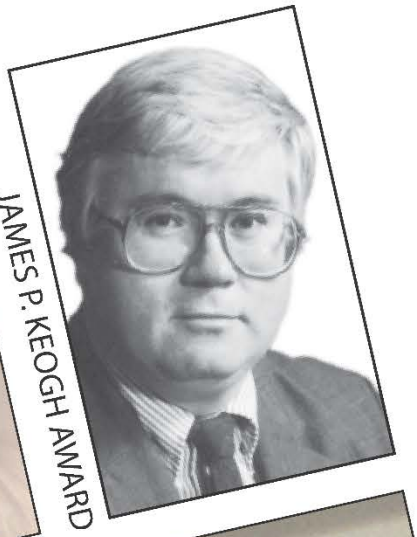
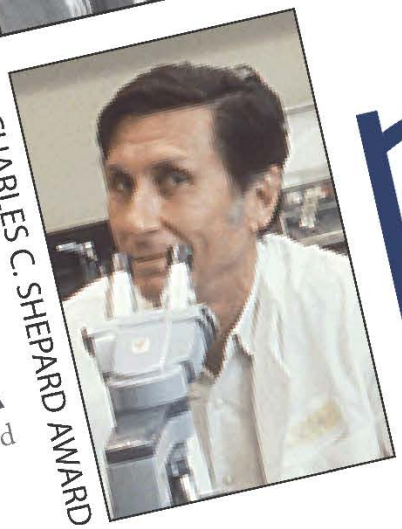
NIOSH SCIENCE AWARDS RESULTS BOOKLET FOR 2015 PROGRAM





DIA
The Director's Intramural Award

r2p®

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

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TTY: 1-888-232-6348
CDC INFO: cdcinfo@cdc.gov

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NIOSH Science Awards 2015

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

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NIOSH Presents 2015 Awards for Significant Scientific Contributions

The National Institute for Occupational Safety and Health (NIOSH) has recognized several NIOSH researchers and partners for their significant contributions in 2014 to the field of occupational safety and health.

John Howard, M.D., NIOSH Director

The annual awards are an opportunity for NIOSH to honor researchers for excellence in science that informs and supports the prevention of work-related injuries, illnesses, and deaths. The awards include the following:

- The **Alice Hamilton Award**, for scientific excellence of technical and instructional materials by NIOSH scientists and engineers.
- The **James P. Keogh Award**, for outstanding service by an individual in the occupational safety and health field.
- The **Bullard-Sherwood Research-to-Practice Award**, for exceptional efforts by NIOSH researchers and partners in applying occupational safety and health research to the prevention of workplace fatalities, illnesses, or injuries.
- The **Director's Award for Extraordinary Intramural Science**.
- Nominations to represent NIOSH for the **Charles C. Shepard Award**, an honor recognizing outstanding contributions to science awarded annually by the Centers for Disease Control and Prevention.

"Strategic research stimulates the scientific evidence, practices, and technologies that are essential for keeping workplaces safe and healthy," said NIOSH Director John Howard, M.D. "We are proud to recognize the dedicated employees of NIOSH and their partners, whose contributions engage the changing demands of the 21st Century workplace while continuing our progress against persistent legacy hazards."

Alice Hamilton Award

Named after Dr. Alice Hamilton, a pioneering researcher and occupational physician, the Alice Hamilton Award is given for outstanding contributions in the areas of biological sciences, engineering and physical sciences, human studies, and educational materials. The submissions go through a rigorous review by panels of scientific experts, including peers from both outside and inside NIOSH. The awardees have contributed to an array of sectors, highlighting the broad range of occupational safety and health.

Among other accomplishments, research and outreach by this year's awardees contributed to protecting workers on the front lines of the Ebola response from job-related exposures to the virus, reducing home healthcare workers' risk of incurring painful and potentially disabling injuries, supporting sustainable safety and health programs in small businesses, improving the safety and health of truck drivers, preventing injuries from repetitive and forceful tasks in poultry processing, and building a base of knowledge for identifying and preventing chemical exposures in oil and gas field operations.

James P. Keogh Award

The James P. Keogh Award for Outstanding Service in Occupational Safety and Health recognizes a current or former employee of NIOSH whose career "exhibits respect and compassion for individual workers, with tireless leadership, courage, and a fierce determination to put knowledge into practice to enhance their well-being." This year, NIOSH honored Dr. Kathleen Kreiss, a dedicated leader in the field of occupational lung disease, who, over the course of three decades, has made extraordinary contributions to occupational medicine through her research, education, and public health work. Research led by Dr. Kreiss was instrumental in identifying and preventing previously unrecognized occupational hazards, such as flavorings-related bronchiolitis obliterans ("popcorn lung"), flock-workers' lung, and adult-onset asthma associated with damp buildings.

Bullard-Sherwood Research-to-Practice Award

The Bullard-Sherwood Research-to-Practice Award, named for the inventor of the hard hat, Edward W. Bullard, and the inventor of the personal industrial hygiene sampling pump, R. Jeremy Sherwood, recognizes recipients for outstanding contributions in three categories: knowledge, interventions, and technology. This year's awards went to NIOSH's pioneering Center for Workers' Compensation Studies, an updated school curriculum for incorporating worker health and safety into instructional courses for today's working teens, and a partnership for reducing silica dust exposure from asphalt pavement milling machines.

Director's Award for Extraordinary Intramural Science

The Director's Award for Extraordinary Intramural Science recognizes outstanding collective contributions to science excellence at NIOSH by individual intramural scientists and support staff. The Distinguished Career Scientist award was presented to Dr. Raymond Roberge, a recognized leader in research for designing comfortable and tolerable personal protective equipment (PPE), and for advancing PPE and respiratory protection for healthcare workers. The Early Career Scientist award was presented to Dr. Cara Halldin for leadership and collaboration in research and health surveillance to prevent serious and debilitating occupational lung diseases, including flavorings-related bronchiolitis obliterans and coal workers' pneumoconiosis. The Scientific Support award

was presented to Jerry Kratzer for providing engineering technical support by expertly fabricating and modifying equipment used in NIOSH's occupational safety and health research.

Charles C. Shepard Award

Earlier this year, NIOSH announced its nominations for the Charles C. Shepard Award. Named for Charles C. Shepard, an internationally recognized microbiologist, this award is given in five categories, including the Lifetime Scientific Achievement Award. NIOSH nominated 12 papers for the 2014 award, and for the Lifetime Scientific Achievement Award nominated Steven Schrader, Ph.D., a Supervisory Research Biologist who is chief of the Biomonitoring and Health Assessment Branch in the Division of Applied Research and Technology of NIOSH.

For more information about the NIOSH Science Awards, including winners and nominees for all categories, go to the website, CDC, NIOSH Scientific Awards.

For more information about NIOSH research activities, go to the website, The National Institute for Occupational Safety and Health (NIOSH).

Alice Hamilton Award for Occupational Safety and Health

The Alice Hamilton Award for Occupational Safety and Health recognizes the scientific excellence of technical and instructional materials by NIOSH scientists and engineers in the areas of biological science, engineering and physical science, human studies, and educational materials.

The award honors Dr. Alice Hamilton (1869–1970), a pioneering researcher and occupational physician, and it is presented each year by NIOSH on the basis of rigorous reviews by panels of scientific experts from outside the Institute.

Education and Guidance

Winner

Ebola Interim Guidance Products

Bernard B, Brinker K, Berryann R, Boudreau Y, Brueck S, Burton N, Caruso C, Coca A, Cummings K, D'Alessandro M, Delaney L, de Perio M, Dowell C, Eisenberg J, Funk R, Jacklitsch B, Kiefer M, Kilinc-Balci FS, King B, Kim JH, MacMahon K, McKernan L, Methner M, Nickels L, Niemeier RT, Ridl S, Scharf T, Shaffer R, Shugart J, Williams W, Albrecht V, Arbury S, Arduino M, Bastian RK, Brown C, Coulliette A, Donlan R, Hodgson M, Klomp R, Matthews D, Noble-Wang J, Petitti C, Rose L, Shams A, Pickrel JM, Rhodes E, Rodgers M, Rotert K, Sayles G, Thomas R, Wang L

> NIOSH [2014]. Limiting heat burden while wearing personal protective equipment (PPE) —developed for healthcare workers and site coordinators providing care in West African countries affected by the Ebola outbreak. Slide presentation. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

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NIOSH [2014]. Prevent heat-related illness. Poster. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

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NIOSH [2014]. Considerations for selecting protective clothing used in healthcare for protection against microorganisms in blood and body fluids. Webpage. By Kilinc-Balci FS, D'Alessandro M, Shaffer R, Dowell C, Berryann R. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Interim guidance for U.S. businesses, employers, and business travelers to prevent exposures to Ebola. Webpage. By Niemeier RT, Shugart J, Brueck S, Cummings K, MacMahon K. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Interim guidance for healthcare workers providing care in West African countries affected by the Ebola outbreak: limiting heat burden while wearing personal protective equipment (PPE). Webpage. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

Abstract

In 2014, an unprecedented Ebola virus disease outbreak ravaged nations in West Africa, causing more than 10,000 deaths as of February 2015. In October 2014, two American nurses contracted the Ebola virus in Dallas, Texas, while treating a patient there who had been infected with the virus in Africa. The concern over Ebola prompted healthcare professionals and workers who might come into contact with people infected with the virus to seek reliable information about personal protective equipment (PPE) and other precautions that could protect workers from exposure to the deadly virus. In late 2014, NIOSH authors contributed to a group of documents that applied NIOSH expertise and research to clarify best practices relating to employees who might become exposed to infected travelers. The publications were recognized with first place in the Education and Guidance category at the 2015 Alice Hamilton Awards program. They deal with topics such as the following:

- Limiting heat burden and preventing heat-related illness while wearing PPE.
- Providing information on Ebola for workers.
- Answering Ebola-related questions for airport retail and food service workers, airline customer service representatives, airport passenger assistance workers, airport custodial staff, and airport baggage and cargo handlers.
- Informing managers and workers who handle untreated sewage from individuals with Ebola in the United States.
- Preventing worker fatigue.
- Using the buddy system.
- Protective clothing.
- Providing information for businesses, employers and business travelers to prevent Ebola exposure.

Honorable Mention

Caring for yourself while caring for others: training for homecare workers

Baron S, Nickels L, Forrester C, Sheahan M, Stock L

NIOSH [2014]. Caring for yourself while caring for others: training for homecare workers. Educational curriculum. By Baron S, Nickels L, Forrester C, Sheahan M, Stock L. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2015-102.
NIOSHTIC-2: 20045410

Summary

Caring for Yourself While Caring for Others is a free and active curriculum to help trainers meet the health and safety training needs for homecare workers and to enhance communication between homecare workers and their clients. The activities in this curriculum are designed to encourage participants in promoting safe and healthy work environments—for their clients and for themselves.

Objective

Through this training, homecare workers learn to recognize hazards commonly encountered in homecare workplaces and apply practical solutions to manage risks and improve safety.

Honorable Mention

Application of a model for delivering occupational safety and health to smaller businesses: case studies from the U.S.

Cunningham T, Sinclair R

Cunningham T, Sinclair R [2015]. Application of a model for delivering occupational safety and health to smaller businesses: case studies from the U.S. Saf Sci *71*(Part C):213–225.
NIOSHTIC-2: 20045033 I NORA: Public Safety

Abstract

Smaller firms are the majority in every industry in the United States, and they endure a greater burden of occupational injuries, illnesses, and fatalities than larger firms. Smaller firms often lack the necessary resources for effective occupational safety and health activities, and many require external assistance with safety and health programming. Based on previous work by researchers in Europe and New Zealand, NIOSH researchers developed [a model] for occupational safety and health intervention in small businesses. This model was evaluated with several intermediary organizations. Four case studies that describe efforts to reach small businesses with occupational safety and health assistance include the following: trenching safety training for construction, basic compliance and hazard recognition for general industry, expanded safety and health training for restaurants, and fall prevention and respirator training for boat repair contractors. Successful efforts included participation by the initiator among the intermediaries' planning activities, alignment of small business needs with intermediary offerings, continued monitoring of intermediary activities by the initiator, and strong leadership for occupational safety and health among intermediaries. Common challenges were a lack of resources among intermediaries, lack of opportunities for in-person meetings between intermediaries and the initiator, and balancing the exchanges in the initiator-intermediary-small business relationships. The model offers some encouragement that initiator organizations can contribute to sustainable OSH assistance for small firms, but they must depend on intermediaries who have compatible interests in smaller businesses and they must work to understand the small business social system.

