

Agenda & Abstracts

DECEMBER 9-11, 2021

Ex4OSH Virtual Conference

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Expanded Focus for Occupational Safety and Health (OSH) Conference

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The **Ex4OSH 2021 conference** was held December 9-11, 2021, and is part of a larger 3-year project (Delclos, G.L., PI) in partnership with the National Institute for Occupational Safety and Health (NIOSH), to address the need for an expanded focus for occupational safety and health (OSH). Ex4OSH 2021 brought together an international, interprofessional audience of employers, workers, health and safety professionals, researchers, policymakers, and academic community to address the need for an expanded focus for OSH.

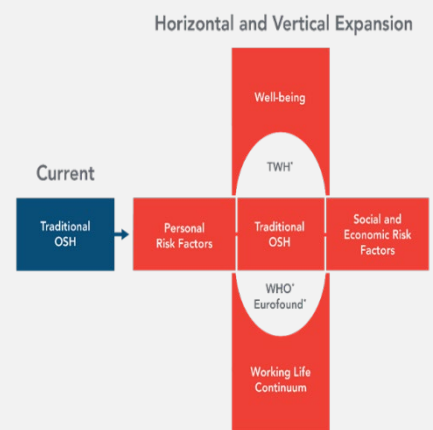
The expanded focus for occupational safety and health (Ex4OSH) towards worker well-being implies a paradigm shift requiring a more expansive, systems-thinking approach, integrated horizontally and vertically, involving stakeholders beyond NIOSH and the OSH community. It impacts our research, how we train OSH professionals, and how we apply proactive policies to assure worker well-being. It involves novel theoretical concepts, a new framework for worker well-being and creative approaches to measurement, the application of adult learning, and effective intervention design. Our project fosters a series of environments, forums and venues that bring these stakeholders together in order to advance this new, expanded approach. Read more on the [Expanded Focus for OSH](#), and two preparatory workshops ([1,2](#)) held in 2020 that informed the agenda of this conference.

The conference addressed three critical areas for the future of OSH: research, training, and policy. The challenges facing OSH will be explored during the conference and recommendations to address these challenges will be developed in the following workshops next year (and future dissemination products).

In occupational safety and health (OSH), setting worker well-being as an outcome implies a paradigm shift beyond the prevention of workplace illness and injury or health promotion. This paradigm will affect how we conduct OSH research, train the future OSH professional workforce, and design forward-thinking policies to maximize worker health and well-being. **The Ex4OSH conference will contribute to this public discourse through keynote addresses, concurrent sessions, plenary panels, discussion forums, case studies and poster communications, bringing together a broad, interprofessional audience that includes, but goes beyond employers, workers and the academic community, focusing on the three critical areas of research, training and policy/application.**

Worker well-being emphasizes quality of life, driven by the relationship between individual worker health and factors both at and outside the workplace, seeking to have workers thrive and achieve their full potential. In occupational safety and health (OSH), setting worker well-being as an outcome implies a paradigm shift beyond the prevention of workplace illness and injury or health promotion. Embracing this paradigm shift requires a more expansive, systems-thinking approach, to better integrate “traditional” OSH, personal and socioeconomic risk factors, both **horizontally** and **vertically**, over the working life continuum.

This expanded paradigm will likely affect how we conduct OSH research, train the future OSH professional workforce, and design forward-thinking policies to maximize worker health and well-being. The Ex4OSH 2021 conference will contribute to this public discourse in a major way through a series of presentations, discussions and dissemination activities that bring together a broad, interprofessional audience that includes, but goes beyond employers, workers and the academic community, focusing on the three critical areas of research, training and policy/application. Ex4OSH 2021 features national and international keynote speakers, concurrent sessions, plenary panels, discussion forums, case studies and poster communications following an international call for abstracts. This conference supports the [NIOSH Strategic Plan 2019 – 2024](#) (4), and is relevant to all [10 Sector Programs](#) (5), especially the Healthy Work Design Cross-Sector Program, and the Safe Skilled Ready Workforce, and Occupational Health Equity Core and Specialty Programs.



Felkner, S., Streit, J., Chosewood, L., McDaniel, M., Schulte, P., & Delclos, G. (2020). How Will the Future of Work Shape the OSH Professional of the Future? A Workshop Summary. *International Journal of Environmental Research and Public Health*, 17(19), 7154. doi:10.3390/ijerph17197154

CONFERENCE SCHEDULE

THURSDAY – DECEMBER 9, 2021

Time (CST)	Session Type and Session Information
8:00 AM - 8:30 AM	Opening and Welcoming Addresses
8:30 AM - 9:30 AM	<p>Keynote 1: Expanding our focus: <u>from</u> what, <u>to</u> what? Needs and opportunities in the OSH field.</p> <p>Keynote Speaker: Laura Punnett, ScD, Distinguished University Professor and Co-Director, Center for the Promotion of Health in the New England Workplace, University of Massachusetts Lowell</p> <p>Description: NIOSH, the WHO, the ILO, and others have called attention to the need for a comprehensive approach to occupational safety and health (OSH) which is not limited to identifying and reducing specific hazards. Concepts such as <i>Total Worker Health</i>[®], Decent Work, and Sustainable Development all envision a positive state of affairs that requires political and social will to prioritize the well-being of the workforce and our environment, broadly defined. This session will summarize some of the hazards of evolving work organization and technology; describe some needs for evidence and potential approaches for intervention research; and identify social partners to be cultivated in an effort to engage society toward the goal of healthy and sustainable work.</p> <p>Learning Objectives: At the end of this session, participants will be able to: (1) explain some of the <u>impacts</u> on health, safety, and wellbeing of evolving work organization and technology; (2) explain the societal-level obstacles to healthy work; (3) for OSH service providers, explain the impacts of these obstacles on their patients and clients, and identify the broader social networks that need to be engaged for positive patient outcomes; (4) appraise the types of evidence that might be useful in efforts to remove those obstacles; (5) appraise and utilize potential strategies for strengthening our research methods and research-to-practice translation, the OSH movement, and potential partners outside the OSH field to meet these challenges.</p>
9:30 AM - 9:45 AM	Break/Move to Next Session
9:45 AM - 10:45 AM	<p>Concurrent Session 1 (Sessions 1A, 1B):</p> <p><u>1A: Horizontal expansion in OSH - Personal Factors: Chronic disease; Personal lifestyle; Mental well-being</u> Moderator: Valerie Valenzuela, MBA; Speakers: Todd Stueckle, PhD, MA.; James Grosch, PhD, MBA; Kim Olszewski, DNP, CRNP, COHN-S/CM, FAAN; Monica Ubalde, PhD</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the horizontal expansion, with an emphasis on personal (i.e., individual level) factors.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on individual level factors and their relationship to worker well-being; (2) describe how individual level factors are incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one individual factor and how it influences (or is influenced by) a workplace factor.</p> <p><u>1B: Vertical expansion in OSH - Well-being and Working Life Continuum (research methods)</u> Moderator: Susan Wu, MPH; Speakers: Anjali Rameshbabu, PhD; Susan Peters, PhD, BOccThy; Jie Zhu, PhD candidate; Rebecca Guerin, PhD, CHES</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking</p>

	<p>approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the vertical expansion, with an emphasis on research aimed at worker well-being and the working life continuum.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on worker well-being and its determinants; (2) describe how the working life continuum is incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one methodological or measurement limitation to conducting research on worker well-being.</p>
10:45 AM – 11:00 AM	Break/Move to Next Session
11:00 AM – 12:30 PM	<p>Plenary 1: Anticipating the Future: How can research and training get ahead of the existential forces that will drive worker health, safety and well-being?</p> <p>Moderator: Lee Newman, MD, MA, Distinguished University Professor and Center Director, Center for Health, Work & Environment, Colorado School of Public Health, CU Anschutz Medical Campus</p> <p>Panelists: Cecilia Sorensen, MD; Mwangi Ndonga, CIH, CSP; Laura Linnan, ScD; Marcela Tamayo, PhD</p> <p>Description: This session is centered on how future changes in the nature of work should shape both the education of the next generation of the Occupational Safety and Health (OSH) professional workforce and OSH research.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe the impact of future of work on how we train the OSH professional workforce; (2) identify gaps and needs in education for the future OSH professional workforce; (3) describe the impact of future of work on how we conduct OSH research aimed at worker well-being; (4) identify gaps and needs in OSH research aimed at worker well-being, in particular in the face of climate change; (5) differentiate among different evidence-based educational approaches to OSH professional curriculum; (6) discuss current methodological limitations and needs in worker well-being research.</p>
12:30 PM – 1:30 PM	Lunch Break / Sponsor Exhibitor Booths / Networking
1:30 PM – 2:30 PM	<p>Keynote 2: The Impact of Workplace Reorganization on Worker Well-Being</p> <p>Keynote Speaker: David Weil, PhD, MPH, Dean and Professor, Heller School for Social Policy and Management, Brandeis University</p> <p>Description: Millions of workers in the US have jobs that do not provide adequate income to support their families, provide few—if any—benefits, lack opportunities for economic advancement, and expose workers to a wide variety of significant health and safety risks. These challenges to worker well-being arise in part because of business models and organizational practices that allow firms to carefully oversee the service or product quality produced by the workforce while shedding many of the responsibilities historically associated with employment. This change in both the present and future structure of work has profound implications on how employers, workers, health and safety professionals, researchers and policymakers can address occupational health and safety.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) analyze what economic and market factors lead businesses to adopt organizational practices that lead to a restructuring of how work and workers are managed; (2) identify features of organizations and organizational practices that may subject workers to a higher risk of health and safety risk due to changes in how industries and business have responded to economic and market factors; (3) explain how different types of regulatory interventions affecting workplace responsibility might positively or negatively impact worker well-being.</p>
2:30 PM – 2:45 PM	Break/Move to Next Session
2:45 PM – 3:45 PM	<p>Concurrent Session 2 (2A, 2B, 2C):</p> <p>2A: Horizontal expansion in OSH - Workplace Factors: COVID-19; Healthy work design; Occupational risk factors</p>

	<p>Moderator: Padmaja Naik, MBBS, MPH candidate; Speakers: Jack Dennerlein, PhD; Maija Leff, MPH; L. Casey Chosewood, MD, MPH; Lawrence John Schulze, PhD, PE, CPE</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the horizontal expansion, with an emphasis on workplace factors.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on workplace factors and their relationship to worker well-being; (2) describe how workplace factors are incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one workplace factor and how it influences (or is influenced by) personal behaviors and habits.</p> <p>2B: Vertical expansion - Well-being and Working Life Continuum (Practice and Policy)</p> <p>Moderator: Madison Bencomo, MBBS; Speakers: Bernard Fontaine Jr., MSc, CIH, CSP, FAIHA; Lisa Pompeii, PhD, MS; Jessica Streit, PhD, MS, CHES</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the vertical expansion, with an emphasis on practices and policies aimed at worker well-being and the working life continuum.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of a workplace intervention designed to promote worker well-being while maintaining productivity; (2) describe how the working life continuum is incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one example of an evidence-based relationship between the working life continuum and worker well-being that is amenable to the development of a workplace policy or intervention.</p> <p>2C: Work and Health: Towards a Broader Understanding</p> <p>Moderator: Michael Flynn, MA; Speakers: Lauren Malthaner, MPH; Francisco Soto Mas, MD, PhD, MPH; Kimberly Erukunuakpor, PhD, MPH; Michael Flynn, MA</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This special concurrent session presents current research examining the relationship between the future of work and its impact on worker health.</p> <p>Learning Objectives: At the end of this session, participants will be able to: (1) describe at least one example of innovative research examining the relationship between work (or employment) and health; (2) discuss the relationship between upcoming changes in the nature of work (or employment) and its impact on worker health, that is amenable to the development of a workplace policy or intervention.</p>
3:45 PM	Break/Move to Next Session
4:00 PM	Networking Session
4:00 PM	<p>Digital Poster Session 1: Expanded Focus for OSH: Determinants of Well-being</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors as determinants, both positive and negative, on worker well-being. This poster session centers on the research studies investigating various determinants</p>

	<p>(personal, workplace and socioeconomic) of worker well-being.</p> <p>Learning objectives: At the end of the conference and by the end of this session participants will be able to: (1) describe current research on worker well-being and its determinants; (2) describe how these determinants are integrated into the expanded focus for OSH model; (3) discuss at least one methodological or measurement limitation to conducting research on determinants of worker well-being.</p> <p>Digital Poster Session Format: Posters presenters have prepared five-minute presentations each for the audience, and the presentations and posters will be available for on-demand digital access throughout the dates of the conference. Presenters will accept and answer questions through the Q&A chat, by individual presenter, during the dates of the conference and during the scheduled session timeframe on the agenda.</p> <p>Poster Presenters:</p> <ol style="list-style-type: none"> 1. Jenil Patel, PhD, MBBS, MPH 2. Hsiang-Ming Wang, PhD, MBA, CBSP 3. Ali Aljaroudi, PhD 4. KC Elliott, MPH, MA 5. Midrel Dorel Tamba Diebres, Diploma in Systems Engineering 6. Paulette Hebert, PhD 7. Nancy Goodyear, PhD, MLS (ASCP) CM 8. Roxane Gervais, PhD 9. Natalie Schwatka, PhD 10. Marian Downing, RBP, CBSP 11. Kaitlin Gallagher, PhD 12. Ismail Nabeel, MD, MPH, MS
5:00 PM	Day 1 Closing

FRIDAY – DECEMBER 10, 2021	
Time (CST)	Session Type and Session Information
8:00 AM – 8:30 AM	Opening and Welcoming Addresses
8:30 AM - 9:30 PM	<p>Keynote 3: New educational strategies for occupational health professionals in Europe</p> <p>Keynote Speaker: Jorma Rantanen, PhD, Finnish Institute for Occupational Health, Finland</p> <p>Description: This session will describe European training strategies for occupational safety and health, and occupational health experts linking them to the EU OSH Framework strategy in case of OSH training, and to the European Bologna Process and European Higher Education Area, EHEA, in case of occupational health specialist training. The Finnish occupational health services are used for exemplifying the use of training strategies for ensuring competent human resources for the occupational health service system.</p> <p>Learning Objectives: At the end of the session, participants will be able to: (1) recognize the European Union OSH and OH training strategies; (2) identify the European Bologna Process for harmonization of academic expert curricula and development of quality of higher education in OSH and OH in Europe; describe the Finnish OHS system, the structure, functions and, human resources, of comprehensive occupational health service, and competence requirements for the occupational safety and health and occupational health service practitioners in Northern Europe.</p>
9:30 AM – 9:45 AM	Break/Move to Next Session
9:45 AM - 10:45 AM	<p>Concurrent Session 3 (3A, 3B):</p> <p>3A: Special session: Employment Regimes and Health 1: LAC Countries and Migrants</p>

	<p>Moderator: Frank Pot, PhD; Speakers: Mireia Utzet, PhD; Michael Silva, PhD; Richard Rabin; Bethany Boggess Alcauter, PhD</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). However, the impact of this expanded focus on vulnerable populations, as well as in resource-poor and other developing countries, is less well known. This special concurrent session presents current research, conducted in Latin America and the Caribbean (LAC), as well as in migrant populations in developed countries, that examines the relationship between the future of work and its impact on worker health.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of innovative research conducted in developing countries and/or vulnerable worker populations that examines the relationship between country, workers and health; (2) distinguish and critique the relationship between different leading occupational health indicators and country status.</p> <p>3B: Training of Future OSH Professionals 1:</p> <p>Moderator: Genesis Miranda, BA; Speakers: Silvia Maberti, PhD (Serving the changing workforce); Silvia Maberti, PhD (AIHA Evolving Profession); Javier Gonzalez, PhD, RN, OHN, MSc; Kim Olszewski, DNP, CRNP, COHN-S/CM, FAAN</p> <p>Description: This session is centered on how future changes in the nature of work will (or should) shape education and training of the next generation of the Occupational Safety and Health (OSH) professional workforce.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe the impact of future of work on how we train the OSH professional workforce; (2) identify gaps and needs in educational and training approaches for the future OSH professional workforce; (3) differentiate among different evidence-based education and training techniques.</p>
10:45 AM	Break/Move to Next Session
11:00 AM	<p>Plenary 2: Future of Work: Partnerships, Perspectives, Policy and Practice</p> <p>Moderator: Faiyaz Bhojani, MD, DrPH, FACP, Business Health Leader, Global Manufacturing and Upstream Americas, Regional Health Manager, Americas Shell Health</p> <p>Panelists: Victor Stretcher, PhD, MPH; Adam Glauberg, BS; Ramya Chari, PhD; Chris Cain, BS, CIH</p> <p>Description: This session is centered on how future changes in the nature of work should shape both policy and employer interventions and practices aimed at securing worker well-being.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe the impact of future of work on how employers shape policies to achieve worker well-being while maximizing productivity; (2) describe at least two examples of effective workplace interventions to promote worker well-being; (3) identify gaps and needs in the design and implementation of workplace interventions to promote worker well-being; (4) discuss current barriers to effective workplace interventions that seek to promote worker well-being while maintaining or improving productivity.</p>
12:30 PM	Lunch Break / Sponsor Exhibitor Booths / Networking
1:30 PM	<p>Keynote 4: Managing work-related psychosocial risks during the pandemic and beyond</p> <p>Keynote Speaker: Manal Azzi, PhD, Senior Occupational Safety and Health Specialist, International Labour Organization, Geneva, Switzerland</p> <p>Description: The session will explore the impact of the pandemic on workplace health and wellbeing. It will cover aspects of effective prevention of psychosocial risks and good practices. The session will also explore</p>

	<p>international labour standards and policy guidance to better manage the changes in the world of work and their impact on mental health.</p> <p>Learning Objectives: At the end of this session, participants will be able to: (1) list the psychosocial factors at work; (2) identify a number of good preventative practices in managing each psychosocial factor; (3) describe the different international labour standards related to managing work-related stress and they will be able to describe how these standards can be reflected in national policy and practice; (4) explain how health promotion in the workplace can lead to the reduction of chronic diseases.</p>
2:30 PM	Break/Move to Next Session
2:45 PM	<p>Concurrent Session 4 (4A, 4B, 4C):</p> <p>4A: Special session: Early Career Scientist (ECS) Session 1: Identifying and Addressing Gaps in OSH Practice Moderator: Jessica Streit, PhD, MS, CHES; Speakers: Kevin Moore, PhD, MBA; Raul Astete, MD; Rosandra Daywalker, MD; Jennifer Laine, DrPH</p> <p>Description: This session will feature research by early career scientists (ECS) and graduate students, aimed at identifying perceptions, competencies and training related to the promotion of worker well-being.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of research on measuring OSH professional and/or employer perceptions of workplace well-being and wellness programs and interventions; (2) describe at least one example of innovative training curriculum that introduces Total Worker Health to OSH professionals; (3) critique current approaches to OSH professional understanding of employer roles in workplace wellness and well-being; (4) discuss opportunities and barriers to the incorporation of early career scientists and graduate students in interprofessional OSH research.</p> <p>Session 4B: Horizontal expansion: Workplace Factors Moderator: Madison Bencomo, MBBS; Speakers: Regina Pana-Cryan, PhD; Wilton Remigio, DSc, MS, MPT; Babak Memarian, PhD, CSP, CHST; Amber Mitchell, DrPH, MPH, CPH</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the horizontal expansion, with an emphasis on workplace factors.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on workplace factors and their relationship to worker well-being; (2) describe how workplace factors are incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one workplace factor and how it influences (or is influenced by) personal behaviors and habits.</p> <p>Session 4C: Vertical expansion: Well-being and Working Life Continuum (Practice and Policy) Moderator: Padmaja Naik, MBBS, MPH candidate; Speakers: Francisco Perez, PhD; Jack Dennerlein, PhD; Babak Memarian, PhD, CSP, CHST</p> <p>Vertical expansion: well-being and working life continuum (practice and policy) (8) Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the vertical expansion, with an emphasis on practices and policies aimed at worker well-being and the working life continuum.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of a workplace intervention designed to promote worker well-being while maintaining productivity; (2) describe how the working life continuum is incorporated into the expanded focus for OSH paradigm shift; (3)</p>

	discuss at least one example of an evidence-based relationship between the working life continuum and worker well-being that is amenable to the development of a workplace policy or intervention.
3:45 PM	Break/Move to Next Session
4:00 PM	Networking Session
4:00 PM	<p>Digital Poster Session 2: Expanded focus for OSH: policy, training and practice</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to the design of educational curricula, policies and implementation of workplace practices to achieve the goal of worker well-being, both in specific workplaces as well as over the working life continuum. This poster session centers on current research and studies investigating various determinants (personal, workplace and socioeconomic) of worker well-being.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current policies, educational and practical experiences designed to advance worker well-being; (2) describe how these experiences are integrated into the expanded focus for OSH model; (3) discuss at least one practice-based intervention (policy, curriculum or program) that has served to advance worker well-being.</p> <p>Digital Poster Session Format: Posters presenters have prepared five-minute presentations each for the audience, and the presentations and posters will be available for on-demand digital access throughout the dates of the conference. Presenters will accept and answer questions through the Q&A chat, by individual presenter, during the dates of the conference and during the scheduled session timeframe on the agenda.</p> <p>Poster Presenters:</p> <ol style="list-style-type: none"> 1. Jenil Patel, PhD, MBBS, MPH 2. Carlos Delclós, PhD 3. Lorena Funcasta, Dr 4. Roxane Gervais, PhD 5. Paula Santia, MPH 6. Alejandra Ramirez-Cardenas, MPH 7. Francisco Soto Mas, MD, PhD, MPH 8. Elizabeth Fisher, CHES, MA(c) 9. Lida Orta-Anes, PhD, MA, MP, BS 10. Shannon Montgomery, PhD 11. Jacqueline Siven, PhD, MA, MPH 12. Amanda Roome, PhD
5:00 PM	Day 2 Closing

