

accomplishments. It will also share information about CMVS strategic planning, which is intended to ensure that resources are directed toward highest-priority topics and worker groups.

In September 2019, the CMVS published an evaluation of progress on its 2014-2018 strategic plan, which identified numerous research and communication products focusing on high-priority worker groups: truck drivers, emergency medical services workers and firefighters, law enforcement officers (LEOs), oil and gas extraction (OGE) workers, and light-vehicle drivers. For example, research on motor vehicle crashes among LEOs led to development of trade journal articles on prevention of officer-involved crashes and a toolkit for use by departments and officers. Research findings about the role of fatigue in crash fatalities of OGE workers, coupled with strong interest from industry partners, led to development of fact sheets on driver fatigue directed toward employers and workers. Research findings on non-use of seat belts by truck drivers led to NIOSH's first CDC Vital Signs, a suite of communication products to promote trucker safety and injury prevention by encouraging belt use. Research on the safety of workers in the ambulance patient compartment led to development of ambulance design and testing standards and to changes in performance specifications for ambulance purchases. CMVS research findings have also contributed to NIOSH comments to regulatory agencies and to national and international standards on fleet safety management that provide critical guidance where no regulations exist.

Building on the evaluation of its 2014-2018 plan, the CMVS is developing a 10-year plan which will go into effect in 2020. The draft plan is informed by input from internal and external partners, the public, and research agendas from other organizations. Following the NIOSH strategic plan for 2019-2023, the CMVS plan will emphasize four industry sectors for which motor vehicle safety is a priority: oil and gas extraction; public safety; transportation, warehousing, and utilities; and wholesale and retail trade. Research and communication activities will center on three strategic areas: (1) crash and injury risk factors; (2) engineering and technology-based interventions; and (3) motor vehicle safety management programs and practices. A continuing balance between research and communication positions the CMVS to effectively and efficiently work toward our overarching goal of preventing work-related motor vehicle crashes.

Stephanie G. Pratt, PhD,\* Rebecca R. Olsavsky, MS, National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research.

## H-11

### NIOSH—Occupational Health Equity Program

*Michael Flynn (NIOSH)*

Not all workers have the same risk of experiencing a work-related health problem, even when they have the same job. The way societies configure social and economic arrangements influence workers' exposure to occupational hazards (differential exposure) as well as their ability to cope with adverse consequences of an occupational injury or illness (differential susceptibility). These arrangements are commonly referred to as social determinants of health (SDOH). Three types of social arrangement particularly salient for the distribution of occupational injury and illness include: social group/identity along axes such as race, class and gender; organizational and industry practices such as competitive bidding, unionization, and sub-contracting; and employment characteristics such as job security, shift work, and pay structures.

The Occupational Health Equity program seeks to identify and eliminate avoidable differences in work-related disease incidence, injury, mental illness, and morbidity and mortality that are closely linked with social, economic, and/or environmental disadvantage.

The United States' workforce is undergoing dramatic demographic and structural shifts. The fastest growing groups in the workforce (such as racial minorities, immigrants, and contingent workers) are also those who are at an increased risk of occupational injuries and illnesses as a result of social, economic, and/or environmental disadvantage. The direct and indirect cost of occupational injury and illness in the United States in 2007 was \$250 billion, up from an inflation-adjusted \$217 billion in 1992. If the disadvantages that contribute to increased occupational injury and illness are not addressed, the costs to society will increase as workers from these high-risk groups make up an increasing percentage of the workforce. Occupational health equity research and practice is essential if we are to maintain the gains in safety and health of the past half-century.

One of the largest challenges facing occupational health equity is that the same social and economic structures that contribute to higher risks of occupational injury have often also excluded these workers from efforts to understand and prevent workplace illness and injury. As a result, existing surveillance systems often have incomplete information, making the occupational health status of some underserved worker populations unclear. Similarly, research methods that work well for understanding majority populations are often not as effective for working with many racial/ethnic minority groups. Tailored research methods and interventions need to be developed and adopted. Occupational safety and health professionals and organizations need to continue developing the internal capacity and institutional relationships to work effectively with these communities.

The Occupational Health Equity program is working to integrate a social determinants of health approach to occupational safety and health. This work includes:

1. Improving surveillance and research methods to more precisely identify which social, economic, and/or environmental disadvantages contribute to higher rates of occupational injury and illness in which industries.
2. Promoting research that explains how barriers to safety and health related to these factors occur at the worksite and how they can be overcome.
3. Developing and evaluating tailored occupational safety and health programs, policies or other changes that directly address these barriers either by themselves or in combination (Overlapping Vulnerabilities)
4. Improving institutional infrastructure to address these risk factors through internal capacity building and partnership development.

Michael A Flynn, MA, Paul Schulte, PhD, Andrea L. Steege, PhD, Carlos Siordia, PhD, National Institute for Occupational Safety and Health, Occupational Health Equity Program, 1090 Tusculum Ave. M/S C-10, Cincinnati, OH 45226, USA

## H-12

### NIOSH—Center for Occupational Robotics Research: Program, Goals, and Research

*Hongwei Hsiao (NIOSH)*

The National Institute for Occupational Safety and Health (NIOSH) conducted extensive robotics research when robots began appearing

in the workplace in the mid-1980s. Increased use of robots and breakthroughs in human-robot collaboration during recent years require a new level of scientific efforts to guide the development and use of robots that enhance worker safety, health, and well-being. NIOSH established the Center for Occupational Robotics Research (CORR) in September 2017. The CORR addresses the safety of today's workers who use, wear, or work near robots by working in partnership with academic researchers, trade associations, robotics manufacturers, employers using robotics technology, integrators who set-up robotic systems in workplaces, labor organizations, and other federal agencies.

