Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research NIOSH

NIOSH eNews

Volume 17, Number 11 (March 2020)

From the Director's Desk

John Howard, M.D. Director, NIOSH

Using Science to Assess Workplace Hazards: NIOSH Practices in Occupational Risk Assessment

What is risk assessment? Do you check for rain before deciding to carry an umbrella? Doing so is an example of *risk assessment*, which describes a process for answering three basic questions on a particular hazard:

What can happen? (It may rain today.)

How likely will it happen? (The Weather Channel says 70% chance of showers.)

What are the consequences if it happens? (I'll be soaked without my umbrella!)

The answers provide a foundation for preventing or lessening the threat imposed by the hazard (e.g., carry an umbrella to avoid getting wet if caught in the rain), known as *risk management*. As part of the human experience, we assess and manage many kinds of risks in our daily lives: financial risks, social risks, and occupational risks. In doing so, we identify *hazards* (the rain), their

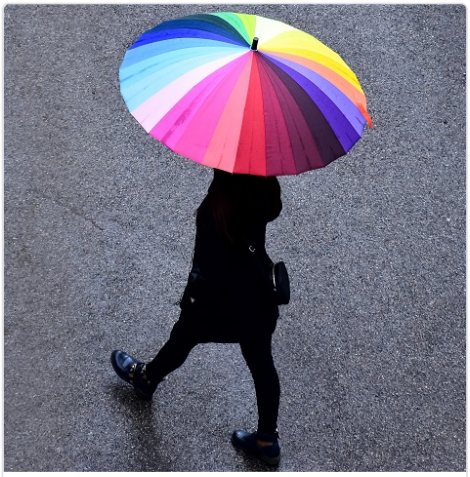

Photo by ©Thinkstock.

In This Issue:

opportunity (chance of rain), and *harm* (get wet). We weigh the evidence on the hazard, opportunity, and harm to choose appropriate *safeguards* (an umbrella) to protect us from the hazard.

There is a pressing need for risk assessment, especially for workplace chemicals. Over 50 million U.S. workers are exposed to hazardous chemicals at work, either by skin contact or by inhaling vapors, gas, dust, or fumes. Toxic chemicals in the workplace pose a wide range of health hazards to workers, such as respiratory disease and cancer.

NIOSH traces its origins in quantitative risk assessment to the 1980 landmark Supreme Court decision "Industrial Union Department, AFL-CIO v. American Petroleum Institute," 448 U.S. 607, also called the *Benzene Decision*. The ruling established a need to quantify the risks from chemical exposure as a basis for recommending exposure limits. Since then, NIOSH has published risk assessments on chemical hazards including carcinogens and noncarcinogens, physical hazards such as noise and radiation, and others. These efforts have culminated in a set of best practices in meeting its mandate under Section 20(a)(3) of the Occupational Safety and Health Act of 1970 "...to describe...exposure levels at which no employee will suffer impaired health or functional capacities or diminished life expectancy as a result of his work experience." We now share these best practices with you through a new report that describes the NIOSH processes used to evaluate occupational hazards in the workplace through risk assessment. This process supports recommended exposure limits (RELs) and risk management limits for carcinogens (RML-CAs) published in criteria documents and current intelligence bulletins, along with other authoritative recommendations like exposure banding.

NIOSH risk assessments begin with input from key stakeholders and partners, such as government agencies, organized labor, industry, and other scientists. The first step in risk assessment is *hazard identification*, which for a chemical in the workplace, considers the nature and strength of the evidence on the harm the chemical may cause. The *dose-response assessment* follows, quantifying the harm at different levels of exposure. The final step, *risk characterization*, synthesizes all of the information to provide a basis for NIOSH recommendations for risk management actions, such as RELs and RML-CAs.

We all want to stay dry in the rain and stay healthy at work. Risk assessment helps us do both.

Research Rounds

Inside NIOSH:
Task and Environment Affect Carbon Monoxide Exposure Among Wildland Firefighters

In the United States, the number of acres burned each year from wildland fires has grown, increasing work-related risks to wildland firefighters. One invisible risk is carbon monoxide (CO), produced from the burning of fuels, such as in fires or from gasoline-powered engines. In a recent study led by Scott Henn, NIOSH industrial hygienist, he describes conditions that increase this risk. The study appeared in the *Journal of Occupational and Environmental Hygiene* .