Engineering and Control

Winner

Tool-specific performance of vibration-reducing gloves for attenuating palm-transmitted vibrations in three orthogonal directions

Dong RG, Welcome DE, Peterson DR, Xu XS, McDowell TW, Warren C, Asaki T, Kudernatsch S, Brammer A

Dong RG, Welcome DE, Peterson DR, Xu XS, McDowell TW, Warren C, Asaki T, Kudernatsch S, Brammer A [2014]. Tool-specific performance of vibration-reducing gloves for attenuating palm-transmitted vibrations in three orthogonal directions. Int J Ind Ergon *44*(6):827–839.
NIOSHTIC-2: 20045364 | NORA: Construction

Abstract

Vibration-reducing (VR) gloves have been increasingly used to help reduce vibration exposure, but it remains unclear how effective these gloves are. The purpose of this study was to estimate tool-specific performances of VR gloves for reducing the vibrations transmitted to the palm of the hand in three orthogonal directions (3-D) in an attempt to assess glove effectiveness and aid in the appropriate selection of these gloves. Four typical VR gloves were considered in this study, two of which can be classified as anti-vibration (AV) gloves according to the current AV glove test standard. The average transmissibility spectrum of each glove in each direction was synthesized based on spectra measured in this study and other spectra collected from reported studies. More than 70 vibration spectra of various tools or machines were considered in the estimations, which were also measured in this study or collected from reported studies. The glove performance assessments were based on the percent reduction of frequency-weighted acceleration as is required in the current standard for assessing the risk of vibration exposures. The estimated tool-specific vibration reductions of the gloves indicate that the VR gloves could slightly reduce (<5%) or marginally amplify (<10%) the vibrations generated from low-frequency (<25 Hz) tools or those vibrating primarily along the axis of the tool handle. With other tools, the VR gloves could reduce palm-transmitted vibrations in the range of 5%–58%, primarily depending on the specific tool and its vibration spectra in the three directions. The two AV gloves were not more effective than the other gloves with some of the tools considered in this study. The implications of the results are discussed.

Honorable Mention

The effects of vibration-reducing gloves on finger vibration

Welcome DE, Dong RG, Xu XS, Warren C, McDowell TW

Welcome DE, Dong RG, Xu XS, Warren C, McDowell TW [2014]. The effects of vibration-reducing gloves on finger vibration. Int J Ind Ergon *44*(1):45–59.
NIOSHTIC-2: 20043446 | NORA: Construction

Abstract

Vibration-reducing (VR) gloves have been used to reduce the hand-transmitted vibration exposures from machines and powered hand tools, but their effectiveness remains unclear, especially for finger protection. The objectives of this study are to determine whether VR gloves can attenuate the vibration transmitted to the fingers and to enhance the understanding of the mechanisms of how these gloves work. Seven adult male subjects participated in the experiment. The fixed factors evaluated include hand force (four levels), glove condition (gel-filled, air bladder, no gloves), and location of the finger vibration measurement. A 3-D laser vibrometer was used to measure the vibrations on the fingers with and without wearing a glove on a 3-D hand-arm vibration test system. This study finds that the effect of VR gloves on the finger vibration depends on not only the gloves but also their influence on the distribution of the finger contact stiffness and the grip effort. As a result, the gloves increase the vibration in the fingertip area but marginally reduce the vibration in the proximal area at some frequencies below 100 Hz. On average, the gloves reduce the vibration of the entire fingers by less than 3% at frequencies below 80 Hz but increase at frequencies from 80 to 400 Hz. At higher frequencies, the gel-filled glove is more effective at reducing the finger vibration than the air bladder-filled glove. The implications of these findings are discussed [in the article].

Epidemiology and Surveillance

Winner

Obesity and other risk factors: the National Survey of U.S. Long-Haul Truck Driver Health and Injury

Sieber WK, Robinson CF, Birdsey J, Chen GX, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH

Sieber WK, Robinson CF, Birdsey J, Chen GX, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH [2014]. Obesity and other risk factors: the National Survey of U.S. Long-Haul Truck Driver Health and Injury. Am J Ind Med *57*(6):615–626.

NIOSHTIC-2: 20043603 | NORA: Transportation, Warehousing and Utilities

Abstract

Background

Drivers of heavy and tractor-trailer trucks accounted for 56% of all production and nonsupervisory employees in the truck transportation industry in 2011. There are limited data for illness and injury in long-haul truck drivers, which prompted a targeted national survey.

Methods

Interviewers collected data during 2010 from 1,670 long-haul truck drivers at 32 truck stops across the 48 contiguous United States, which were used to compute prevalence estimates for self-reported health conditions and risk factors.

Results

Obesity (69% vs. 31%, $P < 0.01$) and current smoking (51% vs. 19%, $P < 0.01$) were twice as prevalent in long-haul truck drivers as in the 2010 U.S. adult working population. Sixty-one percent reported having two or more of the risk factors: hypertension, obesity, smoking, high cholesterol, no physical activity, 6 or fewer hours of sleep per 24-hr period.

Conclusion

Survey findings suggest a need for targeted interventions and continued surveillance for long-haul truck drivers.

Honorable Mention

Coronary artery disease and cancer mortality in a cohort of workers exposed to vinyl chloride, carbon disulfide, rotating shift work, and *o*-toluidine at a chemical manufacturing plant

Carreón T, Hein MJ, Hanley KW, Viet SM, Ruder AM

Carreón T, Hein MJ, Hanley KW, Viet SM, Ruder AM [2014]. Coronary artery disease and cancer mortality in a cohort of workers exposed to vinyl chloride, carbon disulfide, rotating shift work, and *o*-toluidine at a chemical manufacturing plant. Am J Ind Med *57*(4):398–411.
NIOSHTIC-2: 20043726

Abstract

Background

We updated through 2007 the mortality experience of 1,874 workers employed at a New York State chemical manufacturing plant between 1946 and 2006.

Methods

Reassessed exposures to vinyl chloride, carbon disulfide, and shift work and categories of *o*-toluidine exposure were based on year, department, and job title. Standardized mortality ratios (SMR) compared mortality with that of the U.S. population. Internal comparisons used directly standardized rate ratios.

Results

Hepatobiliary cancer mortality was elevated among workers ever exposed to vinyl chloride (SMR = 3.80, 95% confidence interval 1.89–6.80); directly standardized rates increased with increasing vinyl chloride exposure duration. No increase in non-Hodgkin lymphoma mortality was observed with vinyl chloride and shift work exposures. Internal comparisons showed increased coronary artery disease mortality among long-term workers exposed to carbon disulfide and shift work for 4 years or more.

Conclusions

Excess coronary artery disease mortality confirms earlier results; further investigation is needed to understand risk factors.

Honorable Mention

Non-fatal work-related traumatic brain injuries treated in U.S. hospital emergency departments, 1998–2007

Konda S, Reichard A, Tiesman HM, Hendricks S

Konda S, Reichard A, Tiesman HM, Hendricks S [2014]. Non-fatal work-related traumatic brain injuries treated in U.S. hospital emergency departments, 1998–2007. Inj Prev: Epub ahead of print, 2014 Sep.
NIOSHTIC-2: 20045086 | NORA: Transportation, Warehousing and Utilities

Abstract

Purpose

Little is known about work-related traumatic brain injuries (WRTBI). This study describes non-fatal WRTBI treated in U.S. emergency departments from 1998 through 2007.

Methods

Non-fatal WRTBI were identified from the National Electronic Injury Surveillance System occupational supplement (NEISS-Work) using the diagnoses of concussion, internal organ injury to the head and skull fracture. WRTBI rates and rate ratios were calculated, and the trend in rates was assessed.

Results

An estimated 586,600 (95% CI = ±150,000) WRTBI were reported during the 10-year period at a rate of 4.3 (CI = ±1.1) per 10,000 full-time equivalent (FTE) workers (1 FTE = 2000 h per year). From 1998 through 2007, the rate of WRTBI increased at an average of 0.21 per 10,000 FTE per year ($P < 0.0001$) and the rate of fall-related WRTBI increased at an average of 0.10 per 10,000 FTE ($P < 0.0001$). During the same period, the annual rate of WRTBI resulting in hospitalization increased 0.04 per 10,000 FTE ($P < 0.0001$). Ten percent of WRTBI were hospitalized, compared with hospitalization of 2% all NEISS-Work injuries. Also, workers with highest fall-related TBI rates per 10,000 FTE were the youngest (2.4; CI = ± 1.4) and oldest (55 and older) workers (1.9; CI = ±0.8).

Conclusions

Non-fatal WRTBI are one of the most serious workplace injuries among work-related injuries treated in emergency departments. Non-fatal WRTBI are much more likely to result in hospitalization compared with other types of injuries. The upward trend of WRTBI rates from 1998 through 2007 underscore the need for more directed effective prevention methods to reduce WRTBI injuries.

Exposure and Risk Assessment

Winner

Evaluation of some potential chemical exposure risks during flowback operations in unconventional oil and gas extraction: preliminary results

Esswein EJ, Snawder J, King B, Breitenstein M, Alexander-Scott M, Kiefer M

Esswein EJ, Snawder J, King B, Breitenstein M, Alexander-Scott M, Kiefer M [2014]. Evaluation of some potential chemical exposure risks during flowback operations in unconventional oil and gas extraction: preliminary results. J Occup Environ Hyg *11*(10):D174–D184.

NIOSHTIC-2: 20044996 | NORA: Mining: Oil and Gas Extraction / Transportation, Warehousing and Utilities

Abstract

Approximately 562,000 workers were employed in the U.S. oil and gas extraction industry in 2012; nearly half of those workers were employed by well servicing companies, which include companies that conduct hydraulic fracturing and flowback operations. To understand possible risks for chemical exposures in modern oil and gas extraction operations, the National Institute for Occupational Safety and Health (NIOSH) initiated the Field Effort to Assess Chemical Exposures in Oil and Gas Workers. Initial research identified exposure risks for respirable crystalline silica during hydraulic fracturing as an occupational health hazard. This report describes industrial hygiene sampling during flowback operations at six unconventional oil and gas extraction sites in Colorado and Wyoming during spring and summer 2013. The results are considered preliminary; additional exposure assessments are needed to better understand the range of possible exposures, risk factors, and controls during flowback operations.

Honorable Mention

Prevalence of carpal tunnel syndrome among employees at a poultry processing plant

Musolin K, Ramsey JG, Wassell JT, Hard DL

Musolin K, Ramsey JG, Wassell JT, Hard DL [2014]. Prevalence of carpal tunnel syndrome among employees at a poultry processing plant. Appl Ergon *45*(6):1377–1383.

NIOSHTIC-2: 20044369 | NORA: Services / Transportation, Warehousing and Utilities

Abstract

Objective

To determine prevalence of carpal tunnel syndrome (CTS) among poultry processing employees while taking into account non-occupational factors and assess any association between CTS prevalence and exposure groups.

Methods

Performed a cross-sectional survey to assess CTS (n = 318). A CTS case was defined as an employee with self-reported CTS symptoms, an abnormal hand symptom diagram, and an abnormal nerve conduction study (NCS). Log-binomial regression was used to estimate prevalence ratios.

Results

Three hundred and one participants had sufficient symptom information or NCS data to be classified. One hundred twenty-six (42%) of 301 participants had evidence of CTS. In the adjusted analysis, the highest exposure group had CTS prevalence that was significantly higher than that for the lower exposure group (PR: 1.61; 95% CI = [1.20, 2.17]).

Conclusions

Increasing levels of hand activity and force were associated with increased CTS prevalence among participants. Recommendations were provided to reduce exposure to these risk factors.

Methods and Laboratory Science

Winner

Lung epithelial cells resist influenza A infection by inducing the expression of cytochrome c oxidase VIc which is modulated by miRNA 4276

Othumpangat S, Noti JD, Beezhold DH

Othumpangat S, Noti JD, Beezhold DH [2014]. Lung epithelial cells resist influenza A infection by inducing the expression of cytochrome c oxidase VIc which is modulated by miRNA 4276. Virology *468–470*:256–264.
NIOSHTIC-2: 20045072 | NORA: Healthcare and Social Assistance

Abstract

Influenza virus infection induces several changes in host miRNA profile, host cell death and tissue damage. Cytochrome c is a regulator of the intrinsic apoptotic pathway and is altered during viral infections. Within the first 3 h of infection with influenza virus, significant down-regulation of hsa-miRNA-4276 (miRNA-4276) is followed by a 2-fold increase in cytochrome c oxidase VIc (COX6C) mRNA was found to occur in human alveolar and bronchial epithelial cells. Expression of caspase-9 also increased within the first 3 h of infection, but subsequently decreased. Modulation of miR-4276 using mimic and inhibitor oligonucleotides showed significant down-regulation or up-regulation, respectively, of COX6C expression. Our data suggests that on initial exposure to influenza virus, host cells upregulate COX6C mRNA expression through silencing miR-4276 and repressed viral replication by inducing the apoptotic protein caspase-9. Taken together, these data suggest that miR-4276 may be an important regulator of the early stages of infection by influenza.

Honorable Mention, Part One in Group of Three

Evaluation of pump pulsation in respirable size-selective sampling: part I. Pulsation measurements

Lee EG, Lee L, Möhlmann C, Flemmer MM, Kashon M, Harper M

Lee EG, Lee L, Möhlmann C, Flemmer MM, Kashon M, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part I. Pulsation measurements. Ann Occup Hyg *58*(1):60–73.
NIOSHTIC-2: 20043210 | NORA: Mining

Abstract

Pulsations generated by personal sampling pumps modulate the airflow through the sampling trains, thereby varying sampling efficiencies, and possibly invalidating collection or monitoring. The purpose of this study was to characterize pulsations generated by personal sampling pumps relative to a nominal flow rate at the inlet of different respirable cyclones. Experiments were conducted using a factorial combination of 13 widely used sampling pumps (11 medium and 2 high volumetric flow rate pumps having a diaphragm mechanism) and 7 cyclones (10-mm nylon also known as Dorr-Oliver [DO], Higgins-Dewell [HD], GS-1, GS-3, Aluminum, GK2.69, and FSP-10). A hot-wire anemometer probe cemented to the inlet of each cyclone type was used to obtain pulsation readings. The three medium flow rate pump models showing the highest, a midrange, and the lowest pulsations and two high flow rate pump models for each cyclone type were tested with dust-loaded filters (0.05, 0.21, and 1.25mg) to determine the effects of filter loading on pulsations. The effects of different tubing materials and lengths on pulsations were also investigated. The fundamental frequency range was 22–110 Hz, and the magnitude of pulsation as a proportion of the mean flow rate ranged from 4.4 to 73.1%. Most pump/cyclone combinations generated pulse magnitudes ≥10% (48 out of 59 combinations), while pulse shapes varied considerably. Pulsation magnitudes were not considerably different for the clean and dust-loaded filters for the DO, HD, and aluminum cyclones, but no consistent pattern was observed for the other cyclone types. Tubing material had less effect on pulsations than tubing length; when the tubing length was 183cm, pronounced damping was observed for a pump with high pulsation (>60%) for all tested tubing materials except for the Tygon inert tubing. The findings in this study prompted a further study to determine the possibility of shifts in cyclone sampling efficiency due to sampling pump pulsations, and those results are reported subsequently.