SATURDAY – DECEMBER 11, 2021

Time (CST)	Session Type and Session Information
8:00 AM	Opening Addresses – Day 3
8:30 AM	<p>Keynote 5: Employee Mental Health, Work Engagement, and Retention in a New Era: A New Model, New Interventions</p> <p>Keynote Speaker: Victor J. Strecher, PhD, MPH, Professor, University of Michigan School of Public Health, Founder and CEO, Kumanu, Inc.</p>

	<p>Description: The pandemic has left employers facing higher rates of anxiety and depression and lower rates of retention among their workforce. What are the factors influencing these issues and what can we do about it? Dr. Strecher will present a new, data-driven model and possible intervention strategies to address these problems.</p> <p>Learning Objectives: At the end of this session, participants will be able to: (1) identify relevant predictors of employee mental health, work engagement, and retention; (2) intervene upon relevant predictors of employee mental health, work engagement, and retention; (3) identify relevant predictors of mental health and health-related behaviors associated with chronic medical conditions; (4) intervene upon relevant predictors of mental health and health-related behaviors associated with chronic medical conditions.</p>
9:30 AM	Break/Move to Next Session
9:45 AM	<p>Concurrent Session 5 (5A, 5B):</p> <p>Session 5A: Special session: Employment Regimes and Health 2: Precarious Work Moderator: Frank Pot, PhD; Speakers: Tapas Ray, PhD; Noopur Singh, MPH; Emma K. Tsui, PhD, MPH; Sherry Baron, MD, MPH</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Nonstandard employment arrangements are on the rise, but also reflect precarious work situations. This special concurrent session presents current research on the relationships between various forms of precarious employment and its impact on worker health.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of innovative research on nonstandard work arrangements, including precarious work and its relationship between country, workers and health; (2) distinguish and critique the relationship between types of informal and formal work arrangements and how they may impact worker well-being.</p> <p>Session 5B: Training of Future OSH Professionals 2 Moderator: Paul Carey, MD, MPH; Speakers: Lisa Pompeii, PhD, MS; Robert Emery, DrPH, CHP, CIH, CSP; R. Sue Day, PhD; Rebecca Bedell, BS, MS, CSP</p> <p>Description: This session is centered on how future changes in the nature of work will (or should) shape education and training of the next generation of the Occupational Safety and Health (OSH) professional workforce.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe the impact of future of work on how we train the OSH professional workforce; (2) identify gaps and needs in educational and training approaches for the future OSH professional workforce; (3) differentiate among different evidence-based education and training techniques.</p>
10:45 AM	Break/Move to Next Session
11:00 AM	<p>Concurrent Session 6 (6A, 6B):</p> <p>Sessions 6A: Special session: Early Career Scientist (ECS) Session 2: An expanded view of OSH risk factors Moderator: Jessica Streit, PhD, MS, CHES; Speakers: Amaya Ayala Garcia, MPH; Carlos Delclos, PhD; Devan Hawkins, ScD; Emily McAden, MSPH</p> <p>Description: This session will feature research by early career scientists (ECS) and graduate students, examining the multiple interrelationships between workplace and other societal and economic factors that influence worker well-being.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of research on how socioeconomic factors, such as poverty or ownership, can affect overall</p>

	<p>worker well-being; (2) describe at least one example of how workplace factors can impact mortality; (3) describe at least one example of how the implementation of a workplace Total Worker Health program can improve worker safety and health; (4) discuss opportunities and barriers to the incorporation of early career scientists and graduate students in interprofessional OSH research.</p> <p>Session 6B: Horizontal expansion: Socioeconomic Factors</p> <p>Moderator: Cesar Leonardo Pinzon Gomez, MD; Speakers: Preethi Pratap, PhD (A decent work agenda for the US); Tim Bushnell, PhD, MPA; Preethi Pratap, PhD (Public health impacts of underemployment); Tapas Ray, PhD</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the horizontal expansion, with an emphasis on socioeconomic factors.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on socioeconomic level factors and their relationship to worker well-being; (2) describe how socioeconomic level factors are incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one socioeconomic level factor and how it influences worker well-being.</p>
12:00 PM	Lunch Break / Sponsor Exhibitor Booths / Networking
1:00 PM	<p>Concurrent Session 7 (7A, 7B):</p> <p>Session 7A: Special session 2: Work, Mental Health and Well-being</p> <p>Moderator: Michael Flynn, MA; Speakers: Bernard Fontaine Jr., MSc, CIH, CSP, FAIHA; Aro Choi, MS (Well-being and coping strategies); Terry Bunn, PhD; Aro Choi, MS (Well-being and employee perceptions)</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This special concurrent session presents current research examining the relationship between the future of work and its impact on worker mental health and well-being.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe at least one example of innovative research examining the relationship between work (or employment) and worker mental health and overall well-being; (2) discuss the relationship between upcoming changes in the nature of work (and/or employment) and its impact on worker mental health (or worker well-being), that is amenable to the development of a workplace policy or intervention.</p> <p>Sessions 7B: Vertical expansion: well-being and working life continuum (research methods)</p> <p>Moderator: Rosandra Daywalker, MD; Speakers: Paul Schulte, PhD; Chia-Chia Chang, MPH, MBA; Pete Kines, PhD; Consol Serra, MD, PhD</p> <p>Description: The world of work is undergoing major changes: in the nature of work and employment arrangements, in workforce demographics, and in the types of workplaces, all of which can affect both worker well-being and business productivity. Embracing this paradigm shift requires a more expansive, systems-thinking approach to better integrate traditional OSH and non-OSH factors, both horizontally and vertically (from a short-term perspective to a work life continuum perspective). This session centers on the vertical expansion, with an emphasis on research aimed at worker well-being and the working life continuum.</p> <p>Learning objectives: At the end of this session, participants will be able to: (1) describe current research on worker well-being and its determinants; (2) describe how the working life continuum is incorporated into the expanded focus for OSH paradigm shift; (3) discuss at least one methodological or measurement</p>

	limitation to conducting research on worker well-being.
2:00 PM	Day 3 Closes – Conference Ends

Abstracts

Concurrent Session 1 (Sessions 1A, 1B):

1A: Horizontal expansion in OSH - Personal Factors: Chronic disease; Personal lifestyle; Mental well-being

Moderator: Valerie Valenzuela, MBA, The University of Texas Health Science Center

Speakers:

1. Todd Stueckle, PhD, MA, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Expanding Efforts to Reduce Occupational Burden: The NIOSH Chronic Disease Prevention Program

Abstract: As the nature of work changes due to shifts in demographics, globalization, and technology, traditional Occupational Safety and Health (OSH) approaches do not effectively consider overall worker health and well-being in the future. Workplace exposures, personal risk factors, socioeconomic factors, and work life continuum are increasingly acknowledged as contributors toward occupational chronic disease. The NIOSH Cancer, Reproductive, Cardiovascular, and Other Chronic Disease Prevention Program (CRC) provides leadership in the prevention of work-related chronic diseases. The CRC works with industry, labor, trade, professional, and academic partners to reduce and prevent occupational cancer, adverse reproductive outcomes (ARO), cardiovascular disease (CVD), neurological, and renal diseases associated with work. Cancer is of increasing concern as most workers have several different jobs in their working lifetime and work later in life. Recent CRC work with cancer has examined psychosocial variables such as shift work as a carcinogen, in addition to associating long fiber exposure with early markers of lung cancer, linking firefighter exposure to site-specific cancers, development of the National Firefighter Cancer Registry, and routinely providing carcinogen data to the International Agency for Research on Cancer (IARC). Occupational AROs are also receiving increased attention, as more women of childbearing age are working in skilled trades to fill the labor gap and pursue jobs in high demand with lucrative pay. Moving forward, workplace standards need to protect the health of women moving into less traditional occupational roles. Finally, workplace exposures, stress, and personal factors contribute to occupational CVD. CRC researchers and partners recently found that 1) night shift work increases CVD risk in female nurses, 2) high occupational physical activity increases CVD risk, and 3) long working hours increase global deaths in CVD and stroke. Addressing occupational chronic disease in the future workplace is requiring CRC to evaluate and expand our current efforts and multiple collaborations to capture how multiple risk factors impact long-term worker health and well-being.

2. James Grosch, PhD, MBA, Centers for Disease Control and Prevention

Presentation Title: Changes in Job Characteristics, Health, and Well-Being Across the Working Life: Implications for the Future of Work

Abstract: A major societal trend affecting the future of work in developed countries is that people are living and working longer. Over the next decade, the growth rate for U.S. workers 55 years and older is estimated to be more than three times the rate for workers 25 to 54. This aging of the workforce has important implications for both work design and the effective management of safety and health risks. This presentation will describe findings from a study using the General Social Survey (GSS) which collects data on a wide range of topics, including work and health, and provides a representative cross-section sample of the U.S. adult population. In the 2002, 2006, 2010, 2014, and 2018 waves of the GSS, a Quality of Work Life (QWL) module was added to further assess job characteristics (e.g., type of work, autonomy), health (e.g., workplace injury, back pain), and well-being (e.g., job satisfaction, burnout). Descriptive and inferential analyses of the pooled QWL sample (N=7,243) examined age-related differences across these three categories. Findings indicated that older workers were more likely than younger workers to be in non-standard forms of employment (e.g., contingent work, part-time employment), report slightly higher levels of autonomy and social support, experience fewer workplace injuries but worse self-rated general health, and report higher levels of job satisfaction and positive mental health. Evidence was also found for an interaction between age and workplace exposure. For example, the risk of back pain increased with age, but only when workers reported that their job required heavy lifting or other types of physical demands. These

findings will be discussed regarding their implications for work of the future, as well as methodological issues (e.g., healthy worker effect, difficulty determining cause-effect) inherent in data from a cross-sectional survey of aging, working conditions, and health.

3. Kim Olszewski, DNP, CRNP, COHN-S/CM, FAAN, Bloomsburg University

Presentation Title: Exploring e-cigarettes and vaping: Health Effects, Policies, and Preparing for the Future

Abstract: By December 2019, a cluster of 2506 patients were hospitalized due to e-cigarettes or vaping (Hartnett et al., 2019). Subsequently, the Centers for Disease Control and Prevention (2019) released its first analysis report of lung injuries related to vaping and e-cigarettes called EVALI (E-cigarette, or Vaping, product use Associated Lung Injury). Statistics from the United States Department of Health and Human Services (DHHS, 2016) indicated use of e-cigarettes, vaping, and other electronic nicotine delivery systems (ENDS) were rapidly increasing although data on their safety is still scarce. Electronic cigarettes or electronic nicotine delivery systems, most often deliver nicotine as an aerosol for inhalation, without combustion of tobacco. This new mode of nicotine delivery raises concerns about the safety of the product, the effects of secondhand exposure, how the public use of these products should be handled within tobacco-free and smoke-free air policies, and how their use affects tobacco cessation programs, wellness incentives, and other initiatives to prevent and control tobacco use (Whitsel et al., 2015). However, data on smoke-free workplace policy coverage and cessation programs for newer modes of nicotine delivery is incomplete. Additionally, occupational health professional's (OHPs) knowledge on effects of vaping and e-cigarette use on workers' health, efficacy of tobacco policy change, and the impact on workplace safety and health is limited. The results of a study that explored: 1) occupational nurses' current level of knowledge regarding e-cigarettes, vaping, and ENDS, 2) how many workplace organizations include e-cigarettes in tobacco-free policies, and 3) how factors related to policy change is perceived by the OHPs and the organization. The presentation will assist OHPs to better understand e-cigarette, ENDS products, and the known and unknown health effects. The role of OHPs regarding education and cessation programs, will be discussed. Organizational policies addressing e-cigarettes and vaping will also be discussed.

4. Monica Ubalde, PhD, Barcelona Institute for Global Health (ISGlobal)

Presentation Title: The relationship between perceptions of indoor environmental quality (IEQ), productivity and quality of work among public primary school teachers during the Covid19 pandemic.

Abstract: Background: Previous studies have shown that improved IEQ conditions contribute positively to learning quality in children, but the influence of IEQ conditions on teaching quality is not known. We examined whether teachers' perceptions of IEQ influence their productivity and work quality. Methods: 229 female and 29 male teachers in eight primary public schools in Barcelona completed an adapted version of the MM040 questionnaire on indoor climate work environment in November 2020 and May 2021, respectively. A list of 11 worrisome indoor environmental conditions was used to evaluate teachers' IEQ perceptions. Work quality was measured using a composite score of work amount, stimulation, job control and support; productivity was based on a symptom-limited tasks score and sickness absence episodes lasting more than 15 days. Regression models, adjusted for selected individual and organizational confounders, were applied to estimate the relationship between IEQ perceptions, work quality and productivity, separately for both survey waves. Results: Overall, no statistically significant associations were observed between IEQ perception and work quality in either of the two survey waves. Crude and adjusted models showed a significant association between increasingly worrisome IEQ perception scores, limiting symptoms and sickness absence periods lasting longer than 15 days in both survey waves (β :0.41, p-value:0.0008, and β :0.54, p-value:0.001, respectively). Conclusions: Among primary school teachers, lower productivity, reflected by limiting symptoms and prolonged sickness absence periods, may be associated with perceptions of poor IEQ quality, but not with their work quality.

1B: Vertical expansion in OSH - Well-being and Working Life Continuum (research methods)

Moderator: Susan Wu, MPH, The University of Texas Health Science Center

Speakers:

1. Anjali Rameshbabu, PhD, Oregon Healthy Workforce Center (OHWC), Oregon Health & Science University (OHSU)

Presentation Title: Oregon Healthy Workforce Center, a NIOSH *Total Worker Health*® Center of Excellence

Abstract: The Oregon Healthy Workforce Center (OHWC) became a NIOSH *Total Worker Health*® Center of Excellence in 2011 and has since become a regional resource for employers and workers. OHWC's mission (led by Co-Directors, Drs. Leslie Hammer and Ryan Olson) is to improve the safety, health, and well-being of workers through *Total Worker Health* (TWH) research, dissemination, outreach, and education in our region. OHWC is one of six National Institute for Occupational Safety and Health (NIOSH) *Total Worker Health*® Centers of Excellence, and represents OSHA Region 10 (Oregon, Washington, Alaska, and Idaho). As a Center

dedicated to building solutions for worker safety, health, and well-being, OHWC primarily conducts intervention research to address the unique needs and challenges of workers within specific industries. All of our studies are informed by the TWH approach to build integrated programs that jointly target working conditions and employee-level outcomes. All of our intervention studies from previous funding cycles have resulted in ready-to-use toolkits that organizations can implement, e.g., leadership trainings and motivational strategies for front-line workers. OHWC also has a robust Outreach Core that prioritizes a research-to-practice approach and strong cross-sector partnerships in our region. We host events, create educational opportunities for students and professionals, and actively disseminate our evidence-based resources. OHWC's outreach has reached individuals representing over 200 organizations through our educational events, and our social media efforts generate 60,000+ engagements annually. Our TWH practitioner trainings have been delivered to 650 practitioners. Our research projects have partnered with 2500 participants from nearly a dozen industries, and our study outcomes have ranged from decreased lost work-days from injury¹ to improved health, safety-health knowledge and behavior, and enhanced leadership practices and organizational outcomes. We continue to successfully disseminate our toolkits, such as COMPASS, which has been adopted by the state, potentially reaching 60% of Oregon's homecare workers.

2. Susan Peters, PhD, BOccThy, Harvard Center for Work, Health, and Well-being

Presentation Title: Thriving from Work Questionnaire: Conceptualization and Development

Abstract: *"Thriving from work"* is the state of positive mental, physical, and social functioning in which workers' experiences of their work and working conditions enable them to thrive in their overall lives, contributing to their ability to achieve their full potential in their work, home, and community. Thriving from Work consists of six domains: experience of work, work-life, basic needs, psychological/emotional, social, and health-related well-being. The Thriving from Work Questionnaire was developed using a phased iterative approach, including a systematic scoping review, external review with 17 multidisciplinary experts, and 4 rounds of cognitive testing across a diverse sample of workers. Three waves of U.S. workers were surveyed in a national online panel (n=1,550; n=500; n=100) to conduct item reduction and evaluate the psychometric properties of the instrument. Using a clinometric approach to ensure content validity, we first fit a bifactor confirmatory factor analysis model to (a) identify a final set of 30 items (from an original set of 87 candidate items) that measures specific factors for each of our domains as well as thriving overall, and (b) derive an 8-item *short-form*. The final 30-item set had good model fit and excellent reliability for the general "thriving" factor. The *short-form* included at least one item from each specific factor, captured 94% of the variance of general thriving from the long form, and had a similarly good model fit. This factor structure was confirmed through our second sample. We assessed validity using a variety of measures including criterion validity through general thriving's association with Cantril's Ladder for a person's perception of their overall well-being – a 1 SD increase in long- and short-form scores was associated with a 0.6 and 0.57 point increase in Cantril scores ($p < 0.0001$). Thriving from Work Questionnaire appears to be a robust measure of work-related well-being.

3. Jie Zhu, PhD candidate, The University of Texas Health Science Center

Presentation Title: Scholarly Recommender System in the domain of Total Worker's Health

Abstract: Recommendation systems are information-filtering systems that employ data mining and analytics to predict user interests or preferences in information, products or services. These systems are widely utilized in commercial applications. Given their usefulness, extending the applications to aid scholars in finding relevant information and resources will significantly enhance research productivity. Furthermore, such scholarly systems will ultimately promote data and resource reusability. The overall goal is to develop a recommendation system (Virtual Research Assistant, VRA), to aid scholars in identifying related online data-resources including datasets, publications, grant announcements, and collaborators, saving scholars time and enhancing data-resources reusability. Different data representation techniques are explored for the development of the system using state-of-the-art natural language processing and deep-learning models. In addition to application areas in genomics <http://genestudy.org/> and immunology and infectious diseases <http://iidata.org/>, in this collaboration between the UTHealth Biostatistics & Data Science department and the Southwest Center for Occupational and Environmental Health, we are expanding the scope of our system to include Total Worker Health, addressing the need for an expanded focus for occupational safety and health and well-being. The exponential growth of online data resources in the era of Big Data demands new solutions for making these resources easily findable and reusable. Therefore, the VRA will be necessary for the scientific research community. It will aid scholars effectively, efficiently allocate academic resources, and enhance the resources' accessibility and reusability; an idea consistent with the FAIR principle (Findable, Accessible, Interoperable, Reusable) adopted by the NIH strategic plan for data science.

4. Rebecca Guerin, PhD, CHES, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Dissemination and Implementation Science Approaches for Addressing Complex, Future of Work Challenges

Abstract: Complex occupational safety and health (OSH) challenges—including the COVID-19 pandemic, the rise of automation, demographic shifts, increased psychosocial hazards and the interaction of work and nonwork factors—require wider and faster adoption of research that benefits workers, employers, and society. To increase the impact (including representative reach to diverse worker populations) effectiveness, and integration (including the adoption, implementation, and maintenance) of OSH activities, systematic approaches are needed to investigate the complex processes involved in moving promising OSH interventions into sustained practice. Dissemination and implementation (D&I) science is the study of methods and strategies for bridging the gap between research and practice. Although a relatively new and transdisciplinary field of study, D&I has a strong historical foundation. Aligned with the field of public health, D&I is concerned with changing systems by understanding multilevel context, leveraging an established evidence base, documenting outcomes, and characterizing the underlying mechanisms of change so that positive results can be replicated in other community-based and especially low-resource settings. Despite the promise of D&I, the uptake of D&I methods is still relatively limited in the OSH field. This presentation will: 1) provide a “plain language” overview of D&I science theories, models, frameworks, designs, methods and pragmatic measures, 2) give examples of and resources for integrating D&I into OSH research, 3) and identify considerations for researchers on the future of work. D&I approaches, with their influence on dynamic context and adaptations, can help researchers and policymakers to understand and address some of the complex, non-linear systems issues that impact worker safety, health and well-being.