Q: Why did you do this study?
A: Fighting wildland fires involves different tasks performed over many days, in different terrain and conditions, affecting how much CO wildland firefighters might encounter. Understanding conditions that increase CO exposure to wildland firefighters can help determine when to use protective measures that reduce exposure, such as rotating tasks and increasing CO-free breaks.

Q: How did you measure CO exposure?
A: During the 2009–2012 fire seasons, the U.S. Forest Service measured CO exposure for 735 wildland firefighters from 57 different fires and recorded information about their work and environmental conditions. With this information, we calculated the CO exposure associated with different tasks and in different environmental conditions.

Q: What did you find?
A: The highest CO exposures occurred among sawyers and swampers, who are workers who cut down and clear trees and brush. Sawyers and swampers were nine times more likely to have higher levels of CO exposure than pump operators, who operate fire engine and portable water pumps. Several other factors were linked to increased CO exposure:

- High relative humidity
- Grass or timber fires
- Windy, downwind, and changing wind conditions
- Firefighting tasks near a fire

Q: What is the next step?
A: Further research is necessary to understand the risk of CO exposure among workers who support wildland firefighters, especially those working near vehicles, airplanes, and helicopters.

More information is available: NIOSH Firefighter Resources.

NIOSH eNews is Brought to You By:

John Howard, M.D., Director
Christina Spring, Editor in Chief

Managing Editor
Tanya Headley

Section Editors
Anne Blank, Research Rounds
Kiana Harper, Monthly Features

Contributing Editors
Sarah Mitchell
Emily Norton
Donjanea Williams

Copy Editor
Cheryl Hamilton

Technical Support
Steve Leonard, Technical Lead
Tonya White, Web Developer

Outside NIOSH:
Better Together: Combined Tools Estimate Carpal Tunnel Syndrome Risk

Estimating the risk of exposure to safety and health hazards is critical to preventing work-related injuries, illnesses, and deaths. Exposure data can be difficult and expensive to get, making it hard to connect illnesses and injuries to specific tasks. An efficient way to assess risks is with a job exposure matrix (JEM), which estimates individual workers' exposures based on their job titles or tasks.

Rather than measuring individual workers' exposures, a JEM focuses on large groups of workers across multiple industries and occupations. Because of the tool's relatively low cost and ability to estimate past exposures, interest is growing in using it to estimate risk for common musculoskeletal disorders like carpal tunnel syndrome (CTS). This painful disorder of the hands and wrists can occur with tasks involving repetitive or awkward motions.

To test whether a JEM effectively estimates CTS risk, and to examine the association of exposure estimates from different countries, a recent NIOSH-funded study at the Washington University School of Medicine in St. Louis compared two of these tools: the U.S. O*NET, with more than 800 occupations; and the French CONSTANCES, with more than 400 occupations. Researchers then compared the findings to actual CTS cases among 2,393 U.S. workers who participated in a previous NIOSH study of musculoskeletal disorders.

O*NET was comparable to individual worker reports in predicting the CTS risks of certain tasks, while CONSTANCES was slightly less accurate, according to the study published in the *Scandinavian Journal of Work, Environment & Health* . However, combined estimates—using exposures from both tools or exposures from either tool combined with individual worker reports—were the most accurate predictors of CTS. These findings show that combined tools like JEMs, including international ones, can help pinpoint risks for common musculoskeletal disorders and can allow studies of large worker populations where other exposure information is unavailable.

More information is available:

- Developing a General Population Job Exposure Matrix for Studies of Work-related MSD
- NIOSH Investigator-initiated Research and Mentored Research Scientist Career Development

Highlights

Update on Coronavirus Response
In response to Coronavirus Disease 2019 (COVID-19) CDC is operationalizing all of its pandemic preparedness and response plans, working on multiple fronts to meet these goals, including specific measures to prepare communities to respond local transmission of the virus that causes COVID-19. For more information, please visit the COVID-19 Outbreak web page.