Honorable Mention, Part Two in Group of Three

Evaluation of pump pulsation in respirable size-selective sampling: part II. Changes in sampling efficiency

Lee EG, Lee T, Kim SW, Lee L, Flemmer MM, Harper M

Lee EG, Lee T, Kim SW, Lee L, Flemmer MM, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part II. Changes in sampling efficiency. Ann Occup Hyg *58*(1):74–84.
NIOSHTIC-2: 20043256 | NORA: Mining

Abstract

This second, and concluding, part of this study evaluated changes in sampling efficiency of respirable size-selective samplers due to air pulsations generated by the selected personal sampling pumps characterized in Part I (Lee E, Lee L, Möhlmann C, et al. Evaluation of pump pulsation in respirable size-selective sampling: Part I. Pulsation measurements. Ann Occup Hyg 2013). Nine particle sizes of monodisperse ammonium fluorescein (from 1 to 9 µm mass median aerodynamic diameter) were generated individually by a vibrating orifice aerosol generator from dilute solutions of fluorescein in aqueous ammonia and then injected into an environmental chamber. To collect these particles, 10-mm nylon cyclones, also known as Dorr-Oliver (DO) cyclones, were used with five medium volumetric flow rate pumps. Those were the Apex IS, HFS513, GilAir5, Elite5, and Basic5 pumps, which were found in Part I to generate pulsations of 5% (the lowest), 25%, 30%, 56%, and 70% (the highest), respectively. GK2.69 cyclones were used with the Legacy (pump pulsation [PP] = 15%) and Elite12 (PP = 41%) pumps for collection at high flows. The DO cyclone was also used to evaluate changes in sampling efficiency due to pulse shape. The HFS513 pump, which generates a more complex pulse shape, was compared with a single sine wave fluctuation generated by a piston. The luminescent intensity of the fluorescein extracted from each sample was measured with a luminescence spectrometer. Sampling efficiencies were obtained by dividing the intensity of the fluorescein extracted from the filter placed in a cyclone with the intensity obtained from the filter used with a sharp-edged reference sampler. Then, sampling efficiency curves were generated using a sigmoid function with three parameters and each sampling efficiency curve was compared with that of the reference cyclone by constructing bias maps. In general, no change in sampling efficiency (bias under ±10%) was observed until pulsations exceeded 25% for the DO cyclone. However, for three models of pumps producing 30%, 56%, and 70% pulsations, substantial changes were confirmed.

The GK2.69 cyclone showed a similar pattern to that of the DO cyclone, i.e. no change in sampling efficiency for the Legacy producing 15% pulsation and a substantial change for the Elite12 producing 41% pulsation. Pulse shape did not cause any change in sampling efficiency when compared with the single sine wave. The findings suggest that 25% pulsation at the inlet of the cyclone as measured by this test can be acceptable for the respirable particle collection. If this test is used in place of that currently in European standards (EN 1232-1997 and EN 12919-1999) or is used in any International Organization for Standardization standard, then a 25% pulsation criterion could be adopted. This work suggests that a 10% criterion as currently specified in the European standards for testing may be overly restrictive and not able to be met by many pumps on the market. Further work is recommended to determine which criterion would be applicable to this test if it is to be retained in its current form.

Honorable Mention, Part Three in Group of Three

Evaluation of pump pulsation in respirable size selective sampling: part III. Investigation of European standard methods

Soo J-C, Lee EG, Lee LA, Kashon ML, Harper M

Soo J-C, Lee EG, Lee LA, Kashon ML, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part III. Investigation of European standard methods. Ann Occup Hyg *58*(8):1006–1017.
NIOSHTIC-2: 20044739 | NORA: Mining

Abstract

Lee et al. (Evaluation of pump pulsation in respirable size-selective sampling: part I. Pulsation measurements. Ann Occup Hyg 2014a;58:60–73) introduced an approach to measure pump pulsation (PP) using a real-world sampling train, while the European Standards (EN) (EN 1232-1997 and EN 12919-1999) suggest measuring PP using a resistor in place of the sampler. The goal of this study is to characterize PP according to both EN methods and to determine the relationship of PP between the published method (Lee et al., 2014a) and the EN methods. Additional test parameters were investigated to determine whether the test conditions suggested by the EN methods were appropriate for measuring pulsations. Experiments were conducted using a factorial combination of personal sampling pumps (six medium- and two high-volumetric flow rate pumps), back pressures (six medium- and seven high-flow rate pumps), resistors (two types), tubing lengths between a pump and resistor (60 and 90cm), and different flow rates (2 and 2.5 l min-1 for the medium- and 4.4, 10, and 11.2 l min-1 for the high-flow rate pumps). The selection of sampling pumps and the ranges of back pressure were based on measurements obtained in the previous study (Lee et al., 2014a). Among six medium-flow rate pumps, only the Gilian5000 and the Apex IS conformed to the 10% criterion specified in EN 1232-1997. Although the AirChek XR5000 exceeded the 10% limit, the average PP (10.9%) was close to the criterion. One high-flow rate pump, the Legacy (PP = 8.1%), conformed to the 10% criterion in EN 12919-1999, while the Elite12 did not (PP = 18.3%). Conducting supplemental tests with additional test parameters beyond those used in the two subject EN standards did not strengthen the characterization of PPs. For the selected test conditions, a linear regression model (PPEN = 0.014 + 0.375 × PPNIOSH [adjusted R 2 = 0.871]) was developed to determine the PP relationship between the published method (Lee et al., 2014a) and the EN methods. The 25% PP criterion recommended by Lee et al. (2014a), average value derived from repetitive measurements, corresponds to 11% PPEN. The 10% pass/fail criterion in the EN Standards is not based on extensive laboratory evaluation and would unreasonably exclude at least one pump (i.e. AirChek XR5000 in this study) and, therefore, the more accurate criterion of average 11% from repetitive measurements should be substituted. This study suggests that users can measure PP using either a real-world sampling train or a resistor setup and obtain equivalent findings by applying the model herein derived.

The findings of this study will be delivered to the consensus committees to be considered when those standards, including the EN 1232-1997, EN 12919-1999, and ISO 13137-2013, are revised.

Alice Hamilton Award Top Finalists for 2015

The names are not necessarily listed in the order in which they were ranked.

Education and Guidance

NIOSH [2014]. Caring for yourself while caring for others: training for homecare workers. Educational curriculum. By Baron S, Nickels L, Forrester C, Sheahan M, Stock L. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2015-102.
NIOSHTIC-2: 20045410

Cunningham T, Sinclair R [2015]. Application of a model for delivering occupational safety and health to smaller businesses: case studies from the U.S. Saf Sci *71*(Part C):213–225.
NIOSHTIC-2: 20045033 | NORA: Public Safety

Ebola Interim Guidance Submission

NIOSH [2014]. Limiting heat burden while wearing personal protective equipment (PPE)—developed for healthcare workers and site coordinators providing care in West African countries affected by the Ebola outbreak. Slide presentation. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Ebola. Workplace safety and health topic page. By Dowell C, Delaney L, MacMahon K, Jacklitsch B, Niemeier RT, McKernan L, de Perio MA, Bernard B. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Prevent heat-related illness. Poster. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Ebola questions and answers for airport retail and food service workers. NIOSH fact sheet. By Kiefer M, McKernan L, Nickels L, Ridl S, King B, Boudreau Y. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH)

NIOSH [2014]. Ebola questions and answers for airline customer service representatives. NIOSH fact sheet. By Kiefer M, McKernan L, Nickels L, Ridl S, King B, Boudreau Y. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014] Ebola questions and answers for airport passenger assistance workers. NIOSH fact sheet. By Kiefer M, McKernan L, Nickels L, Ridl S, King B, Boudreau Y. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Ebola questions and answers for airport custodial staff. NIOSH fact sheet. By Kiefer M, McKernan L, Nickels L, Ridl S, King B, Boudreau Y. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Ebola questions and answers for airport baggage and cargo handlers. NIOSH fact sheet. By Kiefer M, McKernan L, Nickels L, Ridl S, King B, Boudreau Y. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Interim guidance for managers and workers handling untreated sewage from individuals with Ebola in the United States. Webpage. By Burton N, Shugart J, Arduino M, Donlan R, Albrecht V, Noble-Wang J, Rose L, Shams A, Bastian R, Pickrel JM, Rhodes E, Rodgers M, Rotert K, Sayles G, Wang L. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Frequently asked questions (FAQs) on interim guidance for managers and workers handling untreated sewage from suspected or confirmed individuals with Ebola in the U.S. Webpage. By Donlan R, Burton N, Arduino M, Shugart J, Coulliette A, Albrecht V, Noble-Wang J, Rose L, Shams A, Bastian R, Pickrel JM, Rhodes E, Rodgers M, Rotert K, Sayles G, Wang L. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH and OSHA [2014]. Preventing worker fatigue among Ebola healthcare workers and responders. NIOSH and OSHA fact sheet. By King B, Arbury S, Brown C, Caruso C, Funk R, Hodgson M, Matthews D, Petitti C, Thomas R. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. The buddy system. NIOSH fact sheet. By Brinker K, Klomp R, Scharf T, Funk R. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Considerations for selecting protective clothing used in healthcare for protection against microorganisms in blood and body fluids. Webpage. By Kilinc-Balci FS, D'Alessandro M, Shaffer R, Dowell C, Berry Ann R. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Interim guidance for U.S. businesses, employers, and business travelers to prevent exposures to Ebola. Webpage. By Niemeier RT, Shugart J, Brueck S, Cummings K, MacMahon K. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

NIOSH [2014]. Interim guidance for healthcare workers providing care in West African countries affected by the Ebola outbreak: limiting heat burden while wearing personal protective equipment (PPE). Webpage. By Jacklitsch B, Coca A, Eisenberg J, Kim JH, Methner M, Schaffer R, Shugart J, Williams W. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH).

Hsiao H [2014]. Fall prevention research and practice: a total worker safety approach. Ind Health *52*(5):381–392.
NIOSHTIC-2: 20045018

Engineering and Control

Dong RG, Welcome DE, Peterson DR, Xu XS, McDowell TW, Warren C, Asaki T, Kudernatsch S, Brammer A [2014]. Tool-specific performance of vibration-reducing gloves for attenuating palm-transmitted vibrations in three orthogonal directions. Int J Ind Ergon *44*(6):827–839.
NIOSHTIC-2: 20045364 | **NORA: Construction**

Welcome DE, Dong RG, Xu XS, Warren C, McDowell TW [2014]. The effects of vibration-reducing gloves on finger vibration. Int J Ind Ergon *44*(1):45–59.
NIOSHTIC-2: 20043446 | NORA: Construction

Wu JZ, Sinsel EW, Shroyer JF, Warren CM, Welcome DE, Zhao KD, An K-N, Buczek FL [2014]. Analysis of the musculoskeletal loading of the thumb during pipetting—a pilot study. J Biomech *47*(2):392–399.
NIOSHTIC-2: 20043496 | NORA: Construction / Manufacturing

Epidemiology and Surveillance

Carreón T, Hein MJ, Hanley KW, Viet SM, Ruder AM [2014]. Coronary artery disease and cancer mortality in a cohort of workers exposed to vinyl chloride, carbon disulfide, rotating shift work, and o-toluidine at a chemical manufacturing plant. Am J Ind Med *57*(4):398–411.
NIOSHTIC-2: 20043726

Konda S, Reichard A, Tiesman HM, Hendricks S [2014]. Non-fatal work-related traumatic brain injuries treated in U.S. hospital emergency departments, 1998–2007. Inj Prev: Epub ahead of print, 2014 Sep.
NIOSHTIC-2: 20045086 | NORA: Transportation, Warehousing and Utilities

Sieber WK, Robinson CF, Birdsey J, Chen GX, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH [2014]. Obesity and other risk factors: the National Survey of U.S. Long-Haul Truck Driver Health and Injury. Am J Ind Med *57*(6):615–626.
NIOSHTIC-2: 20043603 | NORA: Transportation, Warehousing and Utilities

Steege AL, Baron SL, Marsh SM, Menéndez CKC, Myers JR [2014]. Examining occupational health and safety disparities using national data: a cause for continuing concern. Am J Ind Med *57*(5):527–538.
NIOSHTIC-2: 20043643 | NORA: Transportation, Warehousing and Utilities