The proposed poster will focus on NIOSH efforts on (1) the potential for robotics technologies to prevent worker injuries and musculoskeletal disorders, (2) increasing understanding of human and robot interactions to ensure human worker safety, (3) improving the ability to identify and track injuries involving robotics technologies, and (4) providing guidance on working safely with robotics technologies. The materials will be organized by (1) the concept of human-centered robotics, (2) NIOSH's role in robotics research, (3) current NIOSH robotics research projects, and (4) NIOSH laboratory capacity for robotics research on worker safety, health, and well-being. The subjects of work, stress, and health are integrated in the poster presentation.

Hongwei Hsiao, PhD\*, Dawn N. Castillo, MPH, Jacob Carr, Ph.D., National Institute for Occupational Safety and Health, Division of Safety Research, 1095 Willowdale Rd, Morgantown, WV 26505, USA

### H-13

#### NIOSH—National Center For Productive Aging And Work

*Bermang Ortiz (NIOSH)*

This poster will present strategic goals for the National Center for Productive Aging and Work (NCPAW), a description of current activities, and a model of productive aging.

Workers 55 or older are increasing in number and will account for nearly 25% of the labor force in 2024. The aging of the U.S. workforce has implications for the safety and health of all workers. Aging can be a process of decline and loss as well as a course of development and growth. For example, although the likelihood of fatal occupational injuries increases with age, older workers tend to experience fewer non-fatal workplace injuries than their younger coworkers. The US workforce is also becoming increasingly age diverse, with many workplaces having up to five generations working side by side.

The National Center for Productive Aging and Work (NCPAW) at the National Institute for Occupational Safety and Health (NIOSH) advances lifelong well-being for workers of all ages and supports productive aging across the working life through: a) research activities that advance the understanding of workplace factors that contribute to the productive and healthy aging of workers; b) research translation that effectively engages stakeholders and intermediaries in the reduction and prevention of work-related injuries and illness in the aging workforce; and c) partnership development and capacity building with occupational health and safety researchers, organized labor, employers, intermediaries, and other stakeholders. Current NCPAW projects include develop educational products to prevent WMSDs in construction workers across age groups; develop educational products to prevent WMSDs and falls among aging retail workers; and develop fact sheets about important occupational and safety affecting aging workers.

NCPAW's concept of productive aging is informed by the Work Ability approach first developed by the Finnish Institute of Occupational Health, and Total Worker Health®. Productive aging takes a comprehensive, integrated approach to understanding the aging process across the life span, including the physical, mental, and social aspects of a worker's well-being. In particular, NCPAW's approach to productive aging includes four attributes: (1) a life-span perspective, (2) a comprehensive and integrated framework, (3) outcomes that recognize the priorities of both workers and organizations, and (4) a supportive work culture for multi-generational issues. These attributes illustrate the emphasis of productive aging on meeting the needs of all workers as they age.

Bermang Ortiz, BA, James Grosch, PhD, Juliann Scholl, PhD, Harpriya Kaur, PhD, National Institute for Occupational Safety and Health, Education and Information Division, Training Research and Evaluation Branch, 1090 Tusculum Ave., Mailstop C-10, Cincinnati, OH 45226

### H-14

#### NIOSH—Safe ▪ Skilled ▪ Ready Workforce Program

*Rebecca Guerin (NIOSH)*

Globalization and advancements in technology have generated new demands for the knowledge and skills required for job and life success. The World Economic Forum suggests that cross-sector competencies, such as critical thinking, are in higher demand by employers than are "narrow" technical skills. No international consensus exists about the skills required for tomorrow's workers or if competencies related to occupational safety and health (OSH) are included in this vision. Yet ensuring that future jobs are also safe and healthy jobs is a critical, and often missing, component of efforts to develop the future workforce. The societal and economic costs of work-related injuries and illnesses are a serious and persistent public health problem in the United States. A 2011 analysis suggests that the cost of work-related fatalities and nonfatal injuries and illnesses, based on medical costs and productivity losses, at over \$250 billion per year. This exceeds the cost of cancer and cardiovascular disease.<sup>1</sup> Young and contingent workers suffer disproportionately from workplace injury and illness.<sup>2,3</sup> Young people between the ages of 15 and 19 are more than twice as likely than workers ages 25 and over to experience a work-related injury that requires treatment in a hospital emergency department.<sup>2</sup> Workplace incidents may result in lifelong disabilities that impact young workers' health, well-being, and financial future. Contingent workers are another population at high risk for experiencing a work-related injury.<sup>3</sup> One of many contributing factors to this high burden of injury among new (including young and contingent) workers is a lack of sufficient safety and health training.<sup>3,4</sup> Thus, OSH knowledge and skills should be part of every effort to prepare the future workforce.

In 2013, NIOSH launched the Safe Skilled Ready Workforce (SSRW) Program to build on two decades of young worker research at NIOSH and advance science for the design, implementation, and evaluation of programs that prepare young and contingent workers for safe and healthy employment. The Program's mission is to ensure that all people, before they join the U.S. labor force or start a new job, have essential OSH competencies that pertain to hazard recognition and control in the workplace; employer responsibilities and worker rights and roles; actions to take in a work-related emergency; and communication with others when feeling unsafe or threatened.<sup>5</sup> These cross-sector

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