Session 2A: Horizontal expansion - Workplace Factors: COVID-19; Healthy work design; Occupational risk factors

Moderator: Padmaja Naik, MBBS, MPH candidate, The University of Texas Health Science Center

Speakers:

1. Jack Dennerlein, PhD, Northeastern University / Harvard Center for Work, Health, and Well-being

Presentation Title: Improving COVID-19 Policies and Practices using Total Worker Health® approaches for essential workplaces: A Case Study in the Energy Supply Sector

Abstract: During the first year of the COVID-19 pandemic, workplaces considered essential had to rapidly implement and continually update new workplace policies, programs, and practices to protect the safety, health, and well-being of their workers. As a result, many workers and managers struggled to comply. To support their efforts and working with a construction company during April of 2020, we adapted our participatory Total Worker Health® organizational intervention for construction companies¹ to address issues associated with the implementation of COVID-19 requirements. The program utilized an interactive toolbox talk (team huddle) to determine worker experiences based on two main questions: (1) what is working well? And (2) what is not working well? These experiences then informed key decision makers as they adapted existing policies and practices to improve the implementation of COVID-19 requirements. We developed a set of resources and trainings to build the capacity of a company to implement the intervention since researchers were not allowed to complete any field work. Partnering with a division of a regional energy company with several crews consisting of about 40 field workers, we implemented and evaluated the intervention over several months in late 2020 and early 2021. The interactive toolbox talks completed by crew supervisors identified several challenges. The division’s management team then developed and implemented action plans to address these challenges and communicated these efforts to the workers. Pre-post worker surveys appeared to indicate improvement in workers’ comfort voicing health and safety concerns. Three themes emerged from key informant interviews post implementation – the program improved communication; it provided opportunities for discovery and to create change, and the company identified characteristics they need to sustain the effort. Overall, the case study indicates that the program was adaptive to new and emerging issues related to the COVID-19 pandemic, which allowed for the integration of real-time issues into their worker health and safety plans.

2. Maija Leff, MPH, University of North Carolina at Chapel Hill

Presentation Title: Assessing the impact of COVID-19 on small- and medium-sized businesses: The Carolina PROSPER Worksite Impact Survey

Abstract: Background and Objectives: The pandemic disrupted small/medium-sized businesses, many of which employ vulnerable workers. An interdisciplinary team from UNC-Chapel Hill launched Carolina PROSPER, a 2-phase study employing a Total Worker Health® (TWH) approach to protect and promote workers’ health in these businesses. This abstract reports on PROSPER’s phase 1, a survey of worksites’ COVID-19-related needs, interests, impacts and practices. Results informed development of services for phase 2’s TWH technical assistance program. **Methods:** The online survey was adapted from concurrent work carried out by other NIOSH

Education Research Centers and the Workplace Health in America survey. A convenience sample of worksites with ≥ 1 employee in a 10-county region in North Carolina were recruited via email, social media, and professional networks. Simple descriptive statistics and stratified analyses were calculated. **Results:** 192 worksites responded. The majority (54.2%) had 2-24 workers. The economic impact of the pandemic differed by worksite size; smaller worksites were more likely to report a reduction in operating hours while larger worksites reported hiring new employees. Larger worksites indicated a higher degree of preparedness for the pandemic, with more preparedness practices (e.g. plans for operations continuity) in place prior. The most common infection control practices were supplying hand sanitizer/cleaning wipes (89.4%) and worker behavior modification (e.g. encouraging sick workers to stay home (87.3%)). To develop services for phase 2, we asked about concerns and interests. Priority concerns were resumption of public health closures (76.2%), employee availability (73.9%), and scared/uncomfortable workers (72.5%). Top technical assistance interests were testing employees for COVID-19 (50.4%); developing disinfection protocols (37%); and supporting employee mental health (34.5%). Stratified analyses, e.g. by worksite size and essential business status, will be presented. **Conclusions:** PROSPER highlighted needs/interests of small/medium-size worksites during a pandemic. Public health practitioners must continue to address these with special attention to smaller, more vulnerable businesses.

3. L. Casey Chosewood, MD, MPH, National Institute of Occupational Safety and Health

Presentation Title: Achieving Worker Well-being through Healthy Work Design: A Research Roadmap Unfolds

Abstract: Each decade starting in 1996, the National Institute for Occupational Safety and Health (NIOSH) inspires and co-leads the creation of a National Occupational Research Agenda (NORA) to guide the nation's research efforts to protect and promote worker safety and health. In this decade, NIOSH added a new NORA cross-sector program, Healthy Work Design and Well-Being (HWD), focused on advancing worker well-being by improving the design of work, management practices, and the physical and psychosocial work environment. In 2020, NIOSH and an external Council of researchers, practitioners, and policy experts published an HWD-specific research agenda focused on seven critical areas of work-related burden and disparity, and opportunities to explore the interactions of occupational and non-occupational risk factors.

The following seven HWD objectives for the nation included broad gaps that need to be addressed:

1. Identify and examine the impact of worker demographics on employer or organizational practices and worker safety, health, and well-being
2. Improve the safety, health, and well-being of workers with non-standard work arrangements
3. Address the safety and health implications of advancing technology
4. Reduce work organization-related chronic health conditions among workers
5. Decrease the burden of shift work, long hours of work, and sleep deficiency
6. Improve the safety, health, and well-being of workers through healthier work design and better organizational practices
7. Promote a sustainable work-nonwork interface

This presentation provides the HWD cross-sector's high-level implementation roadmap for the nation to address the identified gaps and advance worker well-being in these seven domains. The roadmap helps organize, prioritize, and inspire actions leading to sustainable organizational changes that improve the quality of work and well-being outcomes across broad populations and all occupations and industries. Therefore, this presentation also invites diverse partners to join our efforts including researchers, practitioners, professional associations, private and public sector representatives, and worker organizations.

4. Lawrence John Schulze, PhD, PE, CPE, University of Houston

Presentation Title: Using SELR (Simplify-Enable-Leverage-Resource) to Develop Solutions to Identified Ergonomic Opportunities

Abstract: The SELR approach was developed by the U. S. Navy Reserve Force (WW.R2W.NAVY.MIL) to make the U. S. Navy Reserve Force and its associated operations more efficient and responsive to an ever-changing environment. Applied to Ergonomics, the SELR approach uniquely provides a method for solution development to opportunities identified using any time of process analysis approach. The SELR approach applied to solution development is defined by the following. *Simplify* the solution so that the solution is rapidly implemented with immediate impact; the solution does not negatively impact other processes; the solution is easy to understand and use, the solution minimizes costs and returns the investment rapidly; and the solution is feasible, viable and sustainable. *Enable* personnel with the capacity to develop solutions to identified opportunities with their sphere of influence and enable personnel to make decisions that improve the process and improve worker health and safety. After all, workers are the subject matter experts when it comes to their jobs and job tasks. Enabling personnel creates and winning and sustainable

organization. *Leverage* the talent and passions of the workers within the organization. Human resources must transition from personnel management to talent management. When organizations manage their talent, the organization succeeds economically and productively. *Resource* funds that allow local task improvements that are economically justified. When the funds are provided to purchase the correct tool for the task, based on recommendations from those doing the task, the worker, the organization and the community win.

Session 2B: Vertical expansion - Well-being and Working Life Continuum (Practice and Policy)Session

Moderator: Madison Bencomo, MBBS, The University of Texas Health Science Center

Speakers:

1. Bernard Fontaine Jr., MSc, CIH, CSP, FAIHA, The Windsor Consulting Group, Inc.

Presentation Title: Expanding the Boundaries of ISO 45001:OHSMS with ISO 45003 and ISO/PAS 45005:2020

Abstract: The COVID-19 pandemic placed unprecedented pressure on the workforce. From working at home to navigating the safety requirements of the pandemic workplace, workers around the world are experiencing disruption that is taking its toll on mental and physical health. The UK Health and Safety Executive (HSE) reports that stress, depression and anxiety were critical elements in most work-related health cases in 2019-2020. (IoE) As the impact of the pandemic stretches into 2021 and possibly beyond, occupational health and safety must expand its mandate to include a human-centered approach that addresses psychosocial health and the impact on doing work. Psychosocial health and safety are impacted by everything from social factors to hazardous tasks in the work environment. It has a significant impact on well-being in the workplace, but it is often an area in which many health and safety practitioners feel unqualified to lead. As a result, workplace mental health is frequently treated in a superficial way with yoga classes and a stocked fridge in the office kitchen. Instead of simply ignoring the complexity of mental health, organizations must recognize that the root causes of psychological health problems can span the divide between work and home, making it a multi-faceted issue that requires the integration of many workplace teams, such as human resources, occupational health and safety, and leadership. (HSE). Canadian Centre for Occupational Health and Safety (CCSO), in conjunction with Simon Fraser University, identified thirteen psychosocial risk factors that impact organizational health, the health of individual employees and the financial bottom line. But this may only be the tip of the iceberg. A lack of psychological safety and health at work has major business repercussions. First, when people don't feel comfortable talking about initiatives that aren't working, the organization isn't equipped to prevent failure. When employees aren't fully committed, the organization has lost an opportunity to leverage the strengths of all its talent. Since 2018, International Standards Organization (ISO) 45001:2018 has been the international standard for occupational health and safety management systems (OHSMS). It provides guidance to ensure leadership commitment to the OHSMS, policies that support the organization while fulfilling compliance obligations, continuous improvement of the OHSMS and integration of the OHSMS into the organization's business processes. Together with other standards that use the Annex L high-level structure, such as ISO 9001:2015 and ISO 14001:2015, ISO 45001:2018 can be part of an integrated management system that uses shared processes and documentation to meet the requirements of environmental, health and safety and quality management systems. The ISO has expanded the standards in the 45000 series with two additions: ISO 45003 Occupational health and safety management- Psychological health and safety and ISO/PAS 45005:2020.

2. Lisa Pompeii, PhD, MS, Baylor College of Medicine, Department of Pediatrics/Center for Epidemiology & Population Health

Presentation Title: Use of Personal Protective Equipment for Workers Caring for Pediatric Behavioral Health Patients: A Collaborative PDSA Project

Abstract: Background: Healthcare workers are at risk for assault from aggressive behavioral health (BH) patients. To reduce risk, the Initial Behavioral Assessment and Protective Equipment Decision Key (IBA-PEDK) was developed for use in designated pediatric BH units, which uses the patient's aggressive behavior to recommend personal protective equipment (PPE) for healthcare workers. The purpose of this PDSA (Plan, Do, Study, Act) project was to examine the feasibility of implementing the IBA-PEDK on a general pediatric medical surgical unit that already used PPE. Methods: Nurses on this designated unit were trained on how to complete the IBA-PEDK, and how to transfer the recommended PPE information to a sign on the patient's door that informed workers about the PPE to be worn. Nurses' aides, patient sitters, and physicians were trained on how to use the door sign to guide their PPE use. We then evaluated nurses' completion of the IBA and door sign, and workers' use of PPE through direct observation. Findings were then used to make recommendations for improving this program. Results: During the assessment period, 56 BH patients were admitted, 48% (n=27) had a completed IBA-PEDK and of those, 78% had a completed door sign communicating the PPE to be worn. Only seven of 39 (18%) health care workers were observed wearing PPE prior to entering a patient's room. Conclusions: Half the patients did

not have an IBA-PEDK completed by nursing staff, and the door sign did not result in high PPE usage among workers. These findings of low adherence were used to recommend changes to this program including: 1) integrating the IBA-PEDK into the electronic medical record making it available to all workers; 2) changes to the door sign to ensure workers could readily see the type of PPE required; and 3) making training readily available through the hospital intranet so workers could refresh their skills, when needed.

3. Jessica Streit, PhD, MS, CHES, National Institute of Occupational Safety and Health

Presentation Title: Advancing Worker Safety, Health, and Well-being with Strategic Foresight

Abstract: The factors affecting worker safety, health, and well-being in advanced industrialized countries like the United States have undergone a fundamental shift in recent decades. Numerous social, technological, economic, environmental, and political (STEEP) trends now interact to influence work, the workplace, and the workforce. Proactively managing this broad—and growing—set of complex issues affecting workers will require innovative and systems-focused occupational safety and health (OSH) methods and approaches. To that end, we propose incorporating futures-oriented *strategic foresight* into OSH research and practice to more actively anticipate, and even shape, the future of worker safety, health, and well-being. Recognizing that the future is not predetermined or predictable, the practice of strategic foresight identifies and monitors early signals of potential change for multiple plausible futures. Such an approach reduces the likelihood of being unprepared for emerging trends and changes as they arrive in the mainstream. It also aids in the discovery of leverage points for moving toward desirable future outcomes and informs the development of robust strategic options and approaches. This presentation will review strategic foresight and describe how the practice can be integrated into OSH research and practice. First, we will provide a brief overview of strategic foresight and highlight popular foresight models and frameworks. Next, we will review several projects from around the world that have used strategic foresight to develop and explore plausible scenarios for the future of worker safety, health, and well-being. Then, we will present a strategic foresight framework tailored for OSH, which can serve as a guide for investigating the future in support of an expanded focus for OSH. We will conclude by offering recommendations for building strategic foresight capacity in the OSH community.

Session 2C: Work and Health: Towards a Broader Understanding

Moderator: Michael Flynn, MA, National Institute of Occupational Safety and Health

Speakers:

1. Lauren Malthaner, MPH, The University of Texas Health Science Center

Presentation Title: The impact of sleep quality on use of force among police officers in an urban police department

Abstract: Background/Purpose: Law enforcement officers' (LEOs) sleep deprivation negatively impacts job performance, including experiencing accidental injuries and negative community interactions. Additionally, research has shown that poor sleep quality increases LEO use of force (UoF). To our knowledge, no research has examined which specific sleep quality factors, like nightmares or snoring, impact UoF. We evaluated associations between sleep quality factors and UoF among LEOs. **Methods:** A self-reported survey was completed by 434 LEOs at a large, urban police department in Texas, United States. The survey included the Pittsburgh Sleep Quality Index (PSQI), a validated, 10-item construct with 7 sleep domains (i.e., self-perceived quality, latency, duration, efficiency, disturbances, medication use, daytime dysfunction). These 7 domains are added to create a total PSQI score from 0-21, where a higher score indicates more severe sleep difficulty. We linked surveys of the LEOs that provided badge numbers to departmental UoF records (n=234). We dichotomized frequency of UoF to either having or not having a UoF report. UoF type was categorized into four types representing the UoF continuum: verbal commands (e.g. "freeze"), soft empty-hand control (e.g. grabs), hard empty-hand control (e.g. weapon display); and non-lethal weapon use (e.g. taser). Bivariate models tested associations between PSQI subdomains, overall UoF, UoF categories, and reason for UoF. **Results:** Not breathing comfortably, self-perceived sleep quality, and trouble staying awake were associated with having a UoF report (p=.014, p=.029, p=.041). Shorter sleep duration and higher total PSQI score were associated with verbal command presence (p=.018, p=.045). Self-perceived sleep quality was associated with soft empty-hand control presence (p=.033). Higher total PSQI score was associated with non-lethal weapon use presence (p=.017). **Conclusions:** We found significant associations between sleep quality and UoF indicating the possibility for targeted sleep interventions in LEOs to improve community interactions.

2. Francisco Soto Mas, MD, PhD, MPH, University of New Mexico College of Population Health

Presentation Title: The Health, Safety and Psychosocial Organic Farming Survey Study

Abstract: Increased participation in organic agriculture has become a social, economic and public health priority. While this priority can only be achieved by understanding the safety, health and life circumstances of the farmer, there are very little data on the organic farmer, including data that directly or indirectly relate to safety and health. Furthermore, there is a dearth of information on the perspectives and experiences of organic farmers (most of whom are small farmers), and the psychosocial and contextual factors that may influence not only their health and safety-related behaviors but also the sustainability of their farms and life as farmers. This information is essential for the allocation of resources, injury prevention and health education, and policy aimed at supporting and promoting organic agriculture. The Health, Safety and Psychosocial Organic Farming Survey study developed a multidimensional tool to assess the demographic, psychosocial and contextual factors that may contribute to safety and health among organic farmers. The Organic Farmer Safety, Health and Life Survey (OFSHL) was administered to a sample of USDA certified organic producers in the SW AG region of the United States. More than 100 farmers completed the survey. Preliminary results indicate low perception of risk compared to conventional farming and other occupations; low compliance with safety recommendations and equipment; and high level of stress related to family problems, illness/health and isolation. Nearly 80% were “somewhat” or “very concerned” about their own health. On the other hand, a very high majority reported satisfaction with life and work. This presentation discusses the project and the results of the study, and proposes strategies for intervention and policy.

3. Kimberly Erukunuakpor, PhD, MPH, Georgia Department of Public Health

Presentation Title: Identifying Occupation Groups with Low Breastfeeding Rates, Georgia 2017-2019

Abstract: Introduction Breastfeeding provides a range of health benefits to both infants and mothers. Mothers who breastfeed have lower risk of hypertension, Type-2 diabetes, ovarian and breast cancer, and postpartum depression. Certain policies and supports in the workplace can make a difference in whether or how long infants are breastfed. In this study, we assess the association between occupation and low breastfeeding in Georgia. **Methods** We used data from the 2017-2019 Georgia Pregnancy Risk Assessment Monitoring System (PRAMS). Low breastfeeding was defined as breastfeeding for less than eight weeks following birth. Ten major occupation groups with at least 50 respondents on PRAMS were included. Logistic regression was conducted with low breastfeeding as the outcome, adjusting for age, race, education, BMI, and current smoking. Data were weighted to adjust the total number of respondents to equal the population of women with a recent live birth in Georgia. **Results** A total of 2,516 (weighted: 367,614) mothers responded to PRAMS in 2017-2019. An occupation code was assigned to 1,588 (weighted: 234,422) mothers. Fourteen percent (95% CI: 12%-17%; weighted: 32,529) of mothers reported breastfeeding for less than eight weeks. Prevalence of low breastfeeding was highest in production occupations (66%; 95% CI: 48%-80%) and lowest among healthcare practitioners and technical occupations (20%; 95% CI: 13%-30%). After adjusting for covariates, low breastfeeding was notably higher in production occupations (PR: 3.3; 95% CI: 2.0-5.5) and food preparation and serving related occupations (PR: 2.75; 95% CI: 1.7-4.4), compared to healthcare practitioners and technical occupations. **Discussion/Conclusion** This study identified occupation groups where women were more likely to report breastfeeding for less than eight weeks, which is much lower than the recommended duration of one year. Understanding challenges that deter the ability to breastfeed and targeting occupations for workplace interventions that improve breastfeeding support will contribute to the health and well-being of working mothers.

4. Michael Flynn, MA, National Institute of Occupational Safety and Health

Presentation Title: Health Equity and the Future of Occupational Safety and Health: Towards a Biopsychosocial Approach

Abstract: Occupational safety and health (OSH) has evolved into a largely technical field focused on identifying and eliminating physical, chemical, and biological hazards found in the workplace. Central to this approach has been a view of cause and effect rooted in the biomedical model of health. As a result, the OSH field has limited its ability to account for the social structures that circumscribe health outcomes and how they contribute to the inequitable distribution of work-related benefits and risks across the population. Changes to work, the workforce and our understanding of the relationship between work and health have all contributed to a growing awareness of the need to expand and complement this reductionist view of cause and effect by finding ways of accounting for the social, political, and economic interactions that contribute to health outcomes for workers. In short, the field of occupational safety and health is undergoing a paradigm shift towards a biopsychosocial approach to worker health and wellbeing. Central to this approach is the identification and elimination of avoidable differences in workplace injury and illness that are closely linked with social, economic, and/or environmental disadvantage. This presentation discusses health equity as a central component of the shift to a biopsychosocial approach and the implications and opportunities this paradigm shift offers OSH professionals, researchers and institutions.

Digital Poster Session 1: Expanded Focus for OSH: Determinants of Well-being

1. Jenil Patel, PhD, MBBS, MPH, The University of Texas Health Science Center

Presentation Title: Workplace interventions for treatment of occupational asthma

Abstract: *Background* Although workplace exposures are responsible for 1 of every 6 adult-onset asthma cases, the benefits of workplace interventions on occupational asthma are unclear. *Objectives* Serving as an update to a previous Cochrane Systematic Review, we evaluated the effectiveness of workplace interventions on occupational asthma using both newer and older studies available in the literature. *Search methods* We comprehensively searched for studies from multiple databases dated till July 31, 2019. The eligible studies included, but were not limited to, randomized controlled trials, controlled before and after studies and interrupted time-series. Using measures of treatment effect, we reported on three comparisons: 1) complete removal from exposure versus continued exposure 2) reduction of exposure versus continued exposure, and 3) complete removal from exposure versus reduced exposure. *Results* A total of 26 non-randomized controlled before and after studies with 1,695 participants were identified. Compared to continued exposure, both removal from exposure (risk ratio(RR)=4.80, 95% confidence interval (CI)=1.67,13.86) and reduction of exposure (RR=2.65, 95% CI=1.24,5.68) may increase the likelihood of reporting absence of asthma symptoms. Removal was not significantly better than reduction for absence of asthma symptoms (RR= 6.05, 95% CI=0.86,42.34). However, removal was associated with a higher risk for unemployment than reduction of exposure (RR=14.28, 95% CI=2.06,99.16). *Conclusions* Interventions in the form of both removal from exposure and reduction of exposure may improve asthma symptoms compared with continued exposure, but the risk of unemployment may be greater with removal than reduction.