Exposure and Risk Assessment

Esswein EJ, Snawder J, King B, Breitenstein M, Alexander-Scott M, Kiefer M [2014]. Evaluation of some potential chemical exposure risks during flowback operations in unconventional oil and gas extraction: preliminary results. J Occup Environ Hyg *11*(10):D174–D184.
NIOSHTIC-2: 20044996 | NORA: Mining: Oil and Gas Extraction / Transportation, Warehousing and Utilities

Doney B, Hnizdo E, Graziani M, Kullman G, Burchfiel C, Baron S, Fujishiro K, Enright P, Hankinson JL, Hinckley Stukovsky K, Martin CJ, Donohue KM, Barr RG [2014]. Occupational risk factors for COPD phenotypes in the Multi-Ethnic Study of Atherosclerosis (MESA) Lung Study. COPD *11*(4):368–380.
NIOSHTIC-2: 20043901 | NORA: Construction / Mining

Musolin K, Ramsey JG, Wassell JT, Hard DL [2014]. Prevalence of carpal tunnel syndrome among employees at a poultry processing plant. Appl Ergon *45*(6):1377–1383.
NIOSHTIC-2: 20044369 | NORA: Services / Transportation, Warehousing and Utilities

Methods and Laboratory Science

Erdely A, Antonini JM, Young S-H, Kashon ML, Gu JK, Hulderman T, Salmen R, Meighan T, Roberts JR, Zeidler-Erdely PC [2014]. Oxidative stress and reduced responsiveness of challenged circulating leukocytes following pulmonary instillation of metal-rich particulate matter in rats. Part Fibre Toxicol *11*:34.
NIOSHTIC-2: 20044966

Lee Submission

Lee EG, Lee L, Möhlmann C, Flemmer MM, Kashon M, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part I. Pulsation measurements. Ann Occup Hyg *58*(1):60–73.
NIOSHTIC-2: 20043210 | NORA: Mining

Lee EG, Lee T, Kim SW, Lee L, Flemmer MM, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part II. Changes in sampling efficiency. Ann Occup Hyg *58*(1):74–84.
NIOSHTIC-2: 20043256 | NORA: Mining

Soo J-C, Lee EG, Lee LA, Kashon ML, Harper M [2014]. Evaluation of pump pulsation in respirable size-selective sampling: part III. Investigation of European standard methods. Ann Occup Hyg *58*(8):1006–1017.
NIOSHTIC-2: 20044739 | NORA: Mining

Othumpangat S, Noti JD, Beezhold DH [2014]. Lung epithelial cells resist influenza A infection by inducing the expression of cytochrome c oxidase VIc which is modulated by miRNA 4276. Virology *468–470*:256–264.
NIOSHTIC-2: 20045072 | NORA: Healthcare and Social Assistance

Alice Hamilton Award
Research Updates for 2014 Winning Projects

Education and Guidance 2014 Update

Workplace violence prevention for nurses, an online training course

Hartley D, Ridenour M, Craine J, Costa B

> NIOSH [2013]. Workplace violence prevention for nurses. CDC Course No. WB1865. Morgantown, WV: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2013-155.
> **NIOSHTIC-2: 20043051** | NORA: Healthcare and Social Assistance / Transportation, Warehousing and Utilities

Since the online NIOSH Workplace Violence Prevention for Nurses course was released on August 12, 2013, over 10,000 nurses and other healthcare professionals have completed the course for continuing education credits. Webmetrics indicates the course continues to be NIOSH's most popular website, with several of the course's pages in the top 15 monthly NIOSH Webpages.

Development and dissemination of this course would not have been possible without the assistance of our partners. Recognizing the need for a workplace violence prevention training course that would benefit healthcare workers, NIOSH researchers collaborated with Vida Health Communications, Inc. (Vida), to develop an online training course accessible through any device with an Internet connection. The course content is based on existing research from NIOSH; violence prevention programs from the Veterans' Health Administration, and guidelines from the Occupational Safety and Health Administration. We also sought input from healthcare workplace violence prevention experts from academia, labor unions, nurse organizations, private consultants, and other government agencies. Designed to keep the interest of all healthcare workers, ranging from the novice worker to the most experienced, the interactive course employs text, case study videos, and personal interviews to convey the training materials. Some topics covered by the course include definition and typology of workplace violence, consequences of workplace violence, organizational and personal prevention strategies, and post-event response. The course, available at the website Workplace Violence Prevention for Nurses, is free to the public and offers free continuing education units for nurses, health educators, pharmacists, and veterinarians.

Immediately upon release of the course, NIOSH and our partners implemented our collaborative dissemination plan. Several of our external partners published articles in their organizational newsletters and announced the course at conferences during 2013. Follow-up articles by the American Nurses Association, the Emergency Nurses Association, and the Association of Occupational Health Professionals were published in 2014 to update their members on course usage and availability. These organizations also continue to assist with updates to the course content and providing input for additional units, which are planned for release in the future. Two Medscape articles published in 2014 referenced the NIOSH course and provided the course's URL. One of these articles quoted the project officer extensively regarding the course content, usage statistics, and access.

Partners internal to the Department of Health and Human Services (HHS), CDC, and NIOSH are also very important in disseminating this product. Initial announcements or update articles about the course availability appeared in the Federal Occupational Health Newsletter (HHS), CDC Washington Update, and NIOSH eNews in 2014. NIOSH's social media team announced the course using all of the popular social media outlets. The NIOSH Morgantown communications liaison produced a YouTube video describing the course, which is available at the YouTube website Workplace Violence Prevention for Nurse's Training, and set up an interview with a local television station to broadcast a story about violence against nurses, with the NIOSH course as the main topic. Ongoing dissemination efforts by NIOSH and our partners contribute to the enduring popularity of this research to practice product. NIOSH published an Impact Sheet, "Online Training Helps Protect Nurses and Other Healthcare Workers from Workplace Violence," in early 2015, and announced it via our social media channels.

The course consistently receives very positive reviews from course participants. Descriptors include "substantial, enlightening, impressive, extremely important, valuable, effective, great advice, eye opening, very helpful, strong and timely content, raised awareness, learned new prevention strategies, increased knowledge, engaging format, facilitated learning, user friendly, and best course I have ever taken." Most importantly, several participants indicated the course enhanced their skills to recognize early warning signs of violence and how to deescalate or prevent the violence.

Based on NIOSH research, feedback from course participants, and healthcare workplace violence prevention researchers, NIOSH researchers are in the early stages of development for several additional course units. These units include emergency departments, psychiatric departments, long-term care facilities, emergency responders, home health/social service workers, stand-alone healthcare facilities, and bullying. Plans for public release of each of these units will take place upon individual unit completion over the next several years.

Engineering and Control 2014 Update

Research to improve extension ladder angular positioning

Simeonov P, Hsiao H, Powers J, Kim I-J, Kau T-Y, Weaver D

> Simeonov P, Hsiao H, Powers J, Kim I-J, Kau T-Y, Weaver D [2013]. Research to improve extension ladder angular positioning. Appl Ergon *44*(3):496–502.
> NIOSHTIC-2: 20041827 | NORA: Construction

Ladder-related injuries are persistent, and yet a preventable public health problem with significant economic impact on society. In 2013, approximately 511,000 people in the United States were injured from ladders and were treated in hospital emergency rooms, doctors' offices, clinics and other medical settings; and the financial cost of these injuries was $24 billion, including work loss, medical, legal, liability, and pain and suffering expenses. Ladder fall injuries are also a well-recognized problem in the U.S. workplace. In 2011, there were 113 work-related fatal ladder fall injuries, an estimated 15,460 nonfatal ladder fall injuries involving at least one day away from work, and approximately 34,000 ladder fall injuries treated in Emergency Departments (Socias et al, 2014).

The Alice Hamilton Award winning paper described innovative ladder-fall injury prevention research and laid out the scientific foundation for the development of the first NIOSH mobile application "Ladder Safety," as described on the website Fall Injuries Prevention in the Workplace: NIOSH Ladder Safety Mobile Application. The Ladder Safety app, released in 2013 in English and Spanish for iPhone and Android devices, uses smartphone technology to deliver free and easy-to-use ladder safety tools and information, reference materials, and training resources into the hands of individual ladder users (see instructional YouTube video, The NIOSH Ladder Safety Smart Phone App). The app was received with enthusiasm by safety professionals and ladder users—it has been downloaded more than 32,900 times by the end of January 2015 and has received very high ratings and positive reviews (See the August 27, 2013 NIOSH Science Blog post, Ladder Safety: There's an App for That). A range of stakeholders were involved in developing and reviewing the app and providing input, including the DSFederal, ATL International, American Ladder Institute, the ANSI A14 committee on Portable Ladder Safety, representatives of construction companies, professional associations, worker unions, and other government agencies.

Aside from the Alice Hamilton Award, the research team has been awarded the NIOSH 2014 Bullard-Sherwood Research-to-Practice (r2p) Award and the 2014 HHS Innovates Award Honorable Mention. In addition, the research work and innovation was recently selected among the three finalists for the 2015 Federal Health IT Innovation award. The research team continues to enhance the Ladder Safety app content and functionality by including a Step Ladder Safety module and improving several existing app components. Since the Alice Hamilton Award, the following related works have been presented or published:

Socias C, Menéndez CKC, Collins J, Simeonov P [2014]. Occupational ladder fall injuries—United States, 2011. MMWR *63*(16):341–346.
NIOSHTIC-2: 20044168

Simeonov P, Llamas A [2014]. A story of impact: NIOSH smart phone application improves ladder safety to reduce falls. Morgantown, WV: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2015-176.
NIOSHTIC-2: 20045348

Simeonov P, Hsiao H, Powers J [2014]. Extending the reach of information, lessons learned in developing NIOSH's Ladder Safety App. Media Festival and Poster, presented at the XX World Congress on Safety and Health at Work, Frankfurt, Germany, August 24–27, 2014.

Epidemiology and Surveillance 2014 Update

Effectiveness of Taxicab Security Equipment in Reducing Driver Homicide Rates

Menéndez CKC, Amandus HE, Damadi P, Wu N, Konda S, Hendricks SA

Menéndez CKC, Amandus HE, Damadi P, Wu N, Konda S, Hendricks SA [2013]. Effectiveness of taxicab security equipment in reducing driver homicide rates. Am J Prev Med *45*(1):1–8.
NIOSHTIC-2: 20042730 | NORA: Transportation, Warehousing and Utilities

This paper was the culmination of the first project of a large effort to determine effective measures to prevent robberies, assaults, and homicides of taxicab drivers. A version of the article was rewritten for the online newsletter for the International Association of Transportation Regulators (IATR), which has an international membership of more than 200 regulators. Research progress and preliminary findings of the article were presented at three annual conferences of the IATR as updates in a special session on taxicab driver safety. Concurrent with the manuscript publication were an updated NIOSH Science Blog post on taxicab driver safety summarizing the article; a Twitter feed from the Transportation, Warehousing, and Utilities (TWU) Industry Sector for which the project is listed; and a presentation at the TWU Transit Subsector Meeting sponsored by NIOSH in Washington, DC. It was also featured in Science Clips. An interview by a newspaper in St. Paul, Minnesota summarized the key findings after a driver was shot in Minneapolis.

Leading up to the publication, preliminary findings were presented at several scientific conferences: the National Occupational Injury Research Symposium (2011), the American Public Health Association annual conference (2012), the Epidemic Intelligence Service regional conference (2012), and Council for State and Territorial Epidemiologists (2012). The findings were presented as a keynote lecture for the inaugural Salons du Taxi in Montreal, Quebec, with an audience consisting of transportation regulators, taxicab company owners and taxicab drivers.

Once published and disseminated through the IATR newsletter, there was information sharing across cities, in particular when cities experienced a taxicab driver homicide, and there was public pressure or pressure from taxicab drivers to increase safety measures. At different stages of the publication process the regulators in San Diego, Minneapolis, Houston, San Francisco, Chicago, Los Angeles, Philadelphia, New Orleans, and Montreal requested information on either the scope of driver fatalities for their city, interpreting the study findings, a copy of the findings to incorporate into revising a city ordinance or support for an ordinance proposing security cameras for their city (was not provided as it is not permitted by the Anti-Lobbying Act). Concomitant with publication of the article, CME was offered to clinicians (page A3 of the journal). Subsequent to publication, the article was covered in an Occupational Safety and Health blog called "The Pump Handle," where it received Facebook likes, comments and tweets. A LexisNexis Legal Newsroom Workers Compensation Law newsletter also summarized the findings. It was the topic of a list serve used by taxicab drivers. In April 2014, this publication received the NIOSH Alice Hamilton Award for excellence in epidemiology and surveillance, which demonstrates the feasibility of conducting applied research on this difficult to reach study population.

The project officer has also been invited to participate in a National Academies of Science panel for soliciting research to protect bus drivers against workplace violence. Finally, the publication was recently added to a website created by a taxicab driver activist in San Francisco that provides a memoriam for taxicab drivers murdered around the world and is updated frequently.