Follow #KeepTeenWorkersSafe for Young Workers Safety Info
NIOSH has teamed up with OSHA, CareerSafe, and others to provide workplace safety and health information and resources to employers of youth, young workers, parents, and educators with a goal of keeping young workers safe at their summer jobs. Follow along on the NIOSH Facebook, Instagram, and Twitter through April. Visit the Keep Teen Workers Safe website and the NIOSH Science Blog for materials, resources, and information.

NIOSH Seeks Input on Workplace Supported Recovery
In a *Workplace Supported Recovery* program (WSRP), employers use evidence-based approaches to reduce risk factors for substance use among workers and help those who have a substance use disorder in seeking the care they need and assisting in their recovery. To better understand perspectives on and experiences with *Workplace Supported Recovery*, NIOSH is extending an opportunity to provide input through a *Request for Information* in the Federal Register, open now until April 27. NIOSH has posed a series of questions on WSRPs and is interested in responses from a variety of stakeholders, including employers, labor unions, workers, researchers, treatment providers, and government agencies at all levels—federal, state, territorial, local, and tribal. Please contribute your feedback by visiting the Federal Register site .

NIOSH Leadership Updates

- Dr. R.J. Matetic has been appointed to the position of Associate Director for Manufacturing, directing the National Occupational Research Agenda (NORA) Manufacturing Sector portfolio. Dr. Matetic will also serve as a senior advisor to NIOSH for the Transportation, Warehousing and Utilities NORA Sector and the Hearing Loss Prevention NORA Cross-Sector program portfolios.
- Dr. Jennifer Lincoln has been appointed to the position of Associate Director for the NIOSH Office of Agriculture Safety and Health in the Office of the Director.
- LCDR Alice Shumate has been appointed to lead the NIOSH Center for Maritime Safety and Health Studies.

Upcoming Webinar on Future of Work and Implications for Occupational Safety and Health

NIOSH Director Dr. John Howard will be one of three speakers for the first installment of the 2020 Expanding Research Partnerships Webinar Series! Join us on March 11, from 12:00–1:30 p.m. (ET), for a webinar on the future of work and implications for occupational safety and health. Learn more and register here .

2020 Safe-in-Sound Excellence in Hearing Loss Prevention Award Winner Is Out of This World!
The winner of the 2020 Safe-in-Sound Excellence in Hearing Loss Prevention Award™ for innovation was awarded to the Multilateral Medical Operations Panel Acoustics Sub-Working Group for the International Space Station (ISS). In order to mitigate the effects of constant noise from equipment controlling the basic amenities (e.g., air and water supply) on the ISS, as well as noise from the many experiments taking place, the working group developed solutions to reduce noise exposure through monitoring, testing, and protective equipment. Find out more about the Safe-in-Sound award.

NIOSH Congratulates

Hard Hat Inventor Inducted into the National Inventors Hall of Fame
The National Inventors Hall of Fame announced that Edward W. Bullard is being initiated as a historical inductee for his invention of the hard hat. Edward W. Bullard invented the first commercially available industrial head protection device, called the "hard-boiled hat," in 1919. Bullard's lightweight, nonconducting hard hat design was sturdy enough at the time to withstand many falling objects. This invention has since become a mandatory piece of equipment that protects millions of workers around the world.

NIOSH Researcher Named AAAS Fellow

NIOSH researcher Dr. Leonid Turkevich was awarded the distinction of Fellow by the American Association for the Advancement of Science (AAAS) for his contributions in the field of condensed matter physics, particularly in the theory of metals and modeling of complex fluids and finely divided matter. Dr. Turkevich received this distinction because of his efforts toward advancing science applications that are scientifically or socially distinguished. The award was presented at the Fellows Forum during the 2020 American Association for the Advancement of Science Annual Meeting in Seattle, Washington. (Photo Caption: Dr. Turkevich being congratulated by Dr. Steven Chu (president, AAAS).)