2. Hsiang-Ming Wang, PhD, MBA, CBSP, Texas Biomedical Research Institute

Presentation Title: Pandemic Response Team (PRT)- A Systematic Approach to Ensure Business Continuity Amid Major Disaster

Abstract: When faced with serious disaster such as the COVID-19 pandemic, the success and failure of an entity depends heavily on having the right team to quickly and effectively making decisions in response to the unknown and ever-changing environment. As a small non-profit research institution, TxBiomed has the ability to implement the necessary changes quickly based on available scientific data, local ordinance, and federal guidance. The decision is constantly refined with the available institutional surveillance data combined with diligent contact tracing records. The Pandemic Response Team (PRT) at TxBiomed was assembled as soon as pandemic was declared and consists of 7 VP and Director level leaders in finance, research, facility operations, safety and security, human resources, and public relations. Through PRT, TxBiomed implemented mask requirements prior to government mandate, adjusted work environment to minimize potential transmission, rapidly traced and quarantined potentially infectious employee, and offered vaccination to employees at a rate more than double the nearby community- 80% as of May. As the pandemic subsided, PRT is crucial in establishing a recovery plan to bring the institution back to the new normal and document the lessons learned. This unprecedented pandemic provided the invaluable lessons for the business continuity plan and flexible work policy.

3. Ali Aljaroudi, PhD, Sam Houston University

Presentation Title: Effect of Hand Activity on Cleaning Personnel During COVID-19 Pandemic

Abstract: Cleaning personnel complete jobs daily that require frequent excessive force, repetitive motion, and awkward postures. During the current pandemic of coronavirus disease 2019 (COVID-19), there has been extra workload on cleaning staff to provide proper disinfecting and safe work environment. The job tasks could be exacerbated by a lack of equipment, poor maintenance of equipment, and inadequate training on lifting techniques and proper body mechanics. The objective of this research study is to provide an insight to the CTS risk levels related to hand activity during COVID-19 pandemic of most repeated cleaning tasks. A total of 12 cleaning personnel were assessed during their duty completing the following tasks: mopping floors, scrubbing floors, and wiping surfaces. The collected data was analyzed using the American Conference of Government Industrial Hygienist Hand Activity Level (ACGIH HAL). The data reflected that the level of risk increased between mopping floors and scrubbing surfaces then again between scrubbing floors and wiping surfaces. The highest ratio came from the right hand of wiping surfaces at 2 and the highest ratio was in the left hand from scrubbing floors at 1. There was an equal ratio of 0.5 in the left and right hand for mopping. From the data gathered, it seemed that the highest risks came from wiping surfaces with the right hand meaning that the risk level was unacceptable and above the ACGIH TLV. There was a lot of excessive force in place for a simple task that would have to be repeated for hundreds of surfaces a day. The suggested immediate solution in this case is the administrative control such as proper job rotation, increasing number of personnel instead of putting all tasks on one person as well as providing proper tools that can reduce the biomechanical load and make the job safer.

4. KC Elliott, MPH, MA, National Institute of Occupational Safety and Health

Presentation Title: Fatigue and Fatigue Management in the Agriculture, Forestry, and Fishing Sector: Context, Challenges, and Opportunities for Effective Communications and Training

Abstract: The Agriculture, Forestry, and Fishing (AgFF) industry is often characterized as dangerous work in a dynamic environment that takes focus, good judgement, and often quick reflexes. AgFF workers average longer hours per week than those in other industries, and consistently have the highest fatality rate of any sector in the country, while also experiencing high rates of non-fatal injury and illness. However, many federal and state OSH regulations have specific exemptions for AgFF work. Extended work hours, shift work, sleep deprivation, and fatigue have been described as a “significant safety issue” and a “cultural norm” within the sector, but little research or interventions have been developed for AgFF work settings. However, addressing fatigue in AgFF using traditional approaches is difficult. Several work organizational factors culturally and economically incentivize extended shifts and minimal staffing. At the same time, AgFF workers are older, less likely to have health insurance or paid leave, and live in rural and remote areas. AgFF workers realize the risks of fatigue, but do not yet have the tools and training to respond effectively. Future AgFF fatigue management solutions must provide realistic and adaptable solutions to mitigate risk during both acute fatigue incidents and persistent chronic fatigue, while keeping in mind the unique challenges of rural work settings, mental stress, and diverse workplaces. This presentation will explore the unique environmental, economic, geographic, and social contexts of AgFF work which often makes current sleep hygiene best practices incompatible with the realities of working in this sector. The current state of shift work and fatigue research and training in AgFF will be discussed, followed by possible approaches for creating new fatigue interventions and messages, as well as current NIOSH efforts to expand research and develop training for this sector.

5. Midrel Dorel Tamba Diebres, Diploma in Systems, IT Business Campus

Presentation Title: Personal risk factors

Abstract: Epidemiologic studies have identified myriad factors related to cancer risk. Risk can be quantified on the basis of demographic factors, genetics, occupation, medical conditions, and lifestyle. Existing evidence suggests that:

- 1) individuals at risk often are unaware of their risk;
- 2) physicians may not know well those factors associated with the highest cancer risk ; and
- 3) methods to reduce risk have been under-applied because of lack of knowledge, lack of funds, or lack of motivation among both patients and physicians. Methods to reduce risk do not follow the usual medical model in that those groups requiring risk modification intervention usually are symptom free. Evidence indicates that elimination of tobacco use would reduce lung cancer deaths by 83% and substantially reduce the incidence of head and neck malignancies. Broad application of mammographic screening would effect a 30% reduction in breast cancer mortality. Dietary modification could potentially reduce cancer mortality by 30%.

An effective program to reduce cancer risk will accomplish the following:

- 1) develop new and refine existing risk factor measurements to improve identification of individuals at risk;
- 2) apply risk factor identification and modification more completely to populations known to be at risk;
- 3) use combinations of risk factors to identify subpopulations at the highest risk;
- 4) apply existing prevention and screening modalities more broadly and uniformly;
- 5) identify new screening strategies with improved test performance and cost effectiveness to maximize screening efficiency; and
- 6) provide accurate and rapid means of risk assessment and quantification using the best available multivariate estimates of risk.

6. Paulette Hebert, PhD, Oklahoma State University

Presentation Title: Case Study of a University’s Departmental Textile Laboratory: Existing Conditions and Compliance with Illumination Standards

Abstract: Proper illumination is considered necessary for workers’ 1) *accuracy*, 2) *comfort* and 2) *safety*, especially around hazardous chemicals and high temperature procedures commonly found in a textile laboratory. At a University’s Departmental Textile Laboratory, traditional college age students, as well as graduate students, faculty and staff may use the facility. The Illuminating Engineering Society (IES) publishes recommendations for light levels for various tasks with acceptable ranges for different age groups and Light Reflectance Values (LRV) recommendations for room surfaces. As this lab is over 15 years old, it was anticipated it may not comply with current standards. Researchers acquired the upper-limit of departmental faculty ages from a voter records app and estimated youngest undergraduate students’ ages. During two-week period, researchers documented existing conditions. Using industry procedures, researchers utilized an Extech LT300 light meter to measure light levels on work surfaces and lab equipment in both horizontal and vertical planes. They utilized a Sherwin Williams Paint Color Fan deck to visually match and identify the Light Reflectance Values (LRV) of room finishes. They compared the measured light levels to IES Recommendations. Age range for potential laboratory workers was found to be 18 to 67 years. In-situ measured light levels were found to exhibit variability: 2.4-150

footcandles (25.83 – 1614.58 lux) on worksurfaces and 1.3-21.9 footcandles (13.99 – 235.73 lux) on equipment. Lack of compliance of some measured light levels with the IES recommendation for general laboratory work were found including those for 25-65 year old age group (300 horizontal lux, 150 vertical lux) and over-65 age group (600 lux horizontal, 300 lux vertical). LRV ranged from 49% for floor, to 77% for walls and ceiling. Ceiling LRV did not comply with IES recommendations (>90%). The existing textile laboratory should be renovated to meet current recommendations and potentially increase worker accuracy, comfort and safety.

7. Nancy Goodyear, PhD, MLS(ASCP)CM, University of Massachusetts Lowell

Presentation Title: N-halamine-based antimicrobial textiles for infection prevention

Abstract: Healthcare textiles can harbor pathogens for weeks to months and are a potential source of transmission of pathogenic microorganisms to healthcare workers. Antimicrobial textiles can be an engineering control to prevent worker infection. N-halamine-based fabrics utilizing chlorine as the active component have advantages: 1) long stability, 2) low free chloring dissociation constant, 3) compatibility with polyester, nylon, acrylics, and cotton-cellulose, 4) controllable chlorine concentration, 5) regeneration of discharged chlorine with diluted bleach, and 6) monitorable for antimicrobial activity. We have previously shown that N-halamine cotton with a high active chlorine content (5885 ± 98 ppm) is effective against seven pathogens in the presence of PBS, artificial sweat, 5% serum, and four normal skin bacteria. In this study, we tested cotton with a much lower active chlorine concentration (1642 ± 124 ppm) against the same individual microorganisms. Pathogens (ATCC numbers) included: *Acinetobacter baumannii* (19606), *Candida albicans* (24433), *Escherichia coli* (29214), vancomycin-resistant *Enterococcus faecalis* (51575), methicillin-resistant *Staphylococcus aureus* (43300), methicillin-susceptible *Staphylococcus aureus* (6538), and *Pseudomonas aeruginosa* (10145). Normal skin bacteria included: *Acinetobacter lwoffii* (15309), *Corynebacterium striatum* (BAA1293), *Micrococcus luteus* (49732), and *Staphylococcus epidermidis* (14900). Each organism was diluted in PBS, artificial sweat (EN 1800:2011), or 5% serum, standardized to 7.5×10^7 CFU/mL, and remained in contact with the N-halamine fabric for 15 minutes. Under all experimental conditions, all microorganisms were reduced by at least 3.19 log₁₀ (range, 3.19 – 6.61). All were reduced by 100% except for *P. aeruginosa* in 5% serum (3.25 log₁₀, 99.9448%). There was no statistical significance by soil type ($P > 0.05$). The N-halamine textile at 1642 ± 124 ppm active chlorine is extremely effective at reducing microbial contamination within 15 minutes in the presence of PBS, artificial sweat and 5% serum. Rechargeability and monitorability make it an attractive engineering control for infection prevention.

8. Roxane Gervais, PhD, Practical Psychology Consultancy Ltd

Presentation Title: Ensuring a safety culture that facilitates positive behaviours and actions

Abstract: Introduction. The literature that exists on the safety culture concept is extensive. It is a construct that is acknowledged as one that can drive positive change within organisations. As such, it is accepted as one of the drivers that supports how organisations should function to ensure they achieve considered and purposeful actions and behaviours in their safety practices. In this respect, an effective and functional safety culture is expected to add efficacy to those preventive measures used within organisations' health and safety management systems, with an expected benefit of good safety performance. Aim. The purpose of this paper is to present the evidence-base for those actions and preventative measures that promote, ensure and reinforce the characteristics of a robust safety culture. Method: This paper uses desk-based research to investigate those attributes that allow a positive safety culture to emerge within organisations. Results and Discussion: A review of the literature does not provide a definitive set of factors or characteristics that improve an organisation's safety culture. However, various elements emerge as ones that should be considered when organisations wish to enhance their safety culture, these are leadership, communication and training. More recent research has been promoting the usefulness of psychological safety within organisations to support appropriate risk-taking, openness, trust and a healthy working environment, in which raising a concern does not result in censure. The promotion of a psychological safe working environment can be seen to assist with positive change, which in turn will support a robust safety culture.

9. Natalie Schwatka, PhD, University of Colorado Anschutz Medical Campus

Presentation Title: Lessons learned from a study of organizational leadership for occupational health and safety

Abstract: Expanding our focus of occupational safety and health (OHS) to address this complete picture of workforce health cannot be done without considering our vision for the working environment. Our research over the past five years during the Small+Safe+Well intervention study suggests a complex interplay between organizational structures and functions for OHS and the culture that drives engagement in it. We find that businesses implement a variety of OHS approaches with some offering similar safety and health/wellness policies and programs and others offering differing levels. However, businesses that offer more OHS policies and programs tend to employ workers who report that their employer cares for their health and safety than employers who offer fewer OHS policies and programs. Yet for employers that wish to create a culture where employees are proactively engaged in

the OHS policies and programs, company leadership must demonstrate a commitment to these initiatives and create a climate that supports the initiatives use in day-to-day practice. Under these conditions, employees are more internally motivated to participate in OHS initiatives and this internal motivation will drive their engagement even in the absence of incentives that employers commonly use to drive participation. Even in the face of a pandemic, this positive environment may prepare businesses to better maintain their employees' well-being. We also find that a leadership program that trains multiple individuals per organization can help business leaders develop a shared vision and goals for OHS through increased practice of OHS leadership skills. The future of OHS must thus include attention to creating the right structures that support health in the workplace, but also to developing the relationships that sustain the structures in a way that is attuned to workforce emerging needs.

10. Marian Downing, RBP, CBSP, ABSA International

Presentation Title: Academic Programs: The Need for Robust Biorisk Management Training

Abstract: Many scientific and health care workers begin their careers woefully unprepared for dealing with the risks associated with handling human specimens, research materials, infectious agents and genetically modified organisms. In order to serve as an effective and healthy contributor to a workplace, undergraduate and graduate students in the sciences, as well as those in medical profession curricula, need basic training in the principles of biorisk management. While other safety disciplines are highly regulated and the focus of extensive training, biosafety has often been neglected as a topic for students in biology, engineering, nursing, medical school, dentistry, and medical technology in many academic institutions. The American Biological Safety Association, ABSA International, offers several free curriculum packages for graduate and undergraduate students, as well as live in-person and remote training for biosafety professionals. The current pandemic has highlighted the need for evidence-based science as a basis for moving forward – do we owe our future healthcare workers, laboratorians and researchers anything less than the most relevant information for keeping themselves healthy? The common goal of creating a culture of safety in the workplace also depends on effective training and helping workers understand the principles of risk assessment and mitigation, as well as engaging them in the process.

11. Kaitlin Gallagher, PhD, University of Arkansas

Presentation Title: Expanding Occupational Safety and Health Training to Other Disciplines – A Case Study

Abstract: In their commentary, Schulte and Colleagues (2019) discuss additional skills (such as business, education, and applied economics) that Occupational Safety and Health (OSH) professionals should gain as part of their training. Unfortunately, this expanded focus may overburden the curriculum. A possible way to reduce this burden is to also educate **non-OSH professionals** on the expanded OSH focus. In Spring 2021, I taught a "Health in the Workplace" class based on NIOSH's Total Worker Health (TWH)[®] framework to a group of non-OSH undergraduate students. The 16-week class was a special topics course under two alpha codes, Exercise Science and Management. Thirteen students enrolled from a mix of majors (eight Exercise Science, two Management, and one student each from Biology, Human Nutrition & Dietetics, and Public Health). Each week concentrated on an aspect of the TWH[®] framework and used different assessment tools. In the last three weeks of class, we used the *Center for the Promotion of Health in the New England Workplace* (CPH-NEW) resources to create a mock *Healthy Workplace Participatory Program*. Classmates worked together in "Design Teams" to address student health and safety issues on campus. A common theme of the final course reflections was that the concept of a "healthy workplace" was more complex than they initially thought, and that one can approach worker well-being from many angles, as is described in the TWH[®] framework. Teaching OSH principles in other majors has the potential to help future professionals (1) appreciate their employee, patient, and/or customer well-being, (2) appreciate and maintain their personal well-being, and (3) partner with OSH professionals within their organizations and champion OSH initiatives. Future work should guide training expansion and collaboration with non-traditional majors, as well as determine the high-impact topics that should be presented in these classes.

12. Ismail Nabeel, MD, MPH, MS, Icahn School of Medicine at Mount Sinai

Presentation Title: Agile development of innovative, interactive hazard recognition and mitigation tools/learning e-platforms for workers involved in the rescue and recovery operations in diverse flooding environments

Abstract: Introduction:

Flooding events continue to increase in both frequency and intensity. Workers involved in post-flood reconstruction work are at increased risk of adverse health effects due to respiratory exposures and other hazards. **Objective:** E-learning platform 'Pocket Ark' provides training before flooding occurs, real-time decision support during a clean-up, and communications capabilities during and after cleanup to the workers involved. **Methods:** To develop an e-learning platform called 'Pocket Ark (PA)' that will: 1) disseminate and enhance the critical knowledge regarding hazards prior to being deployed in the flooded environment to protect the health of

construction workers (**PA's Multi-module interactive educational program**); 2) provide workers with real-time data to assist with making safe decisions *during the deployment phase* in the flooded zone; and 3) provide a communications platform to improve logistics between operational bases and workers *during and after* the deployment to the flooded zone. **Results:** Platform was evaluated for feasibility, usability, and subjective appeal with a selected sample of workers that participated in Hurricane Harvey reconstruction efforts. Using two sample t-tests for the same person, results showed a statistically significant difference with the p-value of 0.019999657 among the pre and post evaluations. **Conclusions:** Prototype of e-learning platform can be further developed into a functional product through iterative design and feedback to be used by these vulnerable workers in post-flood environments.

3A: Employment Regimes and Health 1: LAC Countries and Migrants

Moderator: Professor Frank Pot, PhD, Radboud University Nijmegen

Speakers:

1.. Mireia Utzet, PhD, Centro de Investigación en Salud Laboral, Universitat Pompeu Fabra-IMIM PSMar, CIBER de Epidemiologia

Presentation Title: Informal employment and poor self-perceived health in Latin America and the Caribbean: a gender-based comparison between countries and welfare states in a pooled analysis of 176,786 workers

Abstract: Background: More than half of the working population in Latin American and Caribbean (LAC) countries is engaged in informal employment. The few previous studies indicate that this employment condition could have negative consequences for workers' health. The aim of the present study was to estimate the association between self-perceived health and informality in LAC countries according to gender and welfare state type. **Methods:** The cross-sectional study based on different working conditions and health national surveys was carried out in 13 LAC countries between 2012 and 2018. A sample of 176,786 workers was selected from these surveys. The association between health and informality was estimated using Poisson regression. Finally, a random effects meta-analysis was carried out by country. All results were stratified by sex and type of welfare state (statelist or familialist). **Results:** Informal workers reported significantly worse health than formal workers, for both women (1.28 [95% CI 1.14-1.43]) and men (1.30 [1.12-1.50]). This difference was broader and more significant in countries with statalist welfare state regimes, among both women (1.40 [1.22-1.60]) and men (1.51 [1.30-1.74]), than in familialist regime countries (1.19 [1.03-1.38] and 1.24 [1.03-1.49], respectively). **Conclusions:** This study provides strong evidence of the association between informal employment and worker health. Welfare states appear to have a modifying effect on this association. The transition from the informal to the formal labour market in LAC is essential to improving the health of the population.

2. Michael Silva, PhD, Universitat Pompeu Fabra

Presentation Title: Association between informal employment and mortality rate by welfare regime in Latin America and the Caribbean: an ecological study.

Abstract: Objective: We aimed to estimate the association between informal employment and mortality in Latin America and the Caribbean (LAC) by comparing welfare state regimes. **Design:** Ecological study using time-series cross-sectional analysis of countries. Informality was estimated from household surveys by the Center of Distributive Labor and Social Studies (CEDLAS) in collaboration with the World Bank, and the adult mortality rates for 2000-2016 were obtained from World Health Organization databases. Countries were grouped by welfare state regimes: state productivist, state protectionist, and familialist. We calculated the compound annual growth rate for each country and performed linear regression between the informality and the adult mortality rates stratified by sex and welfare state regime. **Setting:** Seventeen countries from LAC with available data on informality and adult mortality rates for 2000-2016. **Primary outcome measure:** The association between informality and mortality by welfare state regime. **Results:** Between 2000-2016, mortality rates decreased an average 1.3% per year and informal employment rates 0.5% per year. We found a significant positive association between informality and mortality rates (women: $R^2=0.48$; men: $R^2=0.36$). The association was stronger among the state regime countries (women: $R^2=0.58$; men: $R^2=0.77$), with no significant association among the familialist countries. **Conclusion:** Informal employment negatively impacts population health, which is modified by welfare state regimes. Addressing informal employment could be an effective way to improve population health in LAC. However, linkage with public health and labor market agendas will be necessary.

3. Richard Rabin, Massachusetts Coalition for Occupational Safety and Health

Presentation Title: Undocumented workers: what is to be done?

Abstract: Immigrant and other low-wage workers are often subject to unsafe and abusive working conditions. Fall hazards; lead poisoning; dangerous (and asthma-causing) cleaning chemicals; and lack of protective measures are a few of the dangerous conditions that they report. The Occupational Safety and Health Administration (OSHA); both state and federal wage and hour laws; and state workers' compensation laws all exist to protect workers. Yet many, if not most, immigrants are unaware of these laws and government programs. Undocumented workers are particularly subject to unsafe and unhealthy working conditions, both because they often work in the more dangerous occupations and many employers exploit their precarious legal status. Numerous cases of employers threatening to contact immigration authorities, so-called wage theft, labor trafficking and other extremely abusive practices have been documented. Several social and legal strategies could be employed to significantly improve the working conditions of unauthorized immigrant workers. Establishing a clear and equitable path to citizenship and other legal statuses would perhaps be the most effective mechanism. Amending labor laws to enable workers to join unions more easily would benefit all workers, including immigrants. Strengthening and increasing the number of worker centers – freestanding organizations that organize and advocate for low-wage workers – is another avenue for improving immigrants' working conditions.