At the preliminary findings stage, the research led to the proposal of a follow-up study that would survey 500 drivers each in two large cities to evaluate workplace violence prevalence in the past 12 months. The research was funded by the NIOSH intramural program and will allow for comparisons in workplace violence events between drivers using security cameras and those not using cameras in Houston, in addition to drivers in cabs with cameras compared with those with partitions in Los Angeles. The study is currently undergoing OMB review and is expected to start with data collection the 4th quarter of FY2014 in Houston. There continues to be partnerships renewed with cities that are progressing to promulgating city ordinances specifying installation of cameras in their taxicabs and new partnerships with cities developed or strengthened when taxicab driver homicides occurred in their city. Finally, the findings from this publication provided opportunities to continue research. The findings of one study are being released for dissemination July 2014 in the *Journal of Transportation Technologies* (online, open access) on the key features of security cameras that should be required if regulators are mandating the use of security cameras.

Montreal has promulgated an ordinance that requires cabs be equipped with cameras and will use the publication describing key features in security cameras. Houston is also in the process of mandating cameras in all cabs following the lead of Yellow Cab in Houston, which has required the installation of cameras in cabs since the 1990s as company policy.

Since the preliminary findings of the first paper of the study were presented at the regulators' conference, there have been changes to several city ordinances. Effective in 2013, Minneapolis decided to mandate cameras in taxicabs rather than continuing to give drivers a choice among a camera, a partition, and a GPS. Effective in 2012, New Orleans implemented sweeping changes that brought comprehensive reform to this industry. One change included mandating cameras in taxicabs. Philadelphia received approval (July 2014) of an ordinance to mandate security cameras and require they be equipped with specific key features, the publication is cited in the supportive documents for the ordinance. From 2012 to 2013, other cities, such as Los Angeles, started to provide their taxicab drivers with a choice in security equipment (cameras or partitions) after requiring partitions since the 1970s or 1980s.

The main research found that cities with cameras experienced a threefold reduction in taxicab driver homicides compared with control cities, and the reduction was more pronounced in cities where cameras were mandated by city ordinance than cities where it was a policy for the major companies. There was no statistically significant difference in homicide rate for cities with partitions compared with control cities.

The research from this manuscript has provided ideas for new hypotheses, such as "do security cameras installed in taxicabs result in reduced motor vehicle collisions and better road safety behaviors than taxicabs without cameras?" This hypothesis can also be tested with the recently funded research, in addition to other research questions related to road safety and safety climate. We have seen, since the early 1990s, a sharp decrease in taxicab driver homicides. These decreases were more pronounced in cities where cameras were installed in taxicabs compared with cities with no cameras, and more so in cities where cameras were mandated by law. However, there is still room for improvement, and we hope to see robbery rates, related injuries and homicides reduced even further in this population.

Exposure and Risk Assessment 2014 Update

Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing

Esswein EJ, Breitenstein M, Snawder J, Kiefer M, Sieber WK

> Esswein EJ, Breitenstein M, Snawder J, Kiefer M, Sieber WK [2013]. Occupational exposures to respirable crystalline silica during hydraulic fracturing. J Occup Environ Hyg *10*(7):347–356.
> **NIOSHTIC-2: 20042606** | NORA: Mining: Oil and Gas Extraction

In 2014, the paper was awarded the David L. Swift Memorial Outstanding Aerosol Paper Award presented by American Industrial Hygiene Association (AIHA) and was nominated for the Charles C. Shepard Science Award (Assessment). To date, the article has been downloaded 5,638 times from the *Journal of Occupational and Environmental Hygiene (JOEH),* has been cited 51 times in other journals, and currently is listed as the most read article for JOEH.

The research definitively documented worker risks for exposures to respirable crystalline silica during hydraulic fracturing, which not only exceeded all occupational exposure criteria, but also the assigned protection factor for the respirators commonly used to protect these workers from silica exposures. The study design allowed the investigators to determine eight primary points of silica dust generation at hydraulic fracturing sites, which resulted in the development of recommendations for unique controls for each of the eight point sources. Outputs of this research include an OSHA/NIOSH Hazard Alert, "Worker Exposure to Crystalline Silica During Hydraulic Fracturing," a nationally disseminated NIOSH Science Blog post, "Worker Exposure to Crystalline Silica During Hydraulic Fracturing," industry creation of the Respirable Crystalline Silica Focus Group (RCFG), with three subgroups (Exposure Assessment, Engineering Controls, and Industrial Hygiene), proceedings of an Institute of Medicine workshop on unconventional oil and gas extraction, and webinars hosted by American Industrial Hygiene Association (AIHA) and the Society of Petroleum Engineers (SPE) on exposure risks for oil and gas extraction workers. To date, the results from the RCFG (of which the NIOSH researchers are members), include a worker training video for crystalline silica and a poster called "It's Not Just Dust!" developed in conjunction with the National STEPS Network, which focuses on the eight points of dust generation and targeted engineering controls.

Research-to-Practice Outcome: The research resulted in development, including in-house fabrication of a patent-pending (U.S. Patent Application No. 13/802,265) ventilation engineering control (NIOSH mini-baghouse retrofit assembly) that reduces silica dust emissions from large equipment used to transport sand. Based on recommendations provided in the paper, industry has responded by investing tens of millions of dollars to date in additional engineering controls, and this has spawned several startup companies specializing in silica dust control for hydraulic fracturing operations. The inventors have licensed the NIOSH technology to a private engineering company (SpectraTech) with plans for commercial fabrication and distribution in the near future.

This effort furthers a NIOSH commitment to oil and gas extraction safety and health research, which includes an emphasis on industry and worker education efforts. The NIOSH researchers have given numerous (> 25) presentations at scientific and industry meetings to present the data on silica exposure hazards and exposure risks, and the need for effective engineering controls, especially the NIOSH mini-baghouse retrofit assembly.

NIOSH mini-baghouse assemblies installed on 8 thief hatches atop a sand mover. NIOSH and industry partner Southwestern Energy field evaluation trial, November 2014. Photo courtesy of Mike Gressel and Jerry Kratzer, NIOSH, 2014.

A field evaluation of the NIOSH mini-baghouse retrofit assembly was performed in November 2014 with NIOSH industry partner Southwestern Energy (Little Rock, AR). When installed on thief hatches on the top of a sand mover, the retrofit assembly was determined to be effective in reducing the quantity of respirable dust and respirable crystalline silica released into the workplace atmosphere during bin filling operations. Reductions of respirable dust and respirable crystalline silica were determined to be in a range of 79% to 99% as demonstrated by the field study.

Although personal breathing zone samples were not collected, observed area sample concentrations collected near working positions atop the sand mover exceeded both the NIOSH REL and ACGIH TLV concentrations. A third version of the mini baghouse retrofit assembly has been fabricated in house by NIOSH DART researchers, and field evaluations are planned for Spring/Summer 2015. Based on two initial trials of the mini baghouse retrofit assembly, it has been determined that opportunities exist to further enhance the performance of the NIOSH mini-baghouse retrofit assembly with an improved clamping mechanism and substitution of alternative filter bag fabrics that enhance release of the dust cake, different air-to-cloth ratios, and an improved sealing surface on the bottom of the assembly. Additional field evaluations are recommended and planned after enhancements have been made to the mini-baghouse retrofit.

Methods and Laboratory Science 2014 Update

Extrapulmonary transport of multi-walled carbon nanotubes following inhalation exposure

Mercer RR, Scabilloni J, Hubbs A, Wang L, Battelli L, McKinney W, Castranova V, Porter DW

> Mercer RR, Scabilloni JF, Hubbs AF, Wang L, Battelli LA, McKinney W, Castranova V, Porter DW [2013]. Extrapulmonary transport of MWCNT following inhalation exposure. Part Fibre Toxicol *10*:38.
> NIOSHTIC-2: 20043086 | NORA: Manufacturing

Since the development of engineered nanoparticles, it has been a concern these smaller particles would distribute throughout the body and produce unique or unexpected health effects. In the paper that won the Alice Hamilton Award for 2014, we addressed this issue for a type of nanoparticle, carbon nanotubes, which plays an important role in a number of manufacturing processes. Since that award, we have extended these methods to make direct measurement of the nuclear burden of these nanoparticles in critical targets for cancer induction, such as liver cell nuclei, and we have begun to study the effects of fiber length and other physical-chemical attributes on the development of adverse health effects from exposures. Several peer-reviewed, original papers describing these additional findings of our research project on these topics have been published:

> Sargent LM, Porter DW, Staska LM, Hubbs AR, Lowry DT, Battelli L, Siegrist KJ, Kashon ML, Mercer RR, Bauer AL, Chen BT, Salisbury JL, Frazer D, McKinney W, Andrew M, Tsuroka S, Endo M, Fluharty KL, Castranova V and Reynolds SH [2014]. Promotion of lung adenocarcinoma following inhalation exposure to multi-walled carbon nanotubes. Part Fibre Toxicol *11*:3.
> NIOSHTIC-2: 20043746

> Manke A, Luanpitpong S, Dong C, Wang L, He X, Batteli L, Derk R, Stueckle T, Porter D, Sager T, Gou H, Dinu C-Z, Wu N, Mercer RR, Rojanasakul Y [2014]. Effect of fiber length on carbon nanotube-induced fibrogenesis. Int. J Mol Sci 15:7444-7461.
> NIOSHTIC-2: 20044249

> Dymacek J, Snyder-Talkington BN, Porter DW, Mercer RR, Wolfarth MG, Castranova V, Qian Y, Guo NL [2014]. mRNA and miRNA regulatory networks reflective of multi-walled carbon nanotube-induced lung inflammatory and fibrotic pathologies in mice. Toxicol Sci. Epub ahead of print, 2014 Dec.
> NIOSHTIC-2: 20045561

As we developed methods for detection and measurement of MWCNT distribution and redistribution throughout the body, we have recognized the importance of applying these methods to other classes of nanoparticles. Current research efforts are directed at applying these techniques to study of other common nanoparticles, which are widely used in consumer products and electronic displays.

History of Alice Hamilton, M.D.

Alice Hamilton, M.D.

(February 27, 1869–September 22, 1970)

Many of the first laws and regulations passed to improve the health of workers were the direct result of the work of one dedicated and talented woman, Alice Hamilton, M.D. Born into a prominent family in Indiana (her sister is the well-known classicist, Edith Hamilton), Dr. Hamilton graduated from medical school at the University of Michigan in 1893. After accepting a teaching position at the Women's Medical School of Northwestern University in 1897, she moved into Jane Addams' Hull House in Chicago. There she opened a well-baby clinic for poor families in the local settlement house neighborhood. As she acquainted herself with the families, she learned of their pains, strange deaths, lead palsy, "wrist drop," and of the high numbers of widowed women. Encouraged by the reformers of Hull House, she began to apply her medical knowledge to these social problems and thus began her scientific inquiry into occupational health for which she became known.

Dr. Hamilton quickly realized that while some progress in understanding occupational illness and disease was being made in Europe, little was written or understood about occupational disease conditions in the United States. In 1908, she published one of the first articles on occupational disease in this country and was soon a recognized expert on the topic. Starting in 1910, under the sponsorship initially of a commission of the State of Illinois, and later the Federal Bureau of Labor Statistics, she conducted a series of brilliant explorations of occupational toxic disorders. Relying primarily on "shoe leather epidemiology," and the emerging laboratory science of toxicology, she pioneered occupational epidemiology and industrial hygiene in the United States. Her findings were so scientifically persuasive that they caused sweeping reforms, both voluntary and regulatory, to improve the health of workers.

In 1919, Dr. Hamilton was appointed assistant professor of industrial medicine at Harvard Medical School and became the first female faculty member at Harvard University. There she served two terms on the Health Committee of the League of Nations. When she retired from Harvard at the age of 66, she became a consultant to the U.S. Division of Labor Standards, and she served as president of the National Consumers League.

Alice Hamilton Laboratory for Occupational Safety and Health

On Friday, February 27, 1987, the National Institute for Occupational Safety and Health dedicated its facility located at 5555 Ridge Avenue in Cincinnati, Ohio, to the memory of Alice Hamilton, M.D. The facility is known as the "Alice Hamilton Laboratory for Occupational Safety and Health" in honor of the first American physician to devote her professional life to the practice of occupational health.

Construction of this facility began in Fall 1952 and was completed in November 1954. For several years, it was used as the world headquarters and manufacturing plant of the Disabled American Veterans (DAV). In this facility, "Ident-o-Tags," miniature license plates for key chains, were manufactured by disabled veterans for distribution throughout the United States.

In the early 1960s, a portion of the facility was leased to the federal government to provide space for a small number of federal employees. From the early 1960s to the early 1970s more and more of the facility was used by the federal government, until by 1973, the entire building was leased for federal offices and laboratories. In September of 1974, the first employees of NIOSH were assigned to space in the facility. In December 1982, the U.S. Public Health Service purchased the facility for $3.5 million dollars. It now houses the Division of Physical Science and Engineering and the Division of Surveillance, Hazard Evaluations and Field Studies. More than 200 people work in engineering, epidemiology, general administration, industrial hygiene, and laboratory research. The facility contains some of the most advanced laboratories and sophisticated scientific equipment in the Institute.

Bullard-Sherwood Research-to-Practice (r2p) Award

NIOSH presents the Bullard-Sherwood Research-to-Practice (r2p) Award to recognize outstanding efforts by its scientists and their partners in applying occupational safety and health research to prevent work-related injury, illness, and death. The award is named in honor of two distinguished individuals who have made significant improvements in workplace injury and illness prevention.

