I find no evidence of a positive establishment size-health correlation. At least in some specifications, I actually find evidence of a negative establishment size-health correlation. This result contrasts with the large literature which finds a positive, statistically and economically significant correlation between

employer size and wages. I also find that recent hires at smaller establishments are healthier than recent hires at larger establishments. This suggests that smaller establishments hire workers who are healthier to begin with. I also find that, among longer tenured workers, workers in larger establishments are more likely to report a health conditions than workers in smaller establishments. This result is compatible with the fact that working for a long time at a large establishment has detrimental effects on health relative to working for a long time at a small establishment.

Liliana Tenney, MPH

Center for Health, Work & Environment, Colorado School of Public Health

An assessment of a Total Worker Health® intervention in small business

Americans spend an average of 47 hours per week at work —164 hours more per year than a generation ago. The rate of sedentary jobs among Americans has increased. The workforce is aging and more chronically ill than it used to be. Many workers have multiple conditions and complicating medical management, making Total Worker Health® (TWH) interventions potentially more valuable because they address both health and safety. While several success stories are emerging among small businesses, recent systematic reviews suggest that employers face significant challenges in efforts to promote health and safety. There has been limited research on the adoption and effectiveness of TWH interventions in small businesses. Health Links is a community-based TWH intervention that helps businesses assess organization policies and programs, offers evidence- based recommendations in advising sessions, connects employers with local resources, and certifies qualifying employers as Healthy Businesses. As a first step in characterizing small business organizational behavior regarding TWH programs, we conducted an ecological study of 128 participating organizations representing a range of industry sectors and geographical areas across Colorado. Surveys were completed by company representatives to assess safety, health, and wellness practices that were verified during advising sessions. Companies were stratified by size (<50, 50-500, and >500 employees) to test the hypothesis that TWH engagement varies by scale. In univariate analysis, businesses with <50 employees were less likely than larger businesses to offer health insurance (70% vs 97%), to coordinate wellness with safety (32% vs 83%), and to assess root causes of workers' compensation claims (9% vs 53%). We observed no significant differences in leadership motivation for implementing health and safety or in types of TWH programs offered. Conclusions: Preliminary data suggest that business size may be associated with organizational behavior regarding safety and health. Multivariate modeling and prospective follow-up surveys are warranted and in progress.

Janalee F. Thompson
Colorado State University

Occupational Physical Activity (OPA) in active and sedentary work

Objective: Physical activity in the workplace is an important factor for supporting occupational health and well-being. Physical activity at home and at work are key to maintaining a healthy lifestyle. The ability to measure OPA of individuals in their work environment with simple instrumentation was a significant step toward cauterizing the healthier workplace. The purpose of this study was to measure and evaluate physical activity in the workplace. The study used two activity trackers (Fitbit Charge HRTM and Hexoskin) to measure OPA in two populations of active and sedentary workers and compare results.

Methods: 50 sedentary (office) and 50 active workers wore a Fitbit Charge HRTM and Hexoskin activity tracker for the entirety of one work shift. Subjects were asked to complete daily activity logs as a qualitative measure to assess physical activity during the work shift while wearing the activity trackers. Heart rate, breathing rate and step counts were measured using the Fitbit Charge HRTM and Hexoskin.

Results: The Fitbit Charge HRTM overestimates step counts when compared to the Hexoskin, which was most likely attributable to the nature of it being worn primarily on the wrist. The Fitbit Charge HRTM also overestimates heart rate. Active workers took significantly more steps and expended greater energy (based on calories burned and MET's) during their work shift than the sedentary workers.

Conclusion: People who were physically active for at least seven hours per week have a 40% lower risk of early mortality attributable to adverse health effects associated with a sedentary lifestyle (CDC, 2016). Quantitatively establishing a baseline measure of physical activity across different occupations would assist in the design of future interventions targeted at Total Worker Health.

Albert J. Tien, PhD
Workplace Health Without Borders, U.S.

The role of non-profit organizations such as Workplace Health Without Borders in support networks for small enterprises

The U.S. Bureau of Labor Statistics reports that there were 3.2 injuries and illnesses per 100 full-time employees in 2014, the last year for which statistics are available. Changing employment trends and practices maybe resulting in under reporting of occupational illness and injuries. Many underserved and marginalized people either work for themselves or are employed in companies with less than 10 employees which come under minimal OSHA scrutiny and are not required to maintain illness and injury logs. Workers are often contractors in a business owned by someone else.