4. Bethany Bogges Alcauter, PhD, National Center for Farmworker Health

Presentation Title: Characteristics & Health Issues Impacting International Guest Workers in U.S. Agriculture

Abstract: Background: The H-2A guest worker program is a rapidly expanding non-immigrant visa program in the U.S. that enables agricultural employers and labor contractors to recruit workers outside of the U.S. to come and work for temporary work contracts. The program has ballooned to now bring in over a quarter of a million workers every year, primarily male workers from Mexico. Little is known by researchers, service providers, or advocates about the workplace health issues and well-being of these workers. Many of these workers are located in remote rural areas in the U.S., lack knowledge of workplace health and safety regulations in the U.S., and often come from indigenous communities in Latin America. Objectives: The objectives of this presentation are to enable participants to understand (1) trends in the H-2A program and why it is becoming a critical component of U.S. farm labor, (2) relate to real-life stories and testimonies of H-2A workers and their primary health and safety concerns while working in the U.S., and (3) learn how to identify H-2A worksites and approach H-2A guest worker employers for public health research and practice collaborations.

3B: Training of Future OSH Professionals

Moderator: Genesis Miranda, BA, The University of Texas Health Science Center

Speakers:

1. Silvia Maberti, PhD, ExxonMobil Biomedical Sciences Inc / American Industrial Hygiene Association / Content Portfolio Advisory Group

Presentation Title: Serving the Changing Workforce: A development priority for Industrial Hygienists

Abstract: In 2014, the Board of the American Industrial Hygiene Association (AIHA) carried out a "Landscape Assessment" to identify business and economic trends that could impact the future of Industrial Hygiene as a profession. Key trends identified included: Changing demographics, especially the aging and more global workforce; Changes in the workplace brought about by new technologies and employer relationships; and Changes in the type of work industrial hygienists will do. Although a majority of practicing IHs at that time found it difficult to see how these trends might significantly impact the IH profession, subsequent updates to the initial landscape assessment validated the need to recognize the imminent impact of these trends. In 2018, a Content Priority was developed by AIHA to create awareness for the IH profession around these issues and invited the various technical committees and subject matter experts to consider these challenges and changes when developing their education and training projects. This presentation will share the strategies developed to engage the volunteer groups and initiatives being undertaken by the volunteer committees around this topic.

2. Silvia Maberti, PhD, ExxonMobil Biomedical Sciences Inc / American Industrial Hygiene Association / Content Portfolio Advisory Group

Presentation Title: American Industrial Hygiene Association Efforts to Support an Evolving Profession

Abstract: In 2014, the Board of the American Industrial Hygiene Association (AIHA) carried out a "Landscape Assessment" to identify future trends and challenges that could impact the future of Industrial Hygiene as a profession. A "Content Portfolio Advisory Group" was created to help prioritize these trends and support AIHA in prioritizing where to invest its resources with respect to

creating new educational content and reference materials. The initiatives that are currently being pursued are: a) Big Data and Sensor technology, b) Communicating OHS concepts, c) Serving the Changing Workforce, d) Occupational Exposure Banding, and e) Total Exposure Health. This presentation will share the topics identified as priorities by this group, describe the activities and initiatives currently carried out by each of the priority working groups, and discuss what we see as future trends.

3. Javier Gonzalez, PhD, RN, OHN, MSc, Instituto Nacional de la Seguridad Social

Presentation Title: Occupational Health Nursing in Spain and Total Worker Health® (TWH)

Abstract: Introduction: The NIOSH TWH initiative proposes a holistic approach to achieving worker well-being by simultaneously addressing work and non-work-related factors at multiple societal levels. Occupational health nurses (OHN) are trained in several competencies that can contribute to effective implementation of TWH initiatives; however, the degree to which OHNs in Spain value their importance is not known. **Objective:** To evaluate the importance that OHNs in Spain give to professional competency areas relevant to the TWH initiative. **Methodology:** Data were derived from a 2014 cross-sectional survey conducted among 1985 OHN members of 26 professional societies. Using a 10-point Likert scale (0=not important, 10=maximally important), respondents ranked the importance of TWH-relevant competency areas: subject matter expertise in health promotion; advocacy/engagement in training implementation and evaluation; communication; leadership and management; and building partnerships. We computed mean importance score for each competency, and tested associations with demographics and occupational variables using multivariate linear regression. **Results:** The most highly scored competencies were subject matter expertise in health promotion and risk assessment (mean score, 8.9); advocacy/engagement in training (8.8); partnership building (8.4), followed by program implementation and evaluation (8.1), health communication and dissemination (8.1) and leadership and management (7.7). Higher competency importance scores were strongly associated ($p < .05$) with seniority, occupational health practice setting and economic activity sector. **Conclusion:** OHNs in Spain value several TWH-related competencies that can be useful when implementing TWH in that country. More detailed results, including specific sub-competencies, will be presented at the conference.

4. Kim Olszewski, DNP, CRNP, COHN-S/CM, FAAN, Bloomsburg University

Presentation Title: “Exploring Occupational Health Nurse’s Understanding and Needs in Regard to Total Worker Health (TWH)”

Abstract: The concept of total worker health (TWH) focuses on safety and health of an employee, but also the health promotion of every employee to reduce injury and illness and advance overall well-being. The Center for Disease Control and Prevention ([CDC], 2016) reported that 3 million nonfatal injuries/illnesses occurred, and 4,649 workers died from work related illness in 2014. Employers are beginning to move towards a TWH concept by advancing the level of education and care being offered to employees at work and outside of the work setting to decrease workplace injury and illness. A recent study with occupational health professionals was completed, 1) explore occupational nurses’ current level of knowledge regarding Total Worker Health (TWH), 2) explore how many nurses have begun to adopt the TWH methodology and 3) explore various factors related to how change is perceived by the nurses and the organization. Since the Covid pandemic, many workplaces have embraced that their employee’s health extends well beyond their work environment. In addition to the work environment, community resources, compensation, and environmental concerns can affect employee health as well. This presentation will explore the concepts of TWH, and will review the research findings, as well as discuss practical educational solutions for implementing and moving towards a TWH program in an occupational health setting.

4A: Special session: Early Career Scientist Session 1: Identifying and Addressing Gaps in OSH Practice

Moderator: Jessica Streit, PhD, MS, CHES, National Institute of Occupational Safety and Health

Speakers:

1. Kevin Moore, PhD, MBA, The University of Texas at Tyler Health Science Center

Presentation Title: Employer Perceptions and Approaches to Testing for SARS-CoV-2

Abstract: The COVID-19 pandemic required employers to consider health hazard exposures that occur at work, home, and in public spaces. Illness-prevention activities including physical distancing, mask use, surface cleaning, and SARS-CoV-2 testing of workers required coordination across all aspects of life. The goal of the Employer Testing of COVID-19 History (ETCH) project was to understand how employers were engaged in testing employees for SARS-CoV-2. In the process, employers provided information about a wide range of topics related to worker safety and health during the pandemic. The ETCH group interviewed leaders of 20

companies representing eleven National Occupational Research Agenda (NORA) industry sectors across multiple regions of the United States. Interviews included questions about the company and nature of work, factors that might increase employee risk of infection, and practices related to screening, testing, return to work, contact tracing, and communication. Employee perception of risk improved over time with increased knowledge of the hazard and prevention techniques, and implementation of mitigation strategies. Approaches to testing employees varied over time. Testing was seen to be an employer responsibility if the exposure occurred while working. If employees believed they were exposed elsewhere, they were generally asked to use their own healthcare providers and resources to seek testing. This study reflected the changing nature of employers' responses to COVID-19. The lack of widely available testing resources caused challenges for employers but the majority of those interviewed appeared to be following a traditional model of separating work-related exposures from other exposures. This was a missed opportunity to improve the overall health of their workforce. Reflecting on this may provide a good avenue to promote a Total Worker Health® approach with employers and investigate how to develop programs that will improve overall worker health and safety in the future.

2. Raul Astete, MD, AC Occupational Health Consulting SAC

Presentation Title: "VALIDATION OF THE EUROQUEST NEUROTOXIC SYMPTOMS QUESTIONNAIRE TO EVALUATE NEUROTOXICITY IN WORKERS EXPOSED TO MERCURY"

Abstract: At present, the diagnosis of Neurotoxicity due to exposure to Mercury presents certain difficulties mainly because there are no instruments that can initially detect symptoms and signs that alert us that there is a certain degree of intoxication due to exposure to this element, for which workers with chronic exposure they are already detected when the toxicity has produced irreversible damage at the level of the Central or Peripheral Nervous System. The objective of this study has been the validation of the EUROQUEST Questionnaire in its Spanish version to use it as an instrument for surveillance, detection and prevention in the workplace. The quantification of the validation of the content of the questionnaire was carried out using the V method of Aiken with average values higher than 0.7 in all the sections of the questionnaire except one but exceeding the lower limit (0.5) so it continued to be considered as a valid question Criteria validity was carried out by completing the questionnaire in a total of 70 people, 35 workers exposed to mercury and 35 unexposed workers, obtaining an area under the ROC curve of 92.8%, with a sensitivity of 97.1% and a specificity of 71.4%. The reliability analysis by Cronbach's α method for the entire questionnaire was 0.94, which indicates a very high internal consistency. The test-retest for the analysis of reproducibility was very significant with a value of $r = 0.997$.

3. Rosandra Daywalker, MD, The University of Texas Health Science Center

Presentation Title: Advances in Occupational & Environmental Medicine Training: Integration of the Total Worker Health® Approach

Abstract: Since 2019, occupational and environmental medicine (OEM) resident physicians at the University of Texas Health Science Center at Houston have had the opportunity to engage in *Total Worker Health*® training. The Southwest Center for Occupational and Environmental Health in Texas is the first and only educational research center in the world to concurrently host an occupational and environmental medicine (OEM) residency and a Total Worker Health (TWH) doctoral program. Established by NIOSH, the TWH approach emphasizes policies, programs, and practices integrating hazard protection with health promotion to enhance overall worker well-being. OEM physicians are tasked with supporting the health of the worker population through a combination of clinical care, prevention, research, and education, often serving in leadership roles in various settings (outpatient, corporate, academic, public health, etc.). Academic training in TWH represents a valuable and innovative adjunct in training OEM physicians, who traditionally earn a Master's of Public Health degree during training. Complimentary OEM and TWH training prepares trainees to take a multi-disciplinary approach to the holistic well-being of workers, their families, and their communities. This curriculum prepares these occupational safety and health professionals to more effectively serve all workplace stakeholders on both individual and systemic levels, poising them to take on the expanding occupational safety and health needs of the present and future. The aim of this presentation will be to inspire and inform other programs seeking to formally integrate the new paradigm with traditional medical training by describing how TWH has been integrated into OEM resident training at this center, exploring the potential benefits of this approach, and highlighting a particularly pioneering dual-training experience that arose from this unique offering.

4. Jennifer Laine, DrPH, University of Miami

Presentation Title: The Prevalence of Practicing Safety Professionals' Knowledge and Involvement with Workplace Wellness Programs

Abstract: This research survey investigated how Safety Professionals are impacted by the NIOSH Total Worker Health (TWH) initiative. As the concept of TWH has evolved, apparent confusion has arisen regarding the extent of awareness and involvement

with organizational safety programs with regard to roles, responsibilities, and boundaries. The survey ascertained the prevalence of safety professionals' knowledge of TWH and experience with workplace wellness programs, measured the level of involvement that safety has with their workplace wellness programs, and identified any training safety professionals might have or need relating to TWH or workplace wellness program topics.

4B: Horizontal expansion: Workplace Factors

Moderator: Madison Bencomo, MBBS, The University of Texas Health Science Center

Speakers:

1.. Regina Pana-Cryan, PhD, National Institute of Occupational Safety and Health

Presentation Title: The economic determinants of healthy work design and well-being (HWD) now and in the future

Abstract: We examined over a decade of research conducted by NIOSH economists and their partners on the economic determinants of work design and well-being; they affect workers, their families and employers, and society overall. We expect them to continue to interact with each other and affect many aspects of the future of work and, in turn, worker well-being. We assess well-being according to the NIOSH HWD domain model (www.apa.org/wsh/past/2019/2019-program.pdf, pp. 237-238). This model considers proximal (i.e. stress, fatigue), safety and health, economic (monetary and quality of life related), and other well-being (i.e. current and future life evaluation) outcomes. Well-being outcomes can be assessed for workers, their families and employers, and society overall.

We discuss the business cycle, self-insuring for workers' compensation, work arrangements, and economic security including adequate wages and access to benefits. Examples of findings included:

- the degree of association and the mechanisms through which the business cycle affected the incidence of workplace injuries varied across industries suggesting different prevention strategies,
- self-insuring for workers' compensation was positively associated with relatively low worker injury and illness incidence rates when compared with insuring,
- work arrangement was an important predictor of job stress; stressed workers across all arrangements reported lower health-related quality of life measured as more unhealthy days and more days with activity limitations,
- access to paid sick leave (PSL) affected the ability of workers to seek medical care for their children, workers' ability to take time off to recuperate from illness and avoid occupational injuries, and their ability to reduce the spread of infections at work and the associated cost of absenteeism, and
- access to PSL varied by demographics, industry, and work arrangement.

We discuss the prevention strategies to which our findings point, including designing and ensuring access to "portable" rather than employer-sponsored benefits for workers in non-standard work arrangements.

2. Wilton Remigio, DSc, MS, MPT, Arkansas State University

Presentation Title: Working in the Cold- Environmental Temperatures in the Genesis of Musculoskeletal Painful Disorders

Abstract: Introduction: Movement disorders presenting with pain carry a significant economic and rehabilitative burden which is more predominant in the working-age population. Amongst the many causative factors suggested for these condition, cold exposure has been implicated as an important, albeit, an unrecognized and often ignored etiology in the development of painful movement related conditions. To this date no systematic reviews has focused on the effects of work environment cold exposure and its association with the appearance of musculoskeletal pain. The purpose of this project is to conduct a systematic review aiming to delineate and characterize this relationship and analyze the evidence present in studies the last 2-3 decades. **Methods:** An electronic search will be conducted using several databases on the subject by two different reviewers. A hand search of each reference list will be performed to improve the quality of the literature review. Relevant articles will be collected and analyzed for inclusion of not in the literature review according to the from the literature review and used in this study. **Risk of bias.** If there are Randomized controlled Clinical Trials amongst studies reviewed the research will include a formal assessment for the risk of bias. The risk of bias will be assessed by using criteria included in the Cochrane Collaboration Risk of Bias (RoB) Tool (1) comprising 13 items,

each item is scored as “yes” if it fulfils the criterion, “no” when there is clear RoB, and “unsure” if there is insufficient information. Any disagreement will be resolved by discussion, and if consensus is not obtained, another reviewer will be consulted. To summarize the overall RoB for a study, items related to allocation concealment, blinding of outcome assessment, and incomplete outcome data will be taken into considered. Studies will be classified as “low risk of bias” when all 3 criteria are met, “high risk of bias” when at least 1 criterion is unmet, and “moderate risk of bias” in the remaining cases. **Quality of Evidence Assessment** : Two authors will independently conduct a qualitative analysis to evaluate the overall quality of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.(2)mm

3. Babak Memarian, PhD, CSP, CHST, CPWR – The Center for Construction Research and Training

Presentation Title: Task Demands and Impacts on Safety, Health, and Well-being

Abstract: Task performance is best viewed as a function of task-demand and applied capability. Task-demand is defined as the knowledge, skills, and effort required for successful task performance. High task-demand increases the likelihood of errors, and when task-demand exceeds capabilities, performance degrades, quality suffers, and exposure to health and safety hazards increases. Construction is a task-based industry, and construction tasks place significant physical, mental, and temporal demands on workers. It requires them to perform physical and cognitive tasks under aggressive schedule pressures, often in chaotic and ever-changing work environments, where they may also experience noticeable level of psychosocial demands. Industry sectors such as aviation, transportation, and healthcare have long been concerned with the effects of task-demands on performance. However, the construction industry has not yet fully integrated the concept into existing safety and health management systems. As the work landscape evolves, a more holistic approach to employee well-being over a working lifetime is needed. This presentation will discuss how the concept of task-demand can be applied during the construction pre-task planning phase to enhance worker safety, health, and well-being. It will further discuss the methods to assess task demands, identify contributing factors from workers’ perspectives, and systematically address these factors during the project lifecycle.

4. Amber Mitchell, DrPH, MPH, CPH, International Safety Center

Presentation Title: The Pandemic’s Impact on Sharps Injuries & Mucocutaneous Exposures in Healthcare

Abstract: National occupational incident data for needlesticks, sharps injuries, and mucocutaneous exposures to blood and body fluids has been available for decades, though not through federal agencies like OSHA, NIOSH, or CDC, as the public would expect. Until 2019 based on publicly reported data, overall incidence was trending downward among those working in healthcare settings. This was due to the institution of better engineering controls, advances in medical technology, safer work practices, and the standard performance of PPE. This presentation will summarize data from the Exposure Prevention Information Network (EPINet®) and similar surveillance databases and compare it to injury and exposure incidents from the beginning of the US pandemic in early 2020. It will provide insights based on what we knew in years past about inconsistencies in PPE use, lack of PPE access and availability, and lower than ideal designs for medical devices and clinical spaces. We will then explore what we could have predicted then, what we learned about the impact of occupational COVID-19 in the early days of the pandemic, to how we can build systems to prevent future exposures to infectious and bloodborne disease. This presentation will include not just information about the exposures and incidents alone, but how the current healthcare work environment also has added pressures to perform medical procedures quickly, more focus on patient compared to worker safety, the desire to see more patients in less time, hesitancy to report exposures, exhaustion from long and short-staffed shifts, unhealthy nutrition and sleep patterns, unbearable personal and professional physical stressors, and the stoic patient-first nature of many healthcare workers and institutions. Total healthcare worker health and well-being has long been ignored relative to exposure to infectious disease, this presentation will illustrate just how devastating a future pandemic could be, if we don’t act now.

4C: Vertical expansion: Well-being and Working Life Continuum (Practice and Policy)

Moderator: Padmaja Naik, MBBS, MPH candidate, The University of Texas Health Science Center

Speakers:

1. Francisco Perez, PhD, The University of Texas Health Science Center

Presentation Title: Engineering the Expanded Focus for Occupational Safety and Health – Contributions from Behavior Analysis Science and Practice

Abstract: To engineer the expanded focus for OHS and achieve the pinpointed behavioral goals of wellbeing and work-life balance requires evolutionary work culture change guided by individual and group behavior change. Systems thinking approach helps us integrate traditional OHS factors with a range of factors that impact health over a working life. The reengineered OHS professionals need the technology to effectively pinpoint the behavior to be promoted, measure/monitor behavior changes and manage the work environment to shape and reinforce the desired behavior change. System behavior results from the effects of reinforcing and shaping processes of the participants in context. It requires guiding and measuring behavior change over time. In the workplace there is often no basic understanding of the principles of behavior that influence the work culture and our daily interactions and routine. Behavior analysis is the evidence based natural science of behavior incorporating four functional behavior principles. Behaviors:

1. Are affected by their environment; 2. Can be strengthened or weakened by its consequences; 3. Changes are more effective with positive instead of negative consequences; and 4. Need to be reinforced or disciplined for socially significant change.

Some of the thriving applications of behavior analysis in the workplace include:

1. Organizational Behavior Management - using metrics to scientifically evaluate the factors influencing behavior in the workplace.
2. Performance management by reinforcing worthy performance that builds human competency by changing the way we do work.
3. Promoting workplace safety depends on environmental and individual factors that often require behavior monitoring and change.
4. Reinforcing social justice and equity. 5. Promote healthy behaviors. 6. Teach behavior based self-management strategies promoting work-life balance.

Engineering work behavior builds social capital by reinforcing and enhancing the way we do work! It requires behavior change and self-management to sustain it. The science of behavior provides the methods.

2. Jack Dennerlein, PhD, Northeastern University / Harvard Center for Work, Health, and Well-being

Presentation Title: Integrated Total Worker Health® approach to improve workers' safety, health, and well-being in the transportation industry in Chile: The "Get on Board" Pilot Program

Abstract: Professional drivers suffer from a cadre of health and safety issues associated with their specific and unique conditions of work. A scoping review revealed the need for interventions focused on improving the conditions of work and identified few organizational interventions that have included bus drivers. Therefore, our goal was to develop, by using formative research methods, and implement an intervention that targets the conditions of work to improve the safety, health, and well-being of the drivers of a bus company based in Chile. The formative research indicated that driver safety, health, and well-being concerns included fatigue/sleep, job stress, health behaviors impacting longer term health, work-related health and illness, and accidents. The intervention utilized a continuous improvement model with participatory components to prioritize and address the working conditions associated with these concerns. We evaluated the program from March 2019 through August 2020, which included the social unrest protests in Chile and the COVID-19 pandemic. The intervention resulted in changes in organizational policies, programs, and practices surrounding schedules and routes, vacation policies, and communications between dispatchers/supervisors and drivers. These changes reduced the number of back-to-back longer routes assigned to any one driver and increased trust between workers and supervisors allowing for increased application of driver-initiated safety protocols. Specific changes in worker outcomes were obscured most likely due to other larger external events related to social unrest in Chile and the COVID-19 pandemic. Overall, this project demonstrated that the application of Total Worker Health® interventions within the Chilean context are feasible and could have positive results, improving the conditions of work that impact the safety, health, and well-being of workers.