Edward W. Bullard

Edward W. Bullard designed the first "hard hat" as protective headgear for miners. He combined his experience with doughboy Army helmets during World War I and his understanding of customer needs to develop the "Hard Boiled Hat." The name was derived from the use of steam during the hat manufacturing process. Joseph Strauss, the engineer in charge of constructing the Golden Gate Bridge, requested that Mr. Bullard adapt his mineworker helmet to help protect bridge workers from falling rivets. The bridge site became the first designated "Hard Hat Construction Area." In related history, the steel used in the building of the bridge oxidized during transport to San Francisco from Pennsylvania, and it therefore required sandblasting before it could be painted. As a result, Mr. Bullard designed and sold another helmet to the bridge builders to specifically protect the sandblasting workers. This helmet was similar to the Hard Boiled Hat, but it included in its design a hood or "canopy" over the hat, a window to see through, and supplied air for respiratory protection. Today, approximately 6 million hard hats are sold annually throughout the world to protect workers. Bullard's family-owned company, now entering its fifth generation, still produces many of those hard hats, as well as more modern sandblasting helmets.

R. Jeremy (Jerry) Sherwood

R. Jeremy (Jerry) Sherwood successfully merged research and industrial hygiene by inventing the first practical personal sampling pump in the late 1950s. He identified a need for sampling pumps that could be worn by workers and not impede their work processes. Until then, sampling was done on an area basis, or an industrial hygienist followed a worker while carrying heavy, bulky, and short-term sampling equipment. Using the newly developed personal sampling pump, he demonstrated that area sampling often severely underestimated worker exposures. Within a few years of this invention, personal sampling pumps became the staple in industrial hygiene work that they are today. He also developed a miniature sampler for sulfur dioxide that became commercially available and was widely used throughout Europe. His research on respirators led to the first fit testing. While at the International Labour Organization and later at the World Health Organization, Mr. Sherwood put his own knowledge and research experiences into practice by training others in occupational safety and health, particularly in developing countries. This became one of his greatest passions, and many workers around the world have benefitted from his efforts.

Knowledge

Winning Submission

Center for Workers' Compensation Studies

Wurzelbacher SJ, Meyers AR, Utterback D, Schnorr TM, Bushnell PT, Bertke SJ, Bell JL, Raudabaugh J, Pana-Cryan R, Sestito JP, Sinclair R, Asfaw AG, Bhattacharya A, Harris JR, Lancaster J, Tseng C-Y, Geiman JM, Laber P, Thomas LM, Wei C, Allee S, Giglio D, Jenkins KX, Luo L, Estill CF, Nowlin SJ, Konda S, Reichard AA, Lowe BD, Lu M-L, O'Connor MB, Watson JR, Anderson VP, Ray TK, Hudock SD, Whelan EA, Waters KM, Inserra S, Felknor SA, Sweeney MH, Mobley A, Hartle G, Randolph DG, Cassinelli RT, Castillo DN, Butler CR, Casey ML, Pinkerton LE, Chang C-C, Wagner GR, Tamers S, Oke CA, Corcoran M, Hearl FJ.

Source: Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS)

Background: Work-related injuries, illnesses, and fatalities continue to have great financial and societal impact in the United States. In the United States alone, costs are estimated at $250 billion annually [Leigh 2011]. Tracking these costs and underlying hazards is essential for control of the economic and social burdens. Workers' compensation data, such as claims and employer information, can supplement health-related data and provide a clearer understanding of the risk factors associated with work-related injuries and illnesses. Workers' compensation systems are the largest source of occupational injury information in the United States, with millions of claims in some single-state databases. This information has tremendous potential for prevention purposes, but remains largely underutilized.

Relevance: After co-sponsoring two workshops (involving private insurance carriers, insurance associations, self-insured corporations, academic institutions, and government agencies) on the use of workers' compensation data for occupational safety and health, NIOSH established the Center for Workers' Compensation Studies in 2013. The main goal of the center is to prevent and reduce work-related injuries and illnesses by using workers' compensation data in surveillance and research activities.

Through a partnership with the Ohio Bureau of Workers' Compensation, the Center for Workers' Compensation Studies developed a database of 1.4 million claims from 2001 to 2010, which can be shared across NIOSH to develop trends by industry, employer size, occupation, causation, part of body, and injury/illness diagnoses. The aim is to create usable data for insured employers to benchmark their safety and health performance against industry peers. The data will also be used to help direct the Ohio Bureau of Workers' Compensation consultation services, develop new safety and health interventions, and focus future research.

Together, the Center for Workers' Compensation Studies and Ohio Bureau of Workers' Compensation evaluated the effectiveness of over 15 Ohio Bureau of Workers' Compensation prevention programs. Since 1999, the Ohio Bureau of Workers' Compensation has offered a Safety Intervention Grant program, where 1,800 employers have been provided matching funds to implement engineering controls. Recently, a Center for Workers' Compensation Studies and Ohio Bureau of Workers' Compensation study found that this program significantly reduced the total worker's compensation claim frequency rate by 66%. This reduction in employee claims and costs contributed to an increase in funding for more employers to participate in the Safety Intervention Grant program. A total of 486 employers received funding from 2003–2009. In 2014 alone, the Safety Intervention Grant program provided $15 million to 535 employers.

The initial focus of the Center for Workers' Compensation Studies—which is to build internal and external capacity by working with Ohio Bureau of Workers' Compensation—lays the foundation for future, scalable partnerships with other states. As well, the center is developing resources and tools to foster collaborations between public and private partners and maximize the use of worker's compensation data.

More information about NIOSH's Centers for Workers' Compensation Program is available at the following websites:

- NIOSH Center for Workers' Compensation Studies
- Use of workers' compensation data for occupational health: proceedings from June 2012 workshop
- Workers' compensation insurance: a primer for public health

References

Leigh JP [2011]. Economic burden of occupational injury and illness in the United States. Milbank Q: *89*(4)728–72.

Intervention

Winning Submission

New and Updated NIOSH YOUTH@WORK—Talking Safety Curriculum

Guerin R, Okun A, Stephenson C, Ullah R, Filko A, Williams VB, Lechliter J, Fazio G, Leonard SR, Collins S, Cauley JP

Source: Education and Information Division (EID)

Background: In 2013, there were approximately 18.1 million workers less than 24 years of age, and these workers represented 13% of the workforce. For the 10-year period of 1998 to 2007, an annual average of 795,000 nonfatal injuries caused young workers to be treated in U.S. hospital injury departments. In 2012, 375 workers younger than 24 years old died from work-related injuries, including 29 deaths of youths younger than 18 years old. Jobs typically held by young workers have many hazards and contribute to their high occupational injury rates. Inexperience and lack of safety training may also increase injury risks for young workers.

Relevance: With input from their partners, NIOSH developed the *NIOSH Youth@Work—Talking Safety* curriculum for use in middle schools and high schools and other relevant settings. The new *Talking Safety*, which supersedes the existing young worker curriculum, has been rewritten to include new case studies and learning activities; redesigned with partner input to meet current educational standards; updated with current state and Federal child labor regulations, minimum wage laws, and other OSH information and resources; and customized for each state.

The new curriculum articulates a framework, the NIOSH 8 Core Competencies, for foundational, workplace safety and health skills that young people need before entering the workforce. These include skills to recognize the short-and long-term effects of job injuries and illnesses; recognize job hazards and the best methods for controlling them; understand worker rights and responsibilities; and know how to communicate about problems on the job.

Talking Safety has been used by schools, health departments, and OSH organizations across the country. In particular, NIOSH partnered with the Miami-Dade County Public Schools—the fourth-largest U.S. school district, with more than 355,000 students—to use *Talking Safety* in all 8th grade science courses. The Miami-Dade County Public Schools also integrated workplace safety and health as an "essential element" into the District Pacing Guide, which instructs teachers on the mandatory content to be covered in a particular subject area (e.g., 8th grade science). *Talking Safety* will reach approximately 18,000 youth in the Miami-Dade County Public Schools each year.

The knowledge and abilities taught through *Talking Safety* complement the job-specific skills learned at work or through apprenticeships and other job training programs. The curriculum equips working youth with the critical life skills they need to stay safe and healthy at work, now and throughout their lives.

More information about *NIOSH's Youth@Work—Talking Safety* curriculum is available at the following websites:

- Talking Safety
- Young Worker Safety and Health

Honorable Mention

Silica Dust Controls for Asphalt Pavement Milling Machines

Hammond D, Cecala A, Colinet J, Garcia A, Mead KR, Echt A, Shulman S, Gressel MG, Zimmer JA, Lo L, Joy GJ, Kovein R, Marlow D, Hein MJ, Farwick D, Farwick D, McCleery T, Hall RM, Topmiller J, Earnest GS, Jones BJ, Fazio G

Source: Division of Applied Research and Technology (DART)

Background: At least 1.7 million U.S. workers in various industries and occupations, including construction, are exposed to respirable crystalline silica. Occupational silica exposure can cause silicosis, a debilitating and potentially fatal lung disease, and is also associated with lung cancer, chronic obstructive pulmonary disease (COPD), and renal disease. Approximately 367,000 U.S. workers employed in highway, street, and bridge construction are at risk. Many of these workers use cold-milling machines or worker in close proximity to these machines. Cold-milling machines generate dust that often contains respirable crystalline silica that can be transported by air currents to worker breathing zones near the milling machines.

Relevance: NIOSH worked with industry, management, labor, and government stakeholders through the Silica/Asphalt Milling Machine Partnership to address silica exposure. NIOSH and its partners played a key role in the implementation of this study by spending more than a decade of their time and resources to have NIOSH test and evaluate numerous iterations of silica dust controls on their milling machines at dozens of highway construction sites around the country.

The collaborative effort resulted in *Best Practice Engineering Control Guidelines to Control Worker Exposure to Respirable Crystalline Silica during Asphalt Pavement Milling*. Additionally, NIOSH researchers developed a ventilation system that attaches to the milling machine to reduce silica dust before it can reach the worker.

Currently, all U.S. and foreign manufacturers of heavy construction equipment that currently sell pavement-milling machines to the U.S. market have the NIOSH-evaluated retrofit kits available. The top two manufacturers with 80% of the U.S. market began putting silica dust controls on new milling machines. It is anticipated that new silica dust controls will be on at least 50% of milling machines in the United States by 2020, and nearly 100% of U.S. machines by 2025.

The impact of the developed engineering controls and guidance stretches beyond the United States. The French Institute National de Recherche et de Sécurité (INRS) expressed interest in a French translation of the guidance document and similar implementation of engineering controls in Europe. Also, there have been discussions between NIOSH and the INRS about including the silica milling machine dust controls in

an ISO standard to protect workers internationally from silica exposures on milling machines.

More information about silica and other construction-related topics can be found at the following websites:

- Best Practice Engineering Control Guidelines to Control Worker Exposure to Respirable Crystalline Silica during Asphalt Pavement Milling
- Silica
- Construction

Technology

Winning Submission

Development, Evaluation, and Commercialization of the NIOSH Multi-functional Guardrail System

Bobick TG, McKenzie EA, Cantis DM

Source: Division of Safety Research (DSR)

Background: Falls are the leading cause of construction fatalities, accounting for one-third of workplace-related deaths in the industry. Each year, more than 200 construction workers are killed and more than 10,000 are seriously injured by falls. From 2005 through 2009, construction fatalities averaged 1,089. Of this total, fatalities caused by workers falling to a lower level averaged 379 (35%) per year. Of this second total, workers falling from roof edges and floor holes averaged 137 (36%) per year. Guardrail systems can be used to protect personnel who have to work near unguarded steep-sloped roof edges and holes, skylights, interior floor edges and holes, and on stairways that have not yet had handrails installed.

Relevance: An analysis of fatalities and severe injuries caused by workers falling through roof and floor holes and existing skylights, in conjunction with a pilot study to evaluate guardrails, prompted NIOSH to develop a multi-functional guardrail system. While evaluating the strength and ease of installing three guardrail systems, NIOSH researchers developed a unique engineering modification that became the first component of the guardrail system. The patented fall-prevention system (U.S. Patent No. 7,509,702) has been designed to meet all OSHA safety requirements for guardrails, and yet has more adjustability than any system on the market.

Two residential contractors in West Virginia evaluated the guardrail system externally on the roof and internally on the stairs for edge protection. Training in the use of the fall-prevention system was provided by the West Virginia University Safety and Health Extension Office, using installation instructions developed by the NIOSH research team. After the field evaluation was completed, one of the two contractors liked the guardrail system so much that the contractor continued using it.

In May 2014, Reese Wholesale licensed the guardrail system. By August, samples of the guardrail system, now called "The Protector," had been provided to three long-time customers of Reese Wholesale to use and provide feedback about the product. In October, while repairing a roof, a 240-pound worker slipped and slid about 20 feet downslope to The Protector guardrail, which was installed at the end of the roof. The worker was stopped by the guardrail system and prevented from falling about 18 feet to a lower level.

Much of the success and impact of the NIOSH-Reese multi-functional guardrail system is credited to the strong collaboration between NIOSH and its partners throughout the study, from initial development and evaluation to licensing and commercialization. The guardrail is an adaptable, easy-to-install fall-prevention system that is readily available to improve safety conditions for residential and commercial construction workers. Workers will feel safer and work more confidently with the guardrail in place.

More information about NIOSH-Reese multi-functional guardrail system and other construction-related topics can be found at the following websites:

- Fall Injuries Prevention in the Workplace
- Construction

Bullard-Sherwood Research-to-Practice (r2p) Award Finalists

Projects are listed by category, alphabetically by the last names of project officers. Order of listing does not necessarily reflect the order in which the projects were ranked.