Many are immigrants with a limited command of English and limited knowledge of resources available to workers and ways to protect themselves from workplace hazards including chemical exposures and musculoskeletal stress. Often both employers and employees have limited awareness of health risks associated with those hazards. The challenge to ensuring workplace health in small enterprises is to build awareness and identify resources to manage occupational health and safety where budgets are non-existent or restricted. To address workplace health all stakeholders, need to be involved and barriers to communication need to be removed. Owners and workers, consumers of the product or services, the community in which the business resides, the regulatory community and public health professionals all need to work in collaboration. Non-profit organizations such as Workplace Health Without Borders, its branches and chapters, can serve as support networks for small enterprises within the United States and abroad. This presentation discusses our experiences and lessons learned helping small enterprises and underserved worker populations, exemplified by our brick kiln project in Nepal, training programs in Vietnam, and, in collaboration with students and faculty at the University of Michigan, projects concerning electronics recyclers/workers in Thailand and Mexico, as well as evaluation and training programs directed at immigrant and underserved workers in small enterprises within the US.

Sheryl S. Ulin, Ph.D., CPE

Center for Ergonomics, University of Michigan

Sheryl Ulin

Introduction: Overexertion injuries and illnesses, often referred to as musculoskeletal disorders, affect the back, neck, shoulders, arms and hands of workers; they result in pain and adversely affect health, work performance and daily living tasks. Musculoskeletal disorders have accounted for 28%-34% of the injury and illness days away from work since 2002. Small companies feel the impact of worker injuries quickly and most do not have occupational health and safety professionals within their organization.

Methods: The State of Michigan supplied grant support for occupational ergonomics specialists to provide assistance to small and medium sized companies. The goals of this program were to provide: 1) people from small companies with basic knowledge to identify and reduce occupational risk factors associated with the development of musculoskeletal disorders, 2) ergonomic assessments of selected jobs from the company and 3) a basic framework for incorporating ergonomic job assessment into their organizational structure. Ergonomics training and job analysis services have been provided to more than 190 companies since 1994. Participating companies include manufacturing (automotive parts, t-shirts, vaccines and others), printing, nursing homes, non-profits and other office service sector companies. Companies are provided with written ergonomic assessments of two or more jobs. In addition, a 2.5-hour ergonomics seminar is conducted. Typical seminar attendees

include workers, managers, engineers, skilled trades, and others.

Results: After attending a 2.5-hour ergonomics seminar, more than 93% of attendees reported learning new information and new skills, 65% expected to make changes at their workplace and 89% reported that the seminar changed the way they will address ergonomics in the workplace. Many companies implemented workplace changes. Fifty-five people who have office workstations from four companies that participated in the program completed a survey to document workplace changes. Eighty-four percent of respondents reported workplace changes with a total of 270 unique changes, and 87% of the changes did not require purchasing new equipment. The average number of changes per person was 4.9 ± 4.3 .

Conclusion: With support, small companies learn ergonomics principles and make changes to reduce worker risk of developing musculoskeletal disorders.

Skyler D. Walker

Rocky Mountain Center for Occupational and Environmental Health

Correlation between weekly exercise duration & light duty and lost time: a cross-sectional analysis of an occupational working population

Objective: The United States Office of Disease Prevention and Health Promotion guidelines suggest 150 minutes/week of moderate activity. Physical inactivity doubles the risk of developing cardiovascular disease, Type 2 Diabetes, and obesity. These diseases can cost hundreds of billions of dollars in loss of productivity nationally. We performed a cross-sectional analysis to determine the association of different duration of leisure-time physical activity (PA) and the prevalence of light work and lost time in an industrial working population.

Methods: This was a cross-sectional study analyzing baseline data from a large prospective cohort study. Workers were enrolled from 27 different employers having 30 different production facility types located in Texas, Wisconsin, Utah, and Illinois. At baseline enrollments, workers completed a laptop administered questionnaire. Data quantified included demographics, PA (e.g. baseball, walking, skiing, tennis, yoga), and light duty/lost time (LD/LT) prevalence. Moderate activity was defined as any activity between 3-5.9 Metabolic Equivalent of Tasks (METs). Vigorous activity as an energy expenditure greater than or equal to a MET value of 6. Workers were split into 1-60, 61-150, 151-315, 316+ minutes/week of PA. We performed multivariate logistic regression analyses assessing correlations between exercise duration and LD/LT.

Results: 827 workers were included in our analysis. The majority of workers were male (63.8%) with a mean age of 38.8 ± 12.1 years. The median amount of PA performed was 82.5 min/week, with 25.9% (N=214) indicating they did not participate in any PA. Workers who exercised 1-60 and 61-150 min/wk. were 1.3 (p=0.20) and 1.1 (p=0.97) times

more likely to be prescribed LD/LT, respectively. While the workers who exercised 151-315 and 316+ min/wk. had a 0.7 ($p=0.42$) and 0.4 ($p<0.05$) chance of being prescribed LD/LT, respectively. A test for trend showed a significant negative correlation between LD/LT and increased level of exercise ($p<0.05$).