3. Babak Memarian, PhD, CSP, CHST, CPWR – The Center for Construction Research and Training

Presentation Title: Evidence-based Solutions to Enhance Construction Worker Health and Safety

Abstract: Predicting construction worker exposure to jobsite hazards and proactively implementing effective controls to protect workers and enhance their well-being are ongoing challenges in the construction industry. To fill this gap, CPWR-The Center for Construction Research and Training has developed two web-based tools, both available to the public free of charge: (1) the Exposure Control Database and (2) Construction Solutions Database. The Exposure Control Database is an interactive, online tool that allows construction health and safety practitioners to estimate workers' potential exposure to silica, welding fumes, noise, and lead based on the task being performed and worksite conditions. The system retrieves exposure measurements from the database based on the

user's input and estimates potential exposure to the selected hazard. The Construction Solutions Database compliments the Exposure Control Database. It contains over 330 evidence-based occupational safety and health controls and provides users access to information on commercially available interventions to reduce workers' exposure to occupational safety and health hazards. This presentation will demonstrate how to use these two web-based tools in tandem to reduce construction workers' exposure to occupational safety and health hazards and improve worker well-being.

Digital Poster Session 2: Expanded focus for OSH: policy, training and practice

1. Jenil Patel, PhD, MBBS, MPH, The University of Texas Health Science Center

Presentation Title: Constructing a Job-Exposure Matrix to evaluate Maternal Occupational Exposures during Pregnancy and for evaluating the risk of Congenital Heart Defects in Texas

Abstract: Congenital heart defects (CHDs) affect about one percent of live births in the United States. Risk factors linked with CHDs include certain chemical exposures (e.g. polycyclic aromatic hydrocarbons), some of which are common among specific occupations. However, the existing literature on occupational exposures and CHDs is limited, and most studies have focused on a single risk factor rather than multiple exposures. The proposed case-control study aims to link registry data from the Texas Department of State Health Services (DSHS) and Texas Birth Defects Registry (BDR) to assess the risk of commonly used cleaning agents in the workplace among pregnant women and CHDs among offspring. We will use a known methodology (Job-Exposure Matrix [JEM]) from the field of occupational health epidemiology to estimate occupational exposure level for pregnant women of reproductive age in Texas for five classes of cleaning agents (bleach, sprays, glutaraldehyde, formaldehyde, and quaternary ammonium compounds). Exposure scores will be assigned individually to each type of cleaning agent based on the type of occupation. As part of the JEM design and coding process, extensive literature reviews and knowledge (with consensus) of industrial hygienists will be put into play. The JEM will be presented at the Ex4OSH conference to seek further feedback from the conference attendees. The JEM's availability will facilitate future association analyses between commonly used cleaning agents in the workplace by women during pregnancy and risk for CHDs and other birth defects among offspring, which we will conduct in our future work. This JEM and the resulting work will help in informing better occupational health research, policy and training related to occupational asthma in workplace, and thus improve overall health and well-being of workers.

2. Carlos Delclós, PhD, Universitat Autònoma de Barcelona

Presentation Title: Bordering home? Linking health with housing precariousness, displaceability and citizenship in Spain

Abstract: Background: Healthcare workers are at risk for assault from aggressive behavioral health (BH) patients. To reduce risk, the Initial Behavioral Assessment and Protective Equipment Decision Key (IBA-PEDK) was developed for use in designated pediatric BH units, which uses the patient's aggressive behavior to recommend personal protective equipment (PPE) for healthcare workers. The purpose of this PDSA (Plan, Do, Study, Act) project was to examine the feasibility of implementing the IBA-PEDK on a general pediatric medical surgical unit that already used PPE. Methods: Nurses on this designated unit were trained on how to complete the IBA-PEDK, and how to transfer the recommended PPE information to a sign on the patient's door that informed workers about the PPE to be worn. Nurses' aides, patient sitters, and physicians were trained on how to use the door sign to guide their PPE use. We then evaluated nurses' completion of the IBA and door sign, and workers' use of PPE through direct observation. Findings were then used to make recommendations for improving this program. Results: During the assessment period, 56 BH patients were admitted, 48% (n=27) had a completed IBA-PEDK and of those, 78% had a completed door sign communicating the PPE to be worn. Only seven of 39 (18%) health care workers were observed wearing PPE prior to entering a patient's room. Conclusions: Half the patients did not have an IBA-PEDK completed by nursing staff, and the door sign did not result in high PPE usage among workers. These findings of low adherence were used to recommend changes to this program including: 1) integrating the IBA-PEDK into the electronic medical record making it available to all workers; 2) changes to the door sign to ensure workers could readily see the type of PPE required; and 3) making training readily available through the hospital intranet so workers could refresh their skills, when needed.

3. Lorena Funcasta, Dr, Psychology of Health Institute-Centre of Social Experimentation and Innovation-Faculty of Psychology

Presentation Title: Working conditions and health in paid domestic work in Uruguay. Work in the home: a challenge for occupational health and safety.

Abstract: In the last two decades, Uruguay's paid domestic work sector has gone through many changes and demands. As a result, two fundamental milestones: the enactment of Law No. 18,065 in 2006 regulating working conditions in paid domestic work; and Uruguay ratification of Convention No. 189 of the International Labor Organization in 2012, promoting decent work for domestic workers. In this scenario, we seek to deepen knowledge about the labour situation in the sector through research that aims to describe these female workers' working and health conditions. The study has a mixed methodological approach and has a non-probabilistic sample of unionized domestic workers in different regions of the country. On the one hand, a series of self-

administered measures on their working conditions, characteristics of this occupation and health are used. It allows us to obtain results about their environmental, ergonomic and psychosocial conditions at work and what working in the intimacy of a home implies, and the presence of affection in the development of the task and the physical, mental, and social health conditions these workers. On the other hand, the material collected through interviews and discussion groups contributes to the interpretation and contextualization of the quantitative data. The research contributes to describing these workers' working and health conditions from a complex perspective based on its mixed methodological approach. It also contributes to the Total Worker Health initiative not only because of the previous results but also because at least two of the five cross-cutting axes proposed in the World Health Organization's Model of Social Determinants of Health - social class and gender, and in many cases, ethnicity and migratory status - converge in these workers. Finally, it contributes to the visualization of the home as a workplace that challenges occupational health and safety.

4. Roxane Gervais, PhD, Practical Psychology Consultancy Ltd

Presentation Title: Volition, work outcomes, and well-being: An assessment of choice of work pattern

Abstract: Introduction: Work patterns continue to change, and the 'norm' of a permanent role may no longer meet the needs of many in the workforce. Workers have choices on how and where to work, with temporary work an option that suits the needs of some workers. The literature is mixed on the effect of work volition, a preference for temporary jobs, on workers. This present study explores the impact of work volition on work outcomes, such as career satisfaction, to assess its relevance on workers' well-being. Method: The study used a cross-sectional design, which included collecting the data with an online survey. The participants completed measures of career satisfaction, perceived stress and work engagement as work outcomes, with life stage, work-family spillover, work volition, job autonomy, and social support as independent variables, along with demographic information. Analysis: The data analyses consisted of psychometric testing to assess the robustness of the variables, correlation and stepwise regression analyses. Results: The participants ($N = 313$) had a mean age of 27.03 ($SD = 10.87$) and consisted of more women than men ($M = 1.80$, $SD = 0.43$). They worked an average of 23 hours ($M = 22.56$ hours, $SD = 11.77$). The overall regression analysis was significant for career satisfaction and work engagement, but not for perceived stress, with work volition acting as a significant influence for all. Discussion: The findings showed that work outcomes and well-being were not adversely affected by choosing to have a temporary work role. Such roles may assist workers with balancing life with work, thereby enhancing their lives. The ability to choose one's work pattern may function as a work resource and this will be discussed.

5. Paula Santia, MPH, Parc de Salut MAR

Presentation Title: Employment conditions and mental health in 120 998 workers of Iberoamerica

Abstract: Objectives. To describe the association between informality and mental health on the working population of Iberoamerica. **Methods.** In this cross-sectional study, we pooled individual-level data from nationally representative surveys across 13 countries. Eligible surveys were conducted in Iberoamerica after 2012, had individual-level data, were nationally representative, and contained a mental health questionnaire and data on employment conditions. Poor mental health was defined as a score of <13 on WHO-5 questionnaire, ≥ 10 on PHQ-9, <60 in WHOqol-BREF psychological domain, ≥ 3 on GHQ-12, or 4 in WG-ES affect domain. Workers were categorized according to employment conditions into formal (registered) or informal (unregistered or lacking contract). The association between poor mental health and employment conditions was estimated by Poisson regression with robust variance, stratified by sex and country, and adjusted by age, marital status and level of education. Then, a meta-analysis pooling of aggregate data from each country was performed using a random-effects inverse-variance model. **Findings.** Our pooled dataset included 120998 individuals. Peruvian women showed the highest prevalence of poor mental health (32.5% [29.8; 35.9] according to GHQ-12) while Mexican men showed the lowest (3.69% [3.48; 3.92] according to WG-ES). Informality was greater in Guatemala (men: 88.0% [85.1; 90.4]; women: 88.3% [85.0; 91.0]) and lowest in Spain (men: 4.32 [3.08; 5.56]; women: 7.06% [5.56; 8.57]). In the pooled analysis, informal workers showed a higher risk of poor mental health than formal workers (men aPR 1.14 [0.99; 1.30]; women aPR 1.17 [1.09; 1.26]). However, stratified analyses showed considerable regional variability and results only hold for Mexico (men aPR 1.27 [1.07; 1.50]; women aPR 1.38 [1.18; 1.62]) and Brazilian women (aPR 1.15 [1.02; 1.31]). **Conclusion.** Prevalence of poor mental health is high in Iberoamerica with great variability between countries. In contrast with our hypothesis, we found no clear association between informality and poor mental health.

6. Alejandra Ramirez-Cardenas, MPH, National Institute of Occupational Safety and Health

Presentation Title: Uncovering the sources and impacts of fatigue for onshore oil and gas extraction workers

Abstract: The U.S. oil and gas extraction (OGE) industry employed 471,772 workers in 2019 and has a fatality rate that is five times higher than for all U.S. workers. Work in this industry is done 24 hours a day, seven days a week, and much of that work is performed outdoors. Shift work, long work hours, and long commutes to and from remote locations are all common in the U.S. onshore OGE industry. To better understand the factors driving the high fatality rate in the OGE industry, researchers NIOSH

administered a questionnaire and short interview to 500 oil and gas extraction workers 2017 and 2019. Questions included worker demographics, employer characteristics, work and commute schedules, worker health and exposures, safety culture, training, and driving behaviors. Survey respondents reported extreme daily commutes, long work hours, and limited sleep, all of which were significantly associated with risky driving behaviors and poor driving safety outcomes. The majority of OGE workers work onshore and the nature of work in the onshore OGE industry has been shown to make workers susceptible to adverse safety and health outcomes resulting from fatigue. Previous studies that have examined fatigue in the OGE industry have focused on offshore workers in other countries. Building on the findings from the survey, NIOSH researchers are launching a new research project to identify and describe fatigue in this workforce. The objectives of this research project are to: Better understand the extent to which fatigue and its antecedents are affecting U.S. onshore OGE workers and to identify worker and work design factors to consider when developing and implementing fatigue management strategies in the OGE industry.

7. Francisco Soto Mas, MD, PhD, MPH, University of New Mexico College of Population Health

Presentation Title: The Organic Farmer Safety, Health and Life Survey (OFSHL)

Abstract: Programs to advance the safety, health and well-being of workers must take a socioecological perspective that focuses on multilevel factors, for which work is a significant element but inseparable from others external and contextual factors. However, there are limited data on farmworker safety, health and life and social conditions, including organic farmers. Growing evidence indicates that comprehensive approaches that identify and address the root causes of health and social problems have greater impact on population health than those that focus on individuals and symptoms. A sociological approach is consistent with the “*Whole Worker*” concept promoted by NIOSH and other national and international occupational health agencies and may contribute to greater improvements in behavior change, higher rates of employee participation in programs, potential reductions in occupational injury and disability rates, stronger health and safety programs, and potentially reduced cost. From this perspective, approaches to address “*Total Worker Health*” should not only include worksite-based programs but also community/policy interventions that reinforce these programs and provide a supportive social and community contexts. The OFSHL is a theory-based tool integrating aspects of work and life as mutually dependent. It explores psychosocial factors that relate not only to the work environment but also to the life and community contexts. Thus, the focus of the survey is life conditions, for which work is a significant element but inseparable from others external and contextual factors. This presentation will discuss the conceptual model that informed the development of the OFSHL, the development process, and the psychometric properties of the tool. The OFSHL is innovative and may be adapted to a variety of occupations.

8. Elizabeth Fisher, CHES, MA(c), University of Illinois Chicago - Center for Healthy Work

Presentation Title: Using Participatory Action Research Methods to Operationalize Total Worker Health® for Workers in Precarious Employment

Abstract: Background: Recent calls to action suggest a need to expand the paradigm of occupational safety and health (OSH) to explore social risk factors in worker well-being. Precarious work (PW) is rapidly increasing and perpetuates OSH disparities. Evidence suggests that PW is more dangerous and contributes to adverse health away from work. PW-focused OSH programs preclude the workplace as a point of intervention as workers with PW are unlikely to have a regular employer or workplace. **Methods:** There is limited evidence on *Total Worker Health*® (TWH) in the context of PW. Participatory Action Research (PAR) is a sustainable approach to action wherein researchers and participants work together to address complex problems. The UIC Center for Healthy Work (CHW), a NIOSH TWH Center of Excellence, utilized PAR through the Greater Lawndale Healthy Work project (GLHW) and Healthy Communities through Healthy Work (HCHW). GLHW used community-based participatory action research with two Chicago communities to document community-level experiences related to work and health. HCHW used action research to understand facilitators and barriers to collaborative OSH initiatives between public health and labor. **Results:** GLHW built community capacity to recognize work as an important determinant of health by developing a community-driven OSH Action Roadmap that has guided the development of the GLHW Community Council, a storytelling project, and an evidence informed, culturally tailored, Lotería game to raise awareness on how PW impacts health. HCHW developed the Healthy Work Collaborative to connect public health and healthcare with worker centers, labor unions, and other worker advocacy organizations to share resources and collaborate on policy and systems-level initiatives that address PW. HCHW provided mini-grants for the implementation of collaborative OSH initiatives. **Discussion:** CHW has demonstrated that the application of PAR in TWH can contribute to the development of strategic interventions to address adverse health effects of precarious work.

9. Lida Orta-Anes, PhD, MA, MP, BS, University of Puerto Rico

Presentation Title: Psychosocial Workplace Factors and Stress among Internal Medicine Residents on the Night Shift "Floater" Rotation's Effect on Sleep Quality

Abstract: The Accreditation Council for Graduate Medical Education's (ACGME) recognizes the scientific evidence showing that long hours of work and loss of sleep have negative effects on the performance and well-being of medical residents. In an effort to alleviate the night workloads in Emergency Rooms the “floaters” rotation model was implemented. A stratified analysis of the scientific literature showed a relationship between sleep quality and stress in the floater rotation. Adhering to ACGME’s recommendations, the Internal Medicine Residency Program of the School of Medicine at the University of Puerto Rico-Medical Sciences Campus implemented the “floaters” rotation to alleviate the night workloads in Emergency Rooms. However, despite the efforts of this program to reduce the workload, medical residents continue to suffer from exhaustion, stress, and anxiety, which appear to affect their ability to sleep during the day after working in the floater’s rotation. The aim of this study is to identify perceived quality of sleep and work-related stressors of residents during the floater rotation in the Internal Medicine Program, to better understand the factors that can affect sleep quality. A survey protocol was developed using three validated methods to collect information that compares sleep quality, psychosocial workplace factors, and stress among 19 internal medicine residents in different day and night rotations. Baseline information and sleep preferences will be collected in the “pre-float” rotation and compared with sleep quality, psychosocial workplace factors, and stress information in the “float” and “post-float” rotations. We expect to validate the hypothesis that these residents tend to show higher anxiety levels during the night emergency department duty days when compared with regular working days. Furthermore, we intent to establish that work-related stressors appear to be related to quality of sleep. Policy and program improvements will be recommended.

10. Shannon Montgomery, PhD, Florida State University

Presentation Title: Work Ethic and Cognitive Models of Work: The contribution of Family members, Contractors and Workers Perspectives on Elevated Injury and Fatality among Latino Workers in Small-Scale Residential Construction.

Abstract: *Background.* Research indicates that young immigrant Latino construction workers are at a disproportionately greater risk of work-related injuries compared to their non-Latino counterparts. Evidence suggests that there is a complex system of influencing factors that contribute to their lack of adoption of safety measures on site. One key factor, is social influence from close sources. The transactional model of communication theory suggests that individuals who share similar culture or environments, communicate in a dynamic manner. As a result, workers may receive multiple narratives which may encourage or discourage their safety behaviors. This study aimed to explore the conflicting messages from co-workers, contractors and family members that collectively influence workers’ beliefs about safety. *Methods.* Qualitative semi-structured interviews were undertaken with n=14 family members (usually a spouse), n=4 Latino contractors and n=8 Latino workers in the framing and roofing trades of small-scale residential construction. Interviews were recorded, transcribed verbatim, and analyzed for dominant themes and patterns. *Results.* Both contractors and workers believed they had to “work harder” and “faster” than their American counterparts to demonstrate their value, because of their “immigrant” status in the U.S. Additionally, they felt “peer pressure” to work fast. Such behaviors impeded safety. However, workers acknowledged that safety was their “responsibility”. Alternatively, family members held “safety concerns” for the workers’ wellbeing, whilst also addressing the need for the worker to provide “financially”. *Limitations.* The generalizability of study findings is unknown because the data are from a small, regional sample of contractors, workers and their family members in two trades of small-residential construction. *Implications.* Workers often receive conflicting messages from individuals within their social circle that contribute to their adoption (or lack thereof) of safety behaviors and risk on the construction site. Safety interventions must acknowledge and account for the complex social influences impacting on workers’ safety decisions.

11. Jacqueline Siven, PhD, MA, MPH, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Bridging the divide between OSH and Social Science through the example of research with Congolese refugees

Abstract: The future of Occupational Safety and Health (OSH) should account for systemic and structural issues affecting worker safety, health, and well-being. Work in this area is suited to the theoretical and methodological expertise of social scientists who are adept at uncovering how structural issues interact with other factors to influence the lived experience of individuals and communities. However, applications of qualitative and social science perspectives in OSH, albeit increasing, are somewhat limited. Using the example of an ethnographic research project with 20 former Congolese refugees and 23 refugee-serving professionals, and the unexpected connections participants made between work and mental health, this paper presentation provides an example of the application of qualitative and social science perspectives in OSH research. Using the ethnographic research methods of participant observation and qualitative in-depth interviews this project sought to explore how systemic issues may affect refugee use of mental health services, and unexpectedly found that work, and the financial insecurity of low-wage work, was the major point of discussion for participants. The structural issues inherent in the U.S. refugee resettlement system, such as limited funding and a limited 90-day period for full support, were major factors in the economic hurdles former Congolese refugees faced and were cited as both a cause of distress and a reason for why they didn’t have time to receive mental health services. This ethnographic research project not only provided a connection to OSH by exploring how the well-being of Congolese workers was impacted by the structural limitations of the U.S. refugee resettlement system but is a testament to how a broader definition of OSH can help bridge the divide

between OSH and social science. This paper presentation discusses the value of social science research and qualitative methods to the future of OSH and explores how OSH can deepen engagement with social scientists.

12. Amanda Roome, PhD, Mary Imogene Bassett Hospital dba Bassett Medical Center

Presentation Title: Tick Magnets: The occupational risk of tick-borne disease exposure in forestry workers

Abstract: Outdoor workers, such as forestry workers, are at an increased risk for contracting tick-borne diseases due to their prolonged time spent in tick habitats. Although well studied in Europe, no recent studies have been conducted with forestry workers in the Northeastern United States since the 1990's. Full time forestry workers and two comparison groups (volunteer firefighter/first responders and indoor healthcare/office workers) within New York State Department of Environmental Conservation Regions 3, 4, 5, 6 & 7 were recruited for the study. Blood draws were conducted to test for the presence of antibodies to Lyme, anaplasmosis, babesiosis and ehrlichiosis. Surveys were administered to determine personal risk factors and protective behaviors. Two hundred and fifty-six (105 forestry, 101 firefighter/first responder, and 50 healthcare/office) workers participated in the study that was conducted from November 2020 to May 2021. Forestry workers were nearly twice as likely to test positive for any of the four tick-borne disease (14%) compared to firefighter/first responders (8%) or healthcare/office workers (6%), however, this difference was not significant ($p=0.176$). Forestry workers were more likely to find ticks on themselves at work ($p<0.0001$), to have been previously diagnosed with a tick-borne disease ($p=0.003$), and to report a higher number of embedded ticks ($p<0.0001$). A trend toward higher reported tick bites was seen among forestry workers who reported not using preventives ($p=0.08$). Tick-borne diseases are a public health threat to those living in endemic areas of the United States, especially those with an increased occupational risk like forestry workers. Prevention strategies developed specifically for forestry workers are crucial in mitigating their risk of exposure.