Monthly Features

New Communication Products & Reports

Current Intelligence Bulletin

- Current Intelligence Bulletin 69: NIOSH Practices in Occupational Risk Assessment

FACE Reports

- A Solar Company Owner Dies when He Falls Through a Skylight—California
- Supervisor at Used Clothing Processing Facility and Warehouse Dies when Struck by Falling Clothing Bales—Washington

Health Hazard Evaluation Reports

- Evaluation of Exposures to Metals and Flame Retardants at an Electronics Recycling Company
- Evaluation of Health Symptoms After a Law Enforcement Operation

Website

- Coronavirus Disease—2019

NIOSH Science Blog

- Drug Overdose in the Workplace and the Role of Opioids

- World Cancer Day 2020—Reflecting on a Decade of NIOSH Cancer Research
- Made for Each Other—A Valentine's Day Note About Approved Respirator Configurations
- Are There Nano- and Microplastics in the Workplace?
- Year of the Nurse
- Artificial Intelligence Crowdsourcing Competition for Injury Surveillance

---

Federal Register Notice

Proposed Data Collection Submitted for Public Comment and Recommendations: Health Hazard Evaluations/Technical Assistance and Emerging Problems

The notice was posted on February 10. Comments must be received by April 10.

Proposed Data Collection Submitted for Public Comment and Recommendations: Occupational Driver Safety at Intersections

The notice was posted on February 25. Comments must be received by April 27.

Proposed Data Collection Submitted for Public Comment and Recommendations: Heat-related Changes in Cognitive Performance

The notice was posted on February 25. Comments must be received by April 27.

Proposed Data Collection Submitted for Public Comment and Recommendations: Understanding Long-term Respiratory Morbidity in Former Styrene-Exposed Workers

The notice was posted on February 28. Comments must be received by April 28.

Coal Workers' Health Surveillance Program: B Reader Decertification and Autopsy Payment

The notice was posted on February 14. Comments must be received by May 14.

Research Project To Evaluate and Control Hazards to Landscaping and Grounds Management Workers; Request for Participants

The notice was posted on January 10. Letters of interest must be received by October 16.

National Occupational Research Agenda (NORA)

The final National Occupational Research Agenda (NORA) for Healthy Work Design and Well-Being is now available. It has seven research objectives:

1. Identify and examine the impact of worker demographics on employer or organizational practices and worker safety, health, and well-being
2. Improve the safety, health, and well-being of workers with non-standard work arrangements

3. Address the safety and health implications of advancing technology
4. Reduce work organization-related chronic health conditions among workers
5. Decrease the burden of shift work, long hours of work, and sleep deficiency
6. Improve the safety, health, and well-being of workers through healthier work design and better organizational practices
7. Promote a sustainable work-nonwork interface

News from Our Partners

Agricultural Safety Awareness Program Week is March 1–7
The NIOSH-funded Centers for Agricultural Safety and Health (Ag Centers) are partnering with the American Farm Bureau Federation to promote the Agricultural Safety Awareness Program Week, March 1–7. During the week, a different safety and health focus will be highlighted: Monday, March 2, Mental Health; Tuesday, March 3, Transportation Safety; Wednesday, March 4, Weather Disasters; Thursday, March 5, Confined Spaces; and Friday, March 6, Farmer Wellness. The theme of the Agricultural Safety Awareness Program Week is "20:20 Vision on Ag Safety."

Wildfires and Smoke Exposure: Study Examines Health and Safety Awareness Among Farmers and Employers
In a recent study the Western Center for Agricultural Health and Safety found that, while California farmworkers and employers recognize wildfires and smoke exposure as safety concerns, these groups differ in their means to address these issues. The Western Center for Agricultural Health and Safety is located at the University of California, Davis, and is one of 11 NIOSH-funded Centers for Agricultural Safety and Health.

Recently Released Newsletters Available From NIOSH-funded Centers
CPWR—The Center for Construction Research and Training released its monthly update, which highlights new resources related to opioids and construction workers. CPWR is the NIOSH-funded National Construction Center. The Pacific Northwest Agricultural Safety and Health Center—one of 11 NIOSH-supported Centers for Agricultural Safety and Health—also released its latest newsletter.