Knowledge

Workplace Violence Prevention Course for Nurses

Project Officer and Key Contributors: Hartley D, Ridenour M

NIOSH Location: Morgantown, WV

Reusability of Filtering Facepiece Respirators

Project Officer and Key Contributors: Shaffer R, Fisher E, Bergman M, Vo E, Rengasamy S, Krah J, Delaney L

NIOSH Location: Pittsburgh, PA; Atlanta, GA

Center for Workers' Compensation Studies

Project Officer and Key Contributors: Wurzelbacher SJ, Meyers AR, Utterback D, Schnorr TM, Bushnell PT, Bertke SJ, Bell JL, Raudabaugh J, Pana-Cryan R, Sestito JP, Sinclair R, Asfaw AG, Bhattacharya A, Harris JR, Lancaster J, Tseng C-Y, Geiman JM, Laber P, Thomas LM, Wei C, Allee S, Giglio D, Jenkins KX, Luo L, Estill CF, Nowlin SJ, Konda S, Reichard AA, Lowe BD, Lu M-L, O'Connor MB, Watson JR, Anderson VP, Ray TK, Hudock SD, Whelan EA, Waters KM, Inserra S, Felknor SA, Sweeney MH, Mobley A, Hartle G, Randolph DG, Cassinelli RT II, Castillo DN, Butler CR, Casey ML, Pinkerton LE, Chang C-C, Wagner GR, Tamers S, Oke CA, Corcoran M, Hearl FJ

NIOSH Location: Cincinnati, OH; Anchorage, AK; Atlanta, GA; Denver, CO; Morgantown, WV; Pittsburgh, PA; Washington, DC

Intervention

Partnering with Industry to Build Safe EMS Work Environments

Project Officer: Green JD

NIOSH Location: Morgantown, WV

New and Updated NIOSH YOUTH@WORK—Talking Safety Curriculum

Project Officer and Key Contributors: Guerin R, Okun A, Stephenson C, Ullah R, Filko A, Williams VB, Lechliter J, Fazio G, Leonard SR, Collins S, Cauley JP

NIOSH Locations: Cincinnati, OH; Washington, DC

Silica Dust Controls for Asphalt Pavement Milling Machines

Project Officer and Key Contributors: Hammond D, Cecala A, Colinet J, Garcia A, Mead KR, Echt A, Shulman S, Gressel MG, Zimmer JA, Lo L, Joy GJ, Kovein R, Marlow D, Hein MJ, Farwick D, Farwick D, McCleery T, Hall RM, Topmiller J, Earnest GS, Jones BJ, Fazio G

NIOSH Location: Cincinnati, OH; Pittsburgh, PA

Technology

Development, Education, and Commercialization of the NIOSH Multi-functional Guardrail System

Project Officer and Key Contributors: Bobick TG, McKenzie EA, Cantis DM

NIOSH Location: Morgantown, WV

Intelligent Safety Technologies for Mining Machinery

Project Officer and Key Contributors: DuCarme J, Carr J, Jobes C, Lutz T, Reyes M, Li J, Yonkey J, Srednicki J

NIOSH Location: Pittsburgh, PA

Epidemiology and Engineering Safety for the Fishing Industry

Project Officer and Key Contributors: Lincoln J, Lucas DL, Teske TD, Woodward C, King G, Forrester C, Bond CC

NIOSH Location: Anchorage, AK; Spokane, WA; Washington, DC

Previous Bullard-Sherwood Research-to-Practice (r2p) Award Winners and Honorable Mentions

View the previous Bullard-Sherwood Research-to-Practice (r2p) Award Winners and Honorable Mentions.

Director's Intramural Award for Extraordinary Science (DIA)

Background

Science excellence is the foundation upon which NIOSH generates new knowledge to assure safe and healthful work for all. The purpose of the Director's Intramural Award for Extraordinary Science (DIA) is to recognize outstanding contributions by intramural scientists and support staff to science excellence at NIOSH. Winners of the NIOSH Director's Intramural Award for Extraordinary Science (DIA) will receive a monetary award that augments the discretionary budget for the recipient for the following fiscal year. Winners will also receive recognition at the annual ceremony celebrating the Alice Hamilton Award for Excellence in Occupational Safety and Health.

The CDC-wide Charles C. Shepard Science Award and the NIOSH Alice Hamilton and Bullard-Sherwood Research-to-Practice Award recognize the scientific contributions of a single research project or activity. The Director's Intramural Award for Extraordinary Science (DIA) honors individuals for their scientific contributions through a collective body of work. Although the James P. Keogh Award also recognizes a collective body of work, it is more oriented towards service than science as it focuses on dedicated service, training, and research translation to achieve tangible effects on public health practice. The collective body of work recognized in the Director's Intramural Award for Extraordinary Science (DIA) represents extraordinary individual performance that clearly goes above and beyond past and present basic job requirements.

The Director's Intramural Award serve as a tribute to NIOSH employees whose dedication to science excellence has made significant contributions to the NIOSH mission. Award categories will recognize experienced scientists, early career scientists, and scientific support staff.

Director's Intramural Award for Extraordinary Science (DIA) for 2015

Distinguished Career Scientist

Raymond (Ray) Roberge, M.D.

Dr. Raymond (Ray) Roberge joined NPPTL as a Research Medical Officer in 2005, after a 20-year career in emergency medicine and medical toxicology. He studies the relationships between personal protective equipment (PPE) and human physiology and pathology, and he oversees human subject tests. He has written more than 140 articles, and he is board-certified in emergency medicine, occupational medicine, and medical toxicology. Dr. Roberge is a nationally recognized expert in comfort and tolerability of PPE for healthcare workers, and he has studied physiological and subjective responses upon the wearer and the fetus in PPE-wearing pregnant healthcare workers, an understudied population. He has introduced the use of new equipment and methodology in NPPTL studies including the use of an infrared camera for leak detection in respirators, has mentored junior researchers, and uses resources efficiently. He will use award funds in several ways including on additional studies on the use of infrared cameras.

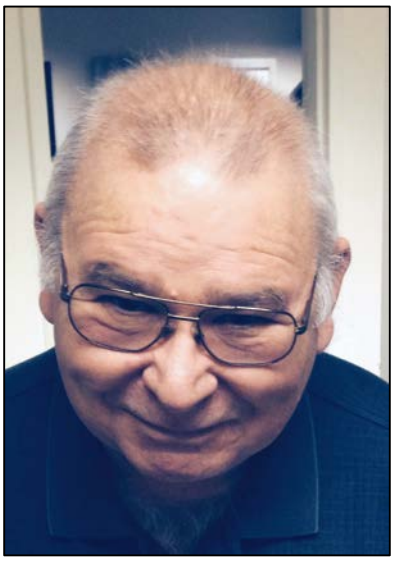
Early Career Scientist

Cara Halldin, Ph.D.

Cara Halldin joined the Division of Respiratory Disease Studies (DRDS) in 2013 as an epidemiologist after 2 years as an Epidemic Intelligence Service Officer with the Centers for Disease Control and Prevention. Dr. Halldin has been highly successful in addressing problems of importance to the field of occupational health disparities. She has undertaken prospective studies working with U.S. surface coal miners and former underground coal miners, populations for which routine medical surveillance has not been historically conducted. Currently she is also the project officer for the Workforce Monitoring Using Pulmonary Function Testing project. A primary goal of this project is to develop, improve, and maintain SPIROLA, a NIOSH-designed software that helps occupational health providers identify workers with excessive lung function decline and design individual and occupational interventions to prevent respiratory disease. Dr. Halldin will use the award money to support costs associated with pilot testing of the web-based version of SPIROLA.

Scientific Support

Jerry Kratzer



Jerry Kratzer joined DART as a mechanical engineering technician in 2004, after a 35-year career in private industry as a senior mechanical designer. He served in the U.S. Air Force from 1966 through 1971, rising to Airman First Class before his honorable discharge. He develops solutions that help study teams complete their research. Examples of his work include the development of analytical instruments, design and fabrication of an aerosol sampler, and timely and cost-effective instrument repair. His knowledge and skills often transform him to a key research team member. For example, he helped develop a prototype of a mini-baghouse that captures fugitive silica emissions from equipment used during hydraulic fracturing. The prototype is currently under patent-pending status, with Mr. Kratzer listed as a contributing patent holder. He also enjoys mentoring co-workers, and he will use award funds to enhance engineering control research and reduce worker exposures to silica in construction.

Director's Intramural Award for Extraordinary Science (DIA) Top Finalists

The names are listed alphabetically, and not necessarily in the order in which they were ranked.

Scientific Support

Lynn Acorn

Jerry Kratzer

Bradley Newbraugh

Early Career Scientist

Cara Halldin

Carissa Rocheleau

Matthew Wheeler

Distinguished Career Scientist

David Dankovic

Michael Gressel

Raymond Roberge

Director's Intramural Award for Extraordinary Science (DIA) Updates

Early Career Scientist Winner 2013

Cammie Chaumont Menéndez

Since having the privilege of winning the award, I have continued my research in workplace violence and occupational health disparities and broadened research efforts to include road safety and safety climate with a strong additional interest in Total Worker Health™. I was able to see the completion of an ecological study that evaluated taxicab driver homicides in 22 cities over a 15-year timespan. We compared cities where taxicabs were equipped with cameras, with cities where taxicabs were equipped with partitions, and cities with neither safety measure installed in cabs. Cities with camera-equipped cabs experienced significantly lower taxicab driver homicide rates both post-installation in their city and compared with cities with neither safety measure. These findings were published with open access in the July 2013 issue of *American Journal of Preventive Medicine*, where it was accompanied by a free podcast summarizing the findings, and a post was published in the NIOSH Science Blog. The second follow-up paper was published in *Crime Science* to reach a different audience. The findings resulted in changes in municipal ordinances regarding safety requirements in Montreal, Philadelphia, New Orleans, and Minneapolis, with other cities currently discussing modifying the safety features mandated in their ordinances. Additionally, this study inspired two other NIOSH studies, one NORA funded. The first study, a lab evaluation of the specific requirements for camera features, is completed and was also used in the Philadelphia ordinance requiring cameras be installed. The second study, NORA funded in 2013, will evaluate various safety measures in two of the largest metropolitan areas (Houston and Los Angeles) in the United States, in addition to describing safety climate (perceptions) and road safety behaviors among taxicab drivers. The first paper of this work received an Alice Hamilton award in 2014 for Epidemiology and Surveillance. The funds awarded for the Early Career Scientist Award were used to develop a NIOSH-OSHA co-branded Quick Card for Taxicab Driver Safety, which is currently approved as a Topic Concept Memo and is underway.

I am fortunate to have been included in a group that analyzed nonfatal and fatal national traumatic injury databases for workers overall by age, gender, race/ethnicity, region, nativity, occupation, and industry over a 5-year timespan. These findings were the first occupational injury findings to be published in the CDC Health Disparities and Inequalities Report within the MMWR Surveillance Summary. The adjusted rate ratios were published in the *American Journal of Industrial Medicine*, Special Issue on Health Disparities and Inequalities, a culmination of an OSHA, NIEHS, and EPA co-sponsored conference on Eliminating Health and Safety Disparities at work, held in Chicago in 2010, in which I participated. Briefly, we found workplace homicides were significantly higher for older workers, men, non-Hispanic blacks, American Indian/Alaska Native/Asian/Pacific Islanders, and workers not born in the United States.

I was invited to serve as a federal liaison to the National Academies of Science Transportation Research Board Transit Cooperative Research Program Project Panel (F-21), entitled "Tools and Strategies for Eliminating Assaults Against Transit Operators" and invited to present on assault countermeasures and safety management systems for the Transit Worker Assault Workgroup Meeting for the Transit Advisory Committee for Safety (TRACS 14-01). I currently serve as the Associate Coordinator for the Traumatic Injury Cross-Sector program.

Scientific Support Winner 2013

Richard Whisler

It was an honor, not only to be nominated, but to actually win the Directors Award for Extraordinary Intramural Science, for scientific support, in April of 2013. The monetary award of $2,500 was used to purchase parts and supplies for improving 3D image collection, processing, and data extraction. More specifically, software licenses were upgraded from machine-specific to floating, dongle-based licenses. Also, a specialized multi-adjustable chair was purchased to assist in positioning our test subjects in our Cyberware PX head scanner. These two items will allow the Anthropometry Laboratory within DSR's Protective Technology Branch to continue to function for years to come.

Since the award, we have traveled to six locations across the country to collect traditional as well as 3D measurements from Emergency Medical Service (EMS) Workers. This effort is part of a larger project focused on improving the safety of EMS workers while they travel and work in the patient compartment of an ambulance. EMS worker sizing data will be used by NIOSH and its partners to support new patient compartment interior designs. EMS worker sizing data will impact seating and occupant restraints, as well as locations for equipment and control locations for HVAC, lighting, and limited medical systems (oxygen and suction).