5A: Special session: Employment Regimes and Health 2: Precarious Work

Moderator: Professor Frank Pot, PhD, Radboud University Nijmegen

Speakers:

1. Tapas Ray, PhD, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Work precariousness and worker well-being

Abstract: Recent technological and work organization changes have resulted in an increased prevalence of nonstandard work arrangement types. One of the consequences has been an increased prevalence of work precariousness, which in turn affects worker well-being. Work precariousness is a multidimensional concept and is broadly defined as uncertain, unstable, and insecure work where workers bear the risks of work and receive limited social benefits and statutory protections. We examined the associations between work precariousness and evaluative well-being of the worker. **Methods:** To measure work precariousness we used the Employment Precariousness Scale (Bhattacharya and Ray, 2021) that we developed for the US workforce and cross-sectional data reported by salaried workers on 22 representative items from the General Social Survey, Quality of Work Life (QWL) module for the year 2018. The precariousness scale includes components of temporariness, sense of disempowerment, vulnerability, and income inadequacy. The combined precariousness scores vary from 1-4, where one reflects the lowest reported precariousness, and four reflects the highest reported precariousness. We measured evaluative well-being using the Cantril current and future life evaluation score of the worker. We used current and future life evaluation scores (1-10) reported in the 2018 QWL, to measure evaluative well-being. The data for our analysis included 1400 observations. We used descriptive analysis and partial ordinary least squares regression models to examine associations between work precariousness, and evaluative well-being, controlling for demographics. **Results:** Statistically significant positive associations existed between evaluative well-being and work precariousness. Workers reporting higher work precariousness were more likely to report lower scores on their current life evaluation (four percentage points lower for each additional jump in the precarious ladder) and future life evaluation (three percentage points lower for each additional jump in the precariousness ladder) after controlling for demographics.

Conclusions: We found evidence that work precariousness is an important contributor towards worker's evaluative well-being.

2. Noopur Singh, MPH, The University of Texas Health Science Center

Presentation Title: Employment phenotypes and general health: a cluster analysis

Abstract: Background: Poorer health is associated with working in temporary contracts, part-time jobs, and among the self-employed. These are all considered non-standard employment, with informal work (lacking social protection benefits) being the most vulnerable of all. However, this relationship may be more complex than at first glance, with different profiles ("phenotypes") of

employment existing depending on the relative weight of the various factors used to characterize this type of work. **Objective:** To determine whether there are distinct clusters of workers, based on employment characteristics, and to measure their association with self-reported general health. **Methods:** The 2011 and 2018 Central America surveys on working conditions and health (I and II ECCTS, by their Spanish acronyms) are large nationally representative samples of workers (12,000 and 9,000, respectively). We applied cluster correspondence analysis, a joint combination of dimension reduction and clustering, to the I ECCTS. CCA allows dimension reduction to retain the greatest variance into the fewest dimensions while simultaneously allocating observations into clusters. We then examined the relationship of each cluster to self-reported general health (poor/good), both overall and stratified by gender. **Results:** Figure 1 depicts three distinct clusters identified in the analysis (C1, 61%, C2, 26% and C3, 13%); their prevalence by gender and characteristics are summarized in Table 1.

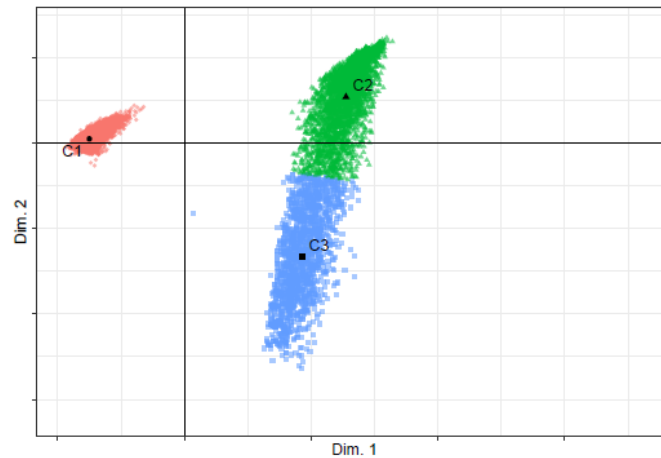


Fig 1. Scatterplot of individuals and cluster centroids (C1, C2, C3).

Cluster	Men	Women	Characteristics
1	62%	57%	Self-employed/employer, limited or no social security benefits
2	25%	30%	Salaried, long-term written contract, social security benefits
3	13%	13%	Temporary work, oral or no contract, no social security benefits

Table 1. Cluster characteristics.

The prevalence of poor/very poor general health differed by cluster, but was similar by gender, being highest in cluster 1 (38% in both men and women), followed by cluster 3 (30% in men versus 31% in women) and lowest in cluster 2 (19% in men versus 22% in women). Stratification by gender showed similar clustering and self-reported health. **Conclusion:** Identification and characterization of employment phenotypes add detail to research on the effects of precarious employment on general health, going beyond simply comparing formal to informal workers. In our study, self-employed and temporary workers reported worse health than salaried workers. Our next step will be to validate this approach using a confirmatory analysis with the II ECCTS data.

3. Emma K. Tsui, PhD, MPH, CUNY Graduate School of Public Health & Health Policy

Presentation Title: Expanding the Conceptualization of Support in Low-Wage Carework: The Case of Home Care Aides & Client Death

Abstract: Home care aides are a rapidly growing, non-standard workforce who face numerous health risks and stressors on the job. Though support can buffer stress and improve worker well-being, research rarely attends to support that aides use from sources outside of work. Our qualitative research richly delineates the ways that aides themselves define and use support, with the goal of developing worker-informed quantitative measures in the future. Specifically, in this study, we used repeated in-depth interviews to explore the multiple sources of support that aides employ in navigating client death (n=29). In order to address both the emotional and financial dimensions of this stressor which is a regular feature of home care labor, our analysis demonstrates aides’ extensive reliance on personal and blended (i.e., personal-professional) sources of support. Job-based sources of support were not commonly available or used. Our data show that this reliance on support outside of work can create challenges in aides’ lives and work, and, potentially, for their communities. In line with the expanded focus for OSH, our findings suggest the importance of integrating models of work stress with the social ecological framework to better conceptualize marginalized careworkers’ experiences of support, well-being, and multi-level opportunities for intervention. We also recommend improved job-based support for home care aides that incorporates realistic expectations of personal-professional boundaries, and the adoption of policies to incentivize and fund these efforts. While employers will always hold primary responsibility for providing support to prevent and mitigate work stress, the increasing prevalence of non-standard work suggests the need to better conceptualize multi-level support systems that bridge the workplace, communities, and beyond.

4. Sherry Baron, MD, MPH, Queens College, City University of New York

Presentation Title: Non-standard Employment in times of crisis - effects on workers and their families: A multi-country qualitative research study in Belgium, Canada, Chile, Spain, Sweden and USA within the Precarious Worker Research Program, Karolinska Institute, Sweden

Abstract: In 2019, the Swedish Karolinska Institute initiated the Precarious Work Research program in collaboration with research centers in Belgium, Spain, Chile, USA and Canada. One program component is a multi-country qualitative study exploring the inter-relationships between non-standard work arrangements and health and well-being. The goal is to understand how work can be proactively shaped to support the needs of workers across countries with different employment and social safety-net policies. In response to the pandemic, the study protocol was modified to consider pandemic-related influences on nonstandard employment. Study participants were recruited through country-specific social media advertisements that linked respondents to an online survey that captured demographic characteristics, employment arrangements and precarity level using a multi-item measure inspired by the Employment Precarity Index developed by the Poverty and Employment Precarity in Southern Ontario project in Canada and the Employment Precariousness Scale developed in Spain. Using purposeful sampling, participants were selected for semi-structured interviews to capture different ages, gender, and precarity levels. We conducted 240 interviews (40 per country) between March and June 2021. Identical interview guides were used and explored: reasons for entering nonstandard employment, working conditions associated with the work arrangement, impacts of work on the workers' own and their family's health and well-being and how policy has already or could ideally affect these issues. We used thematic analysis for country-level data and applied Stake's multiple-case study analysis to compare findings across sites. This presentation will review the study approach and preliminary findings from the thematic and multiple-case analysis.

5B: Training of Future OSH Professionals

Moderator: Paul Carey, MD, MPH, The University of Texas Health Science Center

Speakers:

1. Lisa Pompeii, PhD, MS, Baylor College of Medicine, Department of Pediatrics/Center for Epidemiology & Population Health

Presentation Title: Elastomeric Respirator Use in Health Care

Abstract: Background: Respiratory protection is essential to safeguarding healthcare workers from exposure to infectious airborne pathogens. The shortages of respiratory protection during the H1N1 and COVID-19 pandemics warrants alternative respiratory protection devices such as the elastomeric half-mask respirator (EHMR). This project examined the feasibility of EHMR use in health care. **Methods:** Eighty-nine healthcare workers participated in a simulated emergency respirator fit testing and training session in which we compared the time to fit test and train participants randomly selected into N95 versus EHMR groups. Among the EHMR participants, we tested their competency for respirator use. In a separate laboratory study, we tested the effectiveness of two commercially available cleaning wipes (Oxivir, Cavi) and saline wipes at disinfecting EHMRS inoculated with bacteria. We then recruited ten healthcare workers to clean respirators inoculated with two different bacteria to determine cleaning wipe efficacy when used by healthcare workers in the field. **Findings:** No differences were observed for time to fit test between respirator types. EHMR participants demonstrated high competency in donning, doffing, user seal checks, and cleaning the respirator. The laboratory findings revealed significant reduction in the number of bacteria inoculated on the EHMR following disinfection. In the field, we observed a significant reduction of the bacteria tested following decontamination with Oxivir and Cavi wipes compared to masks decontaminated with saline wipes or left untreated. Although effective at reducing bacterial loads, some residual bacteria remained on some respirators. **Conclusion:** The findings suggest that EHMRS could serve as a feasible alternative to N95s. Workers quickly demonstrated competency and comfort with basic wearing requirements. The findings also suggest that the EHMR can be adequately cleaned by workers using commercially available products, but training methodology to improve disinfection may be needed. Future work is needed to examine barriers and promoters EHMR use during routine patient care.

2. Robert Emery, DrPH, CHP, CIH, CSP, The University of Texas Health Science Center

Presentation Title: Health and Safety Workforce Development Needs in Support of the "Global Health Security" Agenda

Abstract: A series of global factors are combining to make the risk of infectious disease perhaps the world's most significant health and safety threat. Yet many health and safety professionals are not formally trained in this area, as their focus is on treating arising

from the workplace. But in the era of a global pandemic the lines between infection control and workplace health and safety have become blurred. This presentation will describe the Global Health Security agenda, with a special focus on the workforce development needs within the biosafety and infection prevention professions, which play a role equally important as assist patient care in outbreak situations. Prudent steps for protecting individuals and society as a whole will also be discussed.

Learning Objectives

- Define “Global Health Security” and describe its importance
- Describe examples of current threats to our Global Health Security
- List the 5 strategic objectives established for enhancing Global Health Security
- Describe the non-direct healthcare professions that are involved with the prevention and control of infectious diseases and the associated workforce development needs
- Discuss the steps that should be taken by all individuals (including health and safety professionals) to not only protect themselves and their families, but also the organizations they serve
- Provide a useful list of references

3. R. Sue Day, PhD, The University of Texas Health Science Center

Presentation Title: Training the Next Generation of Total Worker Health® (TWH) Professionals

Abstract: Given the changing nature of work and new challenges to workplace safety and health, the unique skills of doctoral trained TWH professionals will be a vital resource to navigate the future. These TWH professionals will be equipped to think beyond the classical occupational health and safety concerns, appreciate and understand new styles of work arrangements, and appreciate the need to address the intersection of home, society and the workplace on health-related matters. Our goal at the UTHealth School of Public Health is to train the next generation of doctoral-trained occupational safety and health professionals in TWH principles and approaches. TWH is defined 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.” In 2019 the SWCOEH was funded by NIOSH to establish the first TWH doctoral training program, consisting of a rigorous academic training program with a major in occupational and environmental health sciences and a minor in health promotion and behavioral sciences. Students are guided to a unique collection of electives to broaden their expertise representing strategic aspects of TWH, including occupational epidemiology, health policy, business management, nutrition, aging, diversity issues, health economics and leadership. To culminate their didactic training, they complete a challenging real-world field-based application of their learning by participating in the development and implementation of a TWH project in a business setting. These TWH professionals will be able to work within workplaces at all levels, helping lead the integration of occupational safety, health and wellness activities, enhancing worker well-being and productivity while adding value to both businesses and workers.

4. Rebecca Bedell, B.S., M.S., CSP, Dräger

Presentation Title: Confined Space Entry: Bridging the Safety Gap with Critical Thinking

Abstract: Confined spaces are found in nearly every oil and gas operation. Confined space entry (CSE) is dangerous and presents a challenge because spaces tend to be unique. A one-size-fits-all solution leaves gaps in safety.

By applying critical thinking to confined space entry (CSE), oil and gas companies can improve safety, environmental operations, and regulatory compliance.

This session focuses on how to apply critical thinking in various applications to optimize safety, starting with the fundamental basics of CSE safety, including lockout/tagout, ventilation and lighting, gas detection, and personal protective equipment.

To illustrate best practices, real-world scenarios illustrate the critical thinking steps to maximize safety:

- Removal of chrome alloy components from sulfur/rich amine service
- Removal and replacement of refractory inside regenerator with cyclones
- Removal of multi-bed reactor catalyst

The session explores special considerations for inert entry, measurement of hazardous substances and risk control, and critical thinking considerations for different sample points.

Also discussed are different types of portable gas detection, which to use and when, and the limitations of each. Critical thinking can guide the user to the best choice for the application.

6A: Special session: Early Career Scientist Session 2: An expanded view of OSH risk factors

Moderator: Jessica Streit, PhD, MS, CHES, National Institute of Occupational Safety and Health

Speakers:

1. Amaya Ayala Garcia, MPH, Centre for Research in Occupational Health (CiSAL)

Presentation Title: Labour market permanence and risk of unemployment in breast cancer survivors after a sickness absence in Catalonia, Spain (2012-2018)

Abstract: Background: Incidence and survival rates of breast cancer have increased in the last decade. The number of women diagnosed with breast cancer in the workplace are expected to increase steadily. Literature shows how breast cancer survivors at a higher risk of unemployment than general working population. Continuing to work after cancer has a positive effect in the quality of life of cancer survivors. **Purpose:** To compare permanence in labour market by continuing in employment and risk of unemployment in a sample of salaried women in Catalonia (Spain) who had a sickness absence (SA) due to breast cancer with salaried women with a SA due to other diagnosis and without SA. **Methods:** Cohort study of 339 women affiliated to Social Security where each woman with SA due to breast cancer between 2012 and 2015 (N=113) was matched by age and time at risk with a woman with a SA due to other diagnosis (N=113) and a second woman without SA (N=113). Individuals were followed up since they ended the SA episode until end of 2018 to measure accumulated days on employment and unemployment. Negative binomial Poisson models were applied to compare the probability of continuing in employment and risk of unemployment. Linear regressions models were applied to assess differences in the mean accumulation of days in employment and unemployment among comparison groups. **Results:** Women without SA had higher probability of continuing employed than those who had a SA due to breast cancer (IRR 1.19; 95% CI: 0.97–1.96; p-value<0.1) and worked in average 215 days more (p-value<0.05). Differences in unemployment were not found to be statistically significant, although we found that women without SA had showed an average of 14 days less in unemployment than those with SA due to breast cancer, whereas those with SA due to other causes showed an average of 44 days less. All results were adjusted by employment and working conditions. **Conclusions:** Even though women with SA due to breast cancer continue working after SA episode they do it less that matched controls. **Implications for Cancer Survivors:** Health and social protection systems should guaranty cancer survivors the opportunity to continue voluntary participation in labour market. Data in an increasing returning to work population will help identify and raise awareness on barriers this population may encounter.

2. Carlos Delclos, PhD, Universitat Autònoma de Barcelona

Presentation Title: Is property polarization giving way to diverging trends in worker health and wellbeing? Evidence from a selection of European countries.

Abstract: During the 2010s, European countries experienced important shifts in the structure of their housing regimes. With varying degrees of intensity and few exceptions, access to housing through the private rental market expanded at the expense of homeownership and social housing across the continent. At the same time, several countries saw increases in landlording activity. Where both of these trends have occurred, economic inequality has increased, a diverging dynamic referred to in this study as property polarization. The implications of this dynamic for worker health and wellbeing have yet to be studied.

Using data from the 2018 European Union Statistics on Income and Living Conditions (EU-SILC), this study examines the association between one's property relationship to housing and their self-reported general health and wellbeing in six European countries: Denmark, Spain, France, Greece, the Netherlands and the United Kingdom (n=83,706). Survey weighted logistic regression revealed that, after controlling for sociodemographic characteristics and household income, tenants were significantly more likely to have poor self-reported health than homeowners in all countries except Greece, but no significant association was found for landlords. In the case of wellbeing, survey weighted linear regression provided more varied results. In Spain and the United Kingdom, significant negative associations were found between wellbeing and being a tenant after controlling for sociodemographic factors and household income, and a significant positive association was found with landlording. In France, Greece and the Netherlands, a significant negative association was also found with respect to tenants, but no significant association was found with landlording. These findings suggest that, in addition to their labour market situation, the property relationship workers have with respect to housing have important implications for their health and well-being.

3. Devan Hawkins, ScD, Massachusetts College of Pharmacy and Health Sciences University

Presentation Title: Using death certificates to study the impact of workplace factors on mortality

Abstract: Workplace factors contribute to disparities in mortality. Studying how work contributes to these disparities is essential both for identifying workers who are at a high risk of dying from particular causes and for designing interventions that can prevent these deaths. Occupation data from death certificates is a valuable resource for identifying occupational disparities to inform these prevention methods. Because of limitations associated with the use of death certificate data, there are different methods that need to be applied in order to get the most out of the data. In this presentation, a methodology will be presented that can be used for the analysis of death certificate data. In particular, the presentation will describe how to access death certificate, methods for coding occupational information from death certificates, methods for calculating occupation specific mortality rates, and how other data sources can be utilized to gain insight into etiological factors (including psychosocial and work environmental factors) that may contribute to different mortality rates by occupation. Recommendations will also be presented for how data collected from death certificates can be improved. Examples of the application of these methods to study deaths of despair (including opioid overdose deaths) and deaths from COVID-19 will be presented.

4. Emily McAden, MSPH, North Carolina Occupational Safety and Health Education and Research Center, UNC - Chapel Hill

Presentation Title: Implementing a Total Worker Health® approach to improve worker safety and health during the COVID-19 pandemic: The Carolina PROSPER study

Abstract: Background and Objectives: COVID-19 disrupted small- and medium-sized businesses, many of which employ lower-wage, vulnerable workers. To rapidly respond to the crisis, an interdisciplinary team from UNC-Chapel Hill received funding to assess the feasibility of assisting small- and medium-sized businesses with their pandemic response efforts using the Total Worker Health® (TWH) approach. Carolina PROSPER integrates protection from work-related safety and health hazards with health promotion efforts to advance overall worker safety, health, and well-being. **Methods:** In phase 1 of this study, PROSPER surveyed businesses about their COVID-19-related occupational safety and health needs. Results informed development of PROSPER's services. During phase 2, PROSPER selected four businesses to receive intensive, tailored TWH technical assistance including ventilation consultations, surface tests for SARS-CoV-2, on-site walkthroughs, and COVID-19 policy reviews. PROSPER tested the feasibility of this approach using employee interviews, focus groups, and surveys. **Results:** Fifty-three of 192 phase 1 survey respondents requested technical assistance. All received recommendations tailored to their survey results. The four businesses receiving technical assistance in phase 2 represented professional services, warehousing, and transportation industries and employed 2 to 110 employees. After assessing employee and organizational needs, leadership prioritized assistance on COVID-19 testing, disinfection protocols, and infection control protocols while employees prioritized air ventilation consultation, employee mental health resources, ergonomics resources for working from home, and COVID-19 policy reviews. PROSPER delivered resources and recommendations to each business based on their priorities. Results from follow-up interviews with business representatives will be described to understand the acceptability, practicality, innovation-values fit, and demand for the TWH approach. **Conclusions:** Demand exists for a TWH approach to protect and promote employee safety, health, and well-being. This approach was feasible, acceptable, and greatly appreciated by small- and medium-sized businesses. Given a persistent need for assistance by small- and medium-sized businesses, Carolina PROSPER represents one successful TWH-guided approach.