Conclusion: This cross-sectional analysis shows a positive correlation between worker productivity and weekly PA duration. These results may be used to implement a worker exercise program in order to increase productivity and well-being of workers. A longitudinal study on exercise intervention in the workplace could be useful to confirm this relationship.

Kevin M. Walters, MS
Colorado State University

Is the 'grass' greener? Work and well-being in the Colorado cannabis industry

In the US, medical cannabis is legal in 29 states and recreational cannabis is legal in 8 states, including Colorado (NORML, 2016). Colorado first legalized cannabis for medical use in November 2000, and legalized cannabis for recreational use with the passing of Amendment 64 in November 2012. Current research literature is sparse regarding worker health, safety, and well-being in the rapidly-growing cannabis industry, which is an economic asset to the state of Colorado. This research-to-practice (R2P) PILOT project is the first examination of Colorado's cannabis industry from an occupational health and safety perspective. Data were collected from Colorado cannabis industry workers ($n=214$) via an online survey from March-June 2014. The research team partnered with cannabis industry leaders, attended industry events, visited cannabis businesses, and administered a recruitment survey to solicit participation. Survey content included worker well-being antecedents and outcomes, workplace supports, training needs, safety climate, occupational hazards, health care access, interest in health and safety topics, job characteristics, and basic demographics. Findings suggest various physical and psychological hazards associated with cannabis industry work, as well as workplace supports that may buffer negative outcomes associated with identified workplace hazards. Additionally, study results suggest heterogeneous work conditions and health and safety training programs, in terms of both quality and quantity of training. Study results provide a basis for many key recommendations for cannabis industry enterprises. In conclusion, this study is the first to assess occupational health and safety in the Colorado cannabis industry. Project significance, design, findings, recommendations, and implications will be presented.

Erika Winning
Canyon Bakehouse

Workplace safety training – turning obligation into opportunity

Do you look at workplace safety training as an opportunity to invest in your employees and to provide strategic direction and engagement, or do you look at it as an obligation? The training “burden” facing companies is enormous, from materials handling to hazard communication to everything in between, work place training takes significant time to complete. Though training, and ensuring adequate training is provided is highly important to OSHA, according to OSHA’s Enforcement of Forklift Standards & the Role of the General Duty Clause by Tracey L. Cekada & Christopher A. Janicak, 46.6% of OSHA citations related to powered industrial trucks were related to operator training. Obviously, the importance of not only completing training, but providing accurate and adequate training is certainly important to OSHA. How does an employer turn their training obligations into opportunities to engage their employees? Through this presentation, attendees will see that through creating a positive training experience, compliance and ultimately workplace safety is improved. Attendees will also see how a cases study in a small business created significant health and safety in-roads for both safety leadership and safety improvements. Additionally, the traits of effective trainers will be addressed and discussed.

Kuck Hyeun Woo, MD, PhD
Soonchunhyang University Gumi Hospital, Gumi, Korea

Participatory action oriented health care program for self-employed merchants in a traditional market, Korea

For the Health Care Program on Self-employed Merchants in a Traditional Market, we applied the principle of the Participatory Action Oriented Training (PAOT). Compared to general population, their life style such as smoking, drinking, exercise etc. is poor and much stressful. And prevalence rate of Hypertension, Diabetes, Metabolic syndrome etc. is higher than general population. However, health care program for them is very difficult due to their working condition. We reviewed health care principles and developed Action checklist for them. Our action checklist is essential training tool of PAOT. Action checklist is not evaluation tool, but promotes participation and positive thinking, and broadens the scope of participants. It consists of 80 items in 11 management areas: 1. Hypertension, 2. Hyperlipidemia, 3. Diabetes, 4. Drinking habits, 5. Smoking, 6. exercise, 7. Diet, 8. Stress, 9. Mental health, 10. Musculoskeletal disorders, 11. Action plans. Each item is considered to be a list of feasible, simple and low cost improvement actions which could be widely applied. This study was conducted incorporated with Gumi city Health Center. In 2014, well trained public health nurse and 2 assistants visit 1 traditional market in Gumi. They met 351 self-employed merchants, and explained

how to use action checklist briefly. After checking action checklist and let them make action plans by themselves, while 2 assistants helped their selling during action plan drawing. After 3 months and 6 months later, we had follow-up visit and confirmed their action plans practices. Total number of action plans they submitted was 1,461. Among their action plans, 1,038(71.0%) have been practicing in 3 months follow-up visit, while 778(53.3%) in 6 months. Waist circumference, fasting blood glucose, metabolic syndrome score and prevalence, cardiovascular disease risk score and grade were significantly decreased. 94.4% of participants were satisfied in this program. Their concerns about health care much improved and their work place changed energetically and joyful. Relationships among them became friendly. In conclusion, PAOT is a very important component not only to improve working conditions and productivity, but also to create health and safety culture in Korea.

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