We have also completed an in-house pilot project that collected traditional as well as 3D measurements from 74 law enforcement officers. This study will: (1) establish an anthropometric database (body size and shape information) of U.S. law enforcement officers for their personal protective equipment (PPE) sizing and vehicle design applications, (2) provide a scientific basis for updating law enforcement officers' PPE and cruiser configuration standards, and (3) develop engineering enhancements for law enforcement officers' PPE (e.g., vest, helmet, gloves, and boots) and vehicle apparatus (e.g., cab, seat, seatbelt, and egress) for improved officer protection and safe vehicle operation. The outputs will have immediate and long-term effects on mitigating the risk of officer safety and health problems that result from poor fit or interference of protective gear during various circumstances, and on reducing law enforcement officers exposures to transportation-related fatal and non-fatal injuries (e.g., through improved driver visibility and control operation, increased post-crash survivability by enhanced seat and seatbelt configurations, and reduced trip potential by enhanced egress designs.

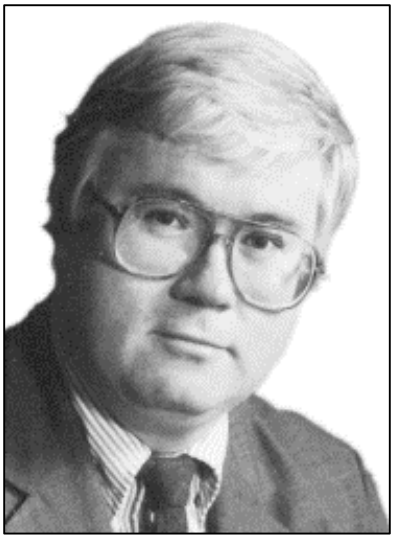
In 2014 our team was presented with the Bullard-Sherwood Research-to-Practice (r2p) Award in the Knowledge category for our paper "Sizing Fire Fighters and Fire Apparatus—Safe by Design." MSA Safety Inc. was able to use our fire fighter data to develop a document as an internal reference for their engineering design team. Using this document, engineers assigned to the SCBA harness design referenced the measurements: "Complete—over the shoulder" and "Waist Circumference" to achieve an optimal fit with shoulder strap, pull strap, and waist belt strap assemblies. Ultimately, harness lengths were increased to facilitate rapid donning and account for turnout gear thickness approximations. The mounting of the harness to the back plate of the carrier also included the determination of departure angles which were guided by Mid-line to Mid-Shoulder Point values. This allowed the harness to be routed over the shoulders, but not load the trapezius muscle group, which was noted as a source of discomfort at a reduced departure angle. An adjustable lumbar pad was also developed, which considered the "Trunk Length" values. These Trunk Lengths were considered among several other variables which led to the identification of three positions for small, medium, and large end users. Ultimately, the final carrier and harness design was the result of prototypes that began with the aforementioned anthropometry in mind, but were subsequently adjusted after several successive fit testing trials. The result is a carrier and harness design that will distribute the product's weight over the end user's shoulders and waist.

Previous Director's Intramural Award for Extraordinary Science (DIA) Winners

View the previous winners of the Director's Intramural Award for Extraordinary Science (DIA).

James P. Keogh Award for Outstanding Service in Occupational Safety and Health

Background



The National Institute for Occupational Safety and Health (NIOSH) is pleased to recognize one current or former NIOSH employee each year for exceptional service to the field of occupational safety and health. This award honors the contributions made by public health workers who fight long odds to achieve safer and healthier workplaces.

James P. Keogh, M.D., was a tireless advocate for worker safety and health who died in June 1999 at the age of 49. His earliest work in academic medicine identified dimethylaminopropionitrile as the causal agent in an outbreak of bladder neuropathy in the 1970s. Dr. Keogh was able to make this determination because, unlike many of the clinicians initially contacted by the workers, he took their complaints seriously and applied clear public health principles to his investigation. Throughout his life, he listened carefully to workers, characterized hazards and diseases, and then fearlessly worked to identify compensation for the individual and prevention strategies for others. Dr. Keogh was instrumental in including construction workers in the Maryland Occupational Safety and Health lead standard, a full decade before the federal standard did the same. He was a leading medical educator who always focused on the need to incorporate clinical compassion with public health prevention. His most outstanding legacy, however, was his fierce determination to put knowledge into practice to benefit the worker.

James P. Keogh Award Winner for 2015

Kathleen Kreiss, M.D.

Kathleen Kreiss, M.D., is a dedicated leader in the field of occupational lung disease. For more than three decades she has made extraordinary contributions to the occupational medicine world through her research, education, and public health work, establishing a lasting legacy at NIOSH. Her contributions to the recognition, understanding, and prevention of occupational lung disease have been invaluable to the occupational health field.

Starting her career as an Epidemic Intelligence Service (EIS) officer in CDC's Special Studies Branch, Chronic Diseases Division, Bureau of Epidemiology, Dr. Kreiss conducted work critical in the identification of an epidemic of bladder neuropathy in workers exposed to the catalyst dimethylaminopropionitrile at an automobile foam seat production plant. She later joined the faculty at the University of Colorado as the Director of the Occupational and Environmental Medicine Division in the Department of Medicine, National Jewish Center for Immunology and Respiratory Medicine. In this role, Dr. Kreiss made major contributions across a range of occupational health issues, most notably risk factors for chronic beryllium disease, occupational asthma, hypersensitivity pneumonitis, and building-related respiratory disease.

Dr. Kreiss joined NIOSH in 1996 and has served as the Chief of the Field Studies Branch in DRDS since its creation in 1999. In this challenging role, she leads the NIOSH Respiratory Diseases Hazard Evaluation and Technical Assistance Program and she also conducts epidemiological studies of work-related respiratory disease. At NIOSH, she has continued her work in the identification and characterization of unrecognized occupational respiratory diseases, demonstrating the value of applying multidisciplinary efforts to address occupational health issues. Under her leadership, her branch has discovered flock workers' lung; flavoring-related obliterative bronchiolitis; prevention of beryllium sensitization by protecting the skin from beryllium exposure; and that some damp buildings cause adult-onset asthma.

The remarkable breadth, significance, and impact of Dr. Kreiss' work is seen through her numerous scientific publications, many prestigious awards, and her commitment to fostering the next generation of leaders in the field of occupational lung disease. We are proud to honor Dr. Kreiss as she truly embodies the spirit of the Keogh Award through her exemplary work to improve the lives of workers through science.

Previous James P. Keogh Award Winners

2014: Albert E. Munson

2013: Michael Attfield

2012: Alice Suter

2011: Linda Rosenstock

2010: James W. Collins

2009: John Howard

2008: Mitch Singal

2007: Steven Sauter

2006: Marilyn Fingerhut

2005: Rosemary Sokas

2004: Dawn Castillo

2003: James A. Merchant

2002: Philip J. Landrigan

2001: William Edward Halperin

2000: Richard A. Lemen

NIOSH Nominations for the Charles C. Shepard Science Award

CDC/ATSDR established the Charles C. Shepard Science Award in 1986 in honor of Dr. Charles C. Shepard, M.D., an internationally recognized microbiologist whose career was marked by a pursuit of scientific excellence. He served as chief of the Leprosy and Rickettsia Branch at CDC for more than 30 years, until his death on February 18, 1985. The Charles C. Shepard Science Award recognizes scientists who have made important research contributions to public health. The awards are given in five categories: one individual award—Lifetime Scientific Achievement—and four for journal articles during the previous year in the following categories:

- Assessment
- Data Methods and Study Design
- Laboratory Science
- Prevention and Control

NIOSH Nominations for the Charles C. Shepard Science Award for 2015

Scientific Publications

Assessment

Cummings KJ, Virji MA, Trapnell BC, Carey B, Healey T, Kreiss K [2014]. Early changes in clinical, functional, and laboratory biomarkers in workers at risk of indium lung disease. Ann Am Thorac Soc 11(9):1395-1403.
NIOSHTIC-2: 20045275 | NORA: Manufacturing

Daniels RD, Kubale TL, Yiin JH, Dahm MM, Hales TR, Baris D, Zahm SH, Beaumont JJ,Waters KM, Pinkerton LE [2014]. Mortality and cancer incidence in a pooled cohortof U.S. firefighters from San Francisco, Chicago and Philadelphia (1950–2009). Occup Environ Med *71*(6):388–397.
NIOSHTIC-2: 20043263 | NORA: Public Safety

Esswein EJ, Snawder J, King B, Breitenstein M, Alexander-Scott M, Kiefer M [2014]. Evaluation of some potential chemical exposure risks during flowback operations in unconventional oil and gas extraction: preliminary results. J Occup Environ Hyg *11*(10):D174–D184.
NIOSHTIC-2: 20044996 | NORA: Mining: Oil and Gas Extraction / Transportation, Warehousing and Utilities

Sieber WK, Robinson CF, Birdsey J, Chen GX, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH [2014]. Obesity and other risk factors: the National Survey of U.S. Long-Haul Truck Driver Health and Injury. Am J Ind Med *57*(6):615–626.
NIOSHTIC-2: 20043603 I NORA: Transportation, Warehousing and Utilities

Data Methods and Study Design

Hsiao H, Whitestone J, Kau T-Y, Whisler R, Routley JG, Wilbur M [2014]. Sizing firefighters: method and implications. Hum Factors *56*(5):873–910.
NIOSHTIC-2: 20043661 I NORA: Transportation, Warehousing and Utilities

Laboratory Science

Nayak AP, Hettick JM, Siegel PD, Anderson SE, Long CM, Green BJ, Beezhold DH [2014]. Toluene diisocyanate (TDI) disposition and co-localization of immune cells in hair follicles. Toxicol Sci *140*(2):327–337.
NIOSHTIC-2: 20044349 | NORA: Healthcare and Social Assistance / Services

O'Callaghan JP, Kelly KA, VanGilder RL, Sofroniew MV, Miller DB [2014]. Early activation of STAT3 regulates reactive astrogliosis induced by diverse forms of neurotoxicity. PLoS ONE *9*(7): e102003.
NIOSHTIC-2: 20044779

Sargent LM, Porter DW, Staska LM, Hubbs AF, Lowry DT, Battelli L, Siegriest KJ, Kashon ML, Mercer RR, Bauer AK, Chen BT, Salisbury JL, Frazer D, McKinney W, Andrew M, Tsuruoka S, Endo M, Fluharty KL, Castranova V, Reynolds SH [2014]. Promotion of lung adenocarcinoma following inhalation exposure to multi-walled carbon nanotubes. Part Fibre Toxicol 11:3.
NIOSHTIC-2: 20043746

Prevention and Control

Dong RG, Welcome DE, Peterson DR, Xu XS, McDowell TW, Warren C, Asaki T, Kudernatsch S, Brammer A [2014]. Tool-specific performance of vibration-reducing gloves for attenuating palm-transmitted vibrations in three orthogonal directions. Int J Ind Ergon *44*(6):827–839.
NIOSTHIC-2: 20045364

Lifetime Scientific Achievement Award for 2015

Steven Schrader, Ph.D.

Since joining NIOSH in 1983, Dr. Steven Schrader has been at the leading edge of advancing scientific knowledge and occupational safety and health (OSH) in reproductive physiology and semen analyses to develop a comprehensive, state-of-the-art male reproductive health profile that was also practical for implementation for conducting occupational field studies. Dr. Schrader was one of the national and global pioneers in this field and established the NIOSH male reproductive health assessment program as one of the preeminent programs globally. His work enabled the NIOSH reproductive health assessment team to conduct numerous occupational field investigations across the United States, including Hawaii, and in Canada, China, and Russia. Dr. Schrader has taught numerous workshop training courses on assessing reproductive health in men in field conditions. He worked with other leading andrology teams and the WHO to determine and standardize the best measures for computer assisted semen analyses. Soon after the NIOSH semen profile began to be used, Dr. Schrader recognized two significant needs for this area of research—a robust quality control assessment program and baseline data of variability for the measures of the male reproductive profile.

By virtue of his work to establish andrology quality control programs that were, and continue to be, recognized and used around the world, Dr. Schrader was invited to teach Quality Control for Andrology in several workshops for the American Society of Andrology, the British Society of Andrology, the American Society for Reproductive Medicine, and the American Association of Tissue Banks. He was asked to write the chapter on Quality Control for the WHO Laboratory Manual for the Examination and Processing of Human Semen published in 2010.

Dr. Schrader conducted the first and, to date, most comprehensive longitudinal study of human semen characteristics, measuring several parameters monthly for nine months in a cohort of men. The data were fundamental in understanding the variability of semen quality within and between men. The importance and quality of the research was recognized with two NIOSH/CDC Alice Hamilton Awards. The primary manuscripts have been cited 372 times.

Dr. Schrader's work on the evaluation of sexual function in bicycle police officers has led to expanded research in this area for male and female bicyclists, and has inspired other aspects of research on the effects of occupational hazards on male sexual function. Numerous improved bicycle saddle designs aimed at alleviating sexual dysfunction have been developed and are now being utilized by cyclists.

The success of his NIOSH program to evaluate the effects of occupational hazards on the reproductive health of men along with his international scientific stature enabled Dr. Schrader to initiate a comparable program to evaluate the effects of occupational exposures on the reproductive health of women and to hire the investigator who leads that program.

Nomination for this prestigious award recognizes not only Dr. Schrader's outstanding contribution to occupational safety and health, but also his dedication and commitment to the NIOSH mission.

Previous NIOSH Nominations for the Charles C. Shepard Science Award

Delivering on the nation's promise: safety and health at work for all people through research and prevention

To receive NIOSH documents or more information about occupational safety and health topics, contact NIOSH at

1-800-CDC-INFO (1-800-232-4636)

TTY: 1-888-232-6348

CDC INFO: www.cdc.gov/info

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