6B: Horizontal expansion: Socioeconomic Factors

Moderator: Cesar Leonardo Pinzon Gomez, MD, The University of Texas Health Science Center

Speakers:

1. Preethi Pratap, PhD, University of Illinois Chicago School of Public Health

Presentation Title: A Decent Work Agenda for the United States: exploring perceptions, gaps and opportunities.

Abstract: Background: Decent work provides economic security, self-esteem and social connectedness, and, as COVID-19 has highlighted, work can also undermine these same factors and contribute to the inequitable distribution of health outcomes. While the United States is a large donor and supporter of International Labour Organisation's Decent Work Agenda there is limited evidence of efforts to fully adopt, or implement, this agenda within the U.S. The pandemic has further highlighted that work provides a concrete social location for influencing other social determinants of health, however to-date there is no dedicated public

health policy on decent work. **Methods:** An environmental scan (including a literature review and 12 key informant interviews) is underway, to understand the facilitators and barriers to formulating a Decent Work Agenda for the United States and documenting stakeholder perspectives on gaps, needs and opportunities for implementation. Additionally, the American Public Health Association's Occupational Health Section (OHS) is dedicating the mid-year conference (July 2021) to explore elements of an APHA decent work policy. **Results:** Preliminary results suggest employment status and quality is vital to researchers' understanding of public health inequities, and this information can add value to discussions of job quality or decent work, not just job quantity, and could help public health professionals engage in more established initiatives on sustainable development and corporate responsibility that increasingly influence development projects and how businesses and jobs are structured. National, regional and local stakeholders identified through this data gathering process expressed a strong interest in strategizing and developing a public health research and practice agenda to support decent work in the United States. **Conclusions:** Findings presented may need to be considered in development of recommendations for integrating workforce health and well-being into labor and economic development agendas across government agencies and industry in the United States.

2. Tim Bushnell, PhD, MPA, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Economic factors in safety, health and well-being and the roles of public policy

Abstract: Broadening our view of factors affecting worker safety, health, and well-being expands the range of employer decisions and initiatives that OSH practitioners might be involved in. But it also points to larger social and economic forces that must be addressed at broader systemic levels by various forms of public policy. Traditional public policy with respect to worker safety and health has tended to take two basic forms, one of which imposes rules for protecting workers, and the other of which assists in protecting workers through provision of guidance, consultation, and technology. Both sets of policies have focused on specific workplace hazards and exposures, and sometimes safety and health programs that provide employer-level frameworks for addressing these hazards and exposures and supporting a safety culture. However, there has been increasing awareness of broader economic determinants of safety that influence the technologies that employers use, the kinds of organizations and jobs that employers design, and how they compete for and serve their customers. These forces and developments are generally outside the purview of OSH professionals, although they may increasingly help respond to them. This presentation will outline economic theories for identifying situations in which public policy is warranted to support, limit, or channel the actions of private employers and individuals to support social welfare. It will then focus more specifically on recent economic policy initiatives and proposals for promoting worker well-being in the face of challenging trends in technology, trade, work arrangements, and economic disparities. Much of the focus is on the creation of "good jobs" or the upgrading of low-skill, low-wage jobs. The objective of the presentation will be to compare and contrast the concerns, policy tools, and rationales of the OSH and economic policy communities in order to set the table for consideration of linkages and collaboration between the two.

3. Preethi Pratap, PhD, University of Illinois Chicago School of Public Health

Presentation Title: Public health impacts of underemployment and unemployment in the United States: Implications for Occupational Safety and Health (OSH).

Abstract: Background: Unemployment, underemployment and the quality and safety of work are national occupational safety and health risk factors that drive critical national problems, however to date there have been no systematic efforts to document the public health impact of this situation. **Methods:** An environmental scan was conducted to highlight some of the major perspectives and factors in the landscape of unemployment and underemployment. Methods included a review of the grey and research literature followed by key informant interviews with nine organizational representatives in employment research and policy, workforce development and industry to assess perceived needs and gaps in practice. **Results:** While on the surface unemployment and underemployment appear to be economic problems, evidence highlights the complex nature of these problems, with multiple macro-level underlying drivers including: changing nature of work, dynamic labor market, inadequate enforcement of labor protection standards, declining unions, wage depression and weak political will interacting with multiple social determinants of health. Empirical literature on unemployment and physical, mental and psychological well-being, substance abuse, depression in young adults and suicides is quite extensive, however, there is limited data on impacts of underemployment on worker health and well-being. Interview respondents revealed that organizations do not routinely consider health outcomes as *it* relates to their work in workforce development *or* policy development. **Discussion and Conclusions:** A cross walk of themes from the literature and interviews revealed several gaps in data and research that will need to be addressed in order to realize the full magnitude of the public health burden of unemployment and underemployment. OSH needs to champion a research and practice agenda in

partnership with multi-sector stakeholders to illuminate the role of employment quality and status in closing the gap on health inequities.

4. Tapas Ray, PhD, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: Digitization and the ability to remain employed

Abstract: Current digitization trends in many instances redefined work design and how work is undertaken. Digitization of work where work is done based on digital technology has not only displaced workers but, at the same time, has created new employment opportunities and enabled workers to remain employed. This is powerfully illustrated by the current rise in flexible work practices like that of teleworking. Social distancing norms during the pandemic required the workers who could work from home or other remote places devoid of physical interactions with coworkers. The ability to telework varied widely among workers in different industries and occupations. This study aims to assess how digitization has enabled teleworking and how this has restricted job losses in different industries from May 2020 to April 2021. To understand teleworking trends, we analyzed the current population survey (CPS) monthly data reported by the US Bureau of Labor Statistics (BLS). Following the Covid-19 onset, the BLS added four questions to its regular pool of survey items that enquire about teleworking and the inability to work due to the pandemic. We studied the monthly trends of the percentage of workers teleworking and the percentage of workers who were unable to work. We also estimated the degree of digitization in different industries using the share of digitally enabled tasks in each industry in 2019, as reported by the Bureau of Economic Analysis. After controlling for demographics, we found that statistically significant correlations exist between the percentage of workers teleworking and workers' inability to work at the industry level. Also, we found that industries with a higher share of digital tasks had a higher percentage of workers teleworking. We conclude that digitization helped workers to telework and deterred job losses. Flexible work practices like telework have well-being implications. Our findings emphasize the same. The findings are important in the context of the future of work (FOW), where teleworking is touted to play a key role.

7A: Special session 2: Work, Mental Health and Well-being

Moderator: Michael Flynn, MA, National Institute of Occupational Safety and Health

Speakers:

1. Bernard Fontaine Jr., M.Sc., CIH, CSP, FAIHA, The Windsor Consulting Group, Inc.

Presentation Title: Total Worker Health Inclusivity of Psychosocial Disorders and Mental Health

Abstract: Abstract: The COVID-19 pandemic has put unprecedented pressure on the workforce. From working at home to navigating the safety requirements of the pandemic workplace, workers around the world are experiencing disruption that is taking its toll on mental and physical health. The UK Health and Safety Executive (HSE) reports that stress, depression and anxiety were critical elements in most work-related health cases in 2019-2020. (IOSH) As the impact of the pandemic stretches into 2021 and possibly beyond, occupational health and safety must expand its mandate to include a human-centered approach that addresses psychosocial health and the impact on doing work. Psychosocial health is impacted by everything from social factors to hazardous tasks in the work environment. It has a significant impact on well-being in the workplace, but it is often an area in which many health and safety practitioners feel unqualified to lead. As a result, workplace mental health is frequently treated in a superficial way with yoga classes and a stocked fridge in the office kitchen. Instead of simply ignoring the complexity of mental health, organizations must recognize that the root causes of psychological health problems can span the divide between work and home, making it a multi-faceted issue that requires the integration of many workplace teams, such as human resources, occupational health and safety, and leadership. The Canadian Centre for Occupational Health and Safety (CCOHS), in conjunction with Simon Fraser University, has identified thirteen psychosocial risk factors that impact organizational health, the health of individual employees and the financial bottom line. But this may only be the tip of the iceberg. A lack of psychological safety at work has major business repercussions. First, when people don't feel comfortable talking about initiatives that aren't working, the organization isn't equipped to prevent failure. And when employees aren't fully committed, the organization has lost an opportunity to leverage the strengths of all its talent. Before March 2020, most organizations did not have a plan for how to continue to operate during a global pandemic. In all likelihood, the severity of COVID-19 will ebb and flow over the next few years, with resurgences of the virus and its variants requiring a sliding scale of lockdown measures around the world. In addition, continued encroachment of human development into forests and wetlands that provide the natural habitats for animals that harbor unknown viruses means that COVID-19 is unlikely to be the last pandemic event. Pandemic preparedness should therefore be a top priority for governments and organizations around

the world. This means every organization should know how to operate safely during a pandemic to ensure that supply chains for such things as food and critical medical supplies remain resilient and efficient. Since 2018, ISO 45001:2018 has been the international standard for occupational health and safety management systems (OHSMS). It provides guidance to ensure leadership commitment to the OHSMS, policies that support the organization while fulfilling compliance obligations, continuous improvement of the OHSMS and integration of the OHSMS into the organization's business processes. Together with other standards that use the Annex L high-level structure, such as ISO 9001:2015 and ISO 14001:2015, ISO 45001:2018 can be part of an integrated management system that uses shared processes and documentation to meet the requirements of environmental, health and safety and quality management systems. Recently the International Organization for Standardization (ISO) has expanded the standards in the 45000 series with two additions: ISO 45003 Occupational health and safety management— Psychological health and safety at work— Guidelines for managing psychosocial risks and ISO/PAS 45005:2020 Occupational health and safety management—General guidelines for safe working during the COVID-19.

2. Aro Choi, MS, The University of Texas Health Science Center

Presentation Title: Associations between Well-being and Coping Strategies for Stress Related to COVID-19 among Health Sciences University Employees during the COVID-19 Pandemic

Abstract: Objective: To examine the associations between well-being and coping strategies for stress related to COVID-19. **Methods:** Two cross-sectional survey waves (May 2020, n=1777 and October 2020, n=1039) of employees at a large US-based health sciences university. The outcome was well-being, assessed by the WHO-5 questionnaire and dichotomized into good or poor well-being. Survey weighted logistic regression, adjusting for socio-demographic characteristics, was used to estimate the associations of coping strategies for stress related to COVID-19 with well-being in each wave. **Results:** The use of coping strategies such as seeking professional therapy/counseling (1st wave: OR=2.56, 95% CI 1.47-4.45; 2nd wave: OR=2.95, 95% CI 1.64-5.32) or avoiding feelings (1st wave: OR=1.70, 95% CI 1.15-2.52; 2nd wave: OR=2.01, CI 1.26-3.22) were associated with poor well-being in both waves. Other strategies were associated with well-being only in the first wave: drinking alcohol was associated with poor well-being (1st wave: OR=1.82, 95% CI 1.14-2.90) and engaging in physical activity was associated with better well-being (1st wave: OR=0.61, 95% CI 0.42-0.89). Employees who reported their coping strategies as being effective were less likely to experience poor well-being in both waves (1st wave: OR=0.38, 95% CI 0.26-0.55; 2nd wave: OR=0.36, 95% CI 0.23-0.57). **Conclusion:** The COVID-19 pandemic has triggered and exacerbated stress levels among workers, who have employed a variety of coping strategies. While some of the strategies seem to have been effective in managing the stress, others seem to have been more harmful. Employers and workers should focus on using healthy strategies for coping with the many challenges and stress faced during and post-COVID-19.

3. Terry Bunn, PhD, University of Kentucky

Presentation Title: FindHelpNowKY.org: A Tool for Health and Safety Professionals to Increase Timely Access to Available Substance Use Disorder Treatment

Abstract: Substance use disorders (SUD) have steadily increased over the last two decades. Referrals to SUD treatment require innovative strategies that rapidly link individuals to SUD treatment when they are at the critical stage of readiness. Seeking SUD treatment typically involves searching SUD treatment facility types (inpatient, outpatient/intensive outpatient, residential/family residential, and withdrawal management facilities) that offer specialized SUD treatment depending on individual needs and preferences. A user-friendly SUD treatment facility opening availability website called FindHelpNowKY.org was developed, implemented, and evaluated. FHNKY provides timely access to SUD treatment because the participating SUD treatment facilities update their slot openings on a near-real-time basis, enabling rapid admission to SUD treatment. FHNKY allows searches according to payment ability (commercial or public insurance or self-pay), gender identity, treatment facility type, need for co-occurring treatment (e.g., mental health care), as well as 30 other criteria. FindHelpNow is available for other jurisdictions and entities to utilize and customize according to their needs. The website is a valuable resource for healthcare facility partners that enhances workflow and reduces staff time spent conducting phone and website searches for available SUD treatment. FHNKY is also used by public safety partners such as the Kentucky State Police's Angel Initiative, which uses the website at its posts to locate available openings; troopers then transport the individual to the facility. Raised awareness of the treatment locator by employers, employee assistance programs, and human resource departments will be essential to increasing timely access to SUD treatment by employers and employees.

4. Aro Choi, MS, The University of Texas Health Science Center

Presentation Title: Associations between Well-being and Employee Perceptions of Remote Work among Health Sciences University Employees during the COVID-19 Pandemic

Abstract: Objective: To examine the associations between well-being and employee perceptions of remote work during the COVID-19 pandemic. **Methods:** Two cross-sectional survey waves (May 2020, n=1777 and October 2020, n=1039) of employees at a large US-based health sciences university. The outcome was well-being, assessed by the WHO-5 questionnaire and dichotomized into good or poor well-being. Survey weighted logistic regression, adjusting for socio-demographic characteristics, was used to estimate the associations of remote work perceptions, including loneliness and concerns about personal health and safety with well-being in each wave. **Results:** Loneliness (1st wave: OR=2.86, 95%CI 1.99-4.12; 2nd wave: OR=2.88, 95%CI 1.69-4.92) and concerns about personal health and safety (1st wave: OR=2.05, 95% CI 1.42-2.96; 2nd wave: OR=1.91, 95% CI 1.29-4.34) were associated with poor well-being in both waves. Faculty were less likely to have poor well-being than staff personnel (1st wave: OR=0.84, 95%CI 0.46-1.55; 2nd wave: OR=0.29, 95% CI 0.14-0.61) in both waves, but the effect was only statistically significant in second wave when the magnitude of the association increased. A similar trend, but with greater likelihood of poor well-being, was observed for employees who needed support to increase remote working effectiveness (1st wave: OR=1.35, 95% CI 0.90-2.02; 2nd wave: OR=3.90, 95% CI 2.27-6.70) and to separate work from personal life (1st wave: OR=1.02, 95% CI 0.67-1.55; 2nd wave: OR=2.36, 95% CI 1.29-4.34). **Conclusion:** Remote work may have financial and job flexibility advantages but it is not free of potentially adverse emotional health effects. These may be particularly important in relation to prolonged periods of solitary activities brought about with forced remote work related to the COVID-19 pandemic.

7B: Vertical expansion: well-being and working life continuum (research methods)

Moderator: Rosandra Daywalker, MD, The University of Texas Health Science Center

Speakers:

1. Paul Schulte, PhD, National Institute of Occupational Safety and Health

Presentation Title: Operationalizing well-being for workers

Abstract: While the concept of well-being is often discussed, mostly in general terms, there have been few attempts to operationalize it for use in workplaces and for workers. The changing nature of work, the workforce, and workplaces drives the need for an overarching concept like well-being that is useable in research, practice and policy making. Additionally, there is recognition that a large number of factors external to work, such as health behaviors (e.g., alcohol and drug use), aging, pandemics, and chronic diseases are influencing work and workers' health, that some of these conditions are in turn influenced by workplace exposure, and that these factors and effects require new, systems-oriented prevention strategies. There is also growing attention to fatigue, psychosocial hazards and effects and increasing consideration of decent, sustainable and healthy work as societal goals. The NIOSH WellBQ is a tool that can be used to address these conditions. The WellBQ is a survey instrument with five domains and 20 subdomains that measures well-being as a holistic construct rather than simply "workplace" or "work related" well-being. Ultimately, if the concept of well-being is to be used in occupational safety and health in the future there is for the field to be prepared for and have the capacity to use it. This preparation requires that in the future occupational safety and health investigators and practitioners have appropriate training and understanding of relevant complimentary disciplines, and the readiness to think about occupational safety and health from a multifactorial perspective. This presentation will review all these factors and provide recommendations for operationalizing well-being for workers.

2. Chia-Chia Chang, MPH, MBA, Centers for Disease Control and Prevention/National Institute of Occupational Safety and Health

Presentation Title: NIOSH Worker Well-Being Questionnaire (WellBQ)

Abstract: Worker well-being is a key theme in an expanded focus on occupational safety and health. For example, the Centers for Disease Control and Prevention (CDC)'s National Institute for Occupational Safety and Health (NIOSH)'s *Total Worker Health*[®] initiative aims to advance worker safety, health, and well-being. However, there has been no consistent definition of the concept of worker well-being nor a measurement tool to assess it. To address this gap, NIOSH and the RAND Corporation conducted research to develop a conceptual framework and operationalize indicators for worker well-being. This session will summarize the initiative, which consisted of a literature review to develop a definition identifying five domains of worker well-being, followed by creation of the NIOSH Worker Well-Being Questionnaire (WellBeQ) in consultation with an expert panel, and pilot testing of the questionnaire. After analysis of the pilot test, the questionnaire was revised and released. The session will provide a brief description of the relevance of worker well-being to *Total Worker Health*, followed by an overview of the NIOSH WellBQ. The session would include

panelists discussing the development of the NIOSH WellBQ and how to use the instrument to further understanding about worker well-being and future opportunities for the instrument.

3. Pete Kines, PhD, National Research Centre for the Working Environment

Presentation Title: Leading indicators for safety, health and wellbeing at work

Abstract: Traditional indicators of occupational safety and health (OSH) are often reactive, negative and with a long follow-up time, such as accidents, injuries, sickness-absence, ill health and disease. In an expanded focus on OSH there is a need for leading indicators and proactive key performance indicators of safety, health and wellbeing as a supplement to these lagging indicators. This presentation deals with the development of 14 proactive leading indicators for safety, health and wellbeing. Information was gathered through a literature study and experience from industries, sector specific organizations and OSH professionals from around the world. Indicators were selected that would be of practical use and value for companies in e.g. proactively gauging progress and benchmarking with others. The concept for the indicators is based on a 'Vision Zero' (comparative to the 'Total Work Health' paradigm) strategy for safety, health and wellbeing at work, and their development was through a knowledge-transfer-and-exchange (research to practice) process. The indicators are relevant for each of the three facets of safety, health and wellbeing, and how they each are 'integrated' in regular business processes. They are outlined in one-page fact-sheets with descriptions of the key concepts, aims, good practices and examples of how to measure the indicator. The indicators deal with integrating safety, health and wellbeing in visible leadership commitment and worker involvement, onboarding, refresher training, procurement, regular briefings, risk assessments, innovation and change, learning from unplanned events etc. An example is an indicator for following-up and learning from pre-work briefings (e.g. toolbox meetings, daily management whiteboard meetings), which are short, regular discussions between leaders and workers held directly before work tasks begin. Three proposals for measuring the indicators are provided, allowing for adaption to the sector and size of an enterprise, and which can be used for benchmarking and as proactive key performance indicators.

4. Consol Serra, MD, PhD, IMIM-Hospital del Mar Medical Research Institute

Presentation Title: Challenges of an innovative and complex workplace intervention to promote musculoskeletal health and well being in nursing staff: process evaluation in a cluster randomized controlled trial

Abstract: Objectives: to evaluate a multifaceted workplace intervention with preventive and health promotion components with focus on compliance of the study protocol, and fulfilment of expectations and satisfaction of workers. **Methods:** a two-armed cluster randomized controlled trial of one year was carried out in two Spanish hospitals and included 257 workers. The process evaluation included quantitative and qualitative methods. Quantitative methods were used to address the indicators of Steckler and Linnan's framework. Data on recruitment was collected through a baseline questionnaire for the intervention and the control group. Reach and dose received were collected through participation sheets, dose delivered and fidelity through internal registries, and fulfilment of expectations and satisfaction were collected with two questions at 12-months follow-up. Qualitative methods were used for a content analysis of discussion groups at the end of the intervention. **Results:** The reach of the activities ranged from 96% for participatory ergonomics to 5% for healthy diet. The number of sessions offered ranged from 60 sessions for Nordic walking to one session for healthy diet. Fidelity of workers ranged from 100% for healthy diet and 79% for participatory ergonomics, to 42% and 39% for Nordic walking and case management, respectively. Lowest fidelity of providers was 75% for case management and 82% for Nordic walking. Fulfilment of expectations and satisfaction ranged from 6.6/10 and 7.6/10, respectively, for case management to 10/10 together for the healthy diet session. Discussion groups revealed several limitations for most of the activities, mainly focused on limited communication. **Conclusions:** the implementation of the intervention was predominantly carried out as intended, however several challenges for its implementation were identified.



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