Opioid Overdoses Leading Cause of Workplace Fatalities in Massachusetts
The Massachusetts Department of Public Health's Occupational Health Surveillance Program (OHSP) recently released a report showing that unintentional drug overdoses were the leading cause of workplace death in Massachusetts in 2016 and 2017. These data follow national trends that drug overdoses at work are increasing, as summarized in a blog coauthored by NIOSH and OHSP, a NIOSH-funded state surveillance program. Read more NIOSH resources related to Opioids in the Workplace.

New Report on Occupational Injuries and Illnesses Among Massachusetts Private Sector Workers
The Massachusetts Department of Public Health's Occupational Health Surveillance Program, and partners recently released a report: *Using Massachusetts Workers' Compensation Data to identify Priorities for Preventing Occupational Injuries and Illnesses among Private Sector Workers: Findings from an Analysis of Massachusetts' Compensation Lost Wage Claims, 2014–2016*. This document presents previously unavailable information about patterns of occupational injuries and illnesses among private sector workers in Massachusetts. These findings aim to guide and promote stakeholders' efforts in preventing occupational injuries and illnesses among Massachusetts workers and associated human and economic costs.

New Online Training for Employers Highlights Importance of Workplace Safety Committee
Washington State's Trucking Injury Reduction Emphasis through Surveillance (TIRES) program has developed a new online training to educate employers on the importance of organizing a safety committee. The training describes the

role of a safety committee, steps to establish a committee, and relevant Washington laws and regulations. It is the latest in a series of online safety trainings and tools produced by TIRES intended for small- and medium-sized employers. TIRES is a NIOSH-funded state surveillance program at Washington's Safety and Health Assessment and Research for Prevention (SHARP) program.

New Publication on Defining 'Integration' for *Total Worker Health®*
The Center for the Promotion of Health in the New England Workplace (CPH-NEW) has a new article in the *Annals of Work Exposures and Health*, entitled Defining 'Integration' for Total Worker Health®: A New Proposal . CPH-NEW is one of six grant-funded Centers of Excellence for *Total Worker Health*.

Learn More About CDC Trainings
CDC Learning Connection helps public health and healthcare professionals stay informed about quality trainings from CDC, other federal agencies, and federally funded partners. Each month, we feature trainings on this website and promote them via a newsletter, social media, and partner outreach.

Webinars, Conferences & Events

Upcoming Webinars

CPWR Fall Protection Q&A Panel
March 4, 2–3 p.m. (ET). Contact Scott Earnest for more information.

NIOSH Education and Research Centers Industrial Hygiene Webinar Series 2020: Respiratory Exposures and Outcomes Among Cannabis Workers
March 10, 3–4 p.m. (ET). Contact Donjanea Williams for more information.

Expanding Research Partnerships Webinar Series
March 11, 12:00–1:30 p.m. (ET). Contact Donjanea Williams for more information.

Upcoming Conferences & Workshops

Artificial Intelligence in Government
March 19, 6–8 p.m., Washington D.C.

CONEXPO-CON
March 10—14, Las Vegas, Nevada

Prevention through Design Workshop
March 11, Tempe, Arizona

12th Annual Research Day Symposium
March 26, Westminster, Colorado

Toxicology and Risk Assessment Conference
April 20–23, Cincinnati, Ohio

30th Annual Art & Science of Health Promotion Conference
April 20–24, Hilton Head Island, South Carolina

VPPPA Safety Conference
April 29–May 1, Mount Pocono, Pennsylvania

Epidemic Intelligence Services Conference
May 4–7, Atlanta, Georgia

World Health Organization Health for All Film Festival
May 16–22, Geneva, Switzerland

7th International Conference on the History of Occupational and Environmental Health
May 27–29, Durban, South Africa

American Industrial Hygiene Conference & Exposition
June 1–3, Atlanta, Georgia

National Conference on Health Communication, Marketing & Media
August 10–12, Atlanta, Georgia

XXII World Congress on Safety and Health at Work
October 4–7, Toronto, Canada

International Media Festival for Prevention
October 4–7, Toronto, Canada

Follow NIOSH

Facebook Instagram Pinterest Twitter YouTube more sites

Page last reviewed: March 2, 2020
Content source: National Institute for Occupational Safety and Health (NIOSH)