

October 2015,
Issue 50

Army Industrial Hygiene News and Regulatory Summary

Hazardous Substances

Electromagnetic Fields Associated with Commercial Solar Photovoltaic Electric Power Generating Facilities

The southwest region of the United States is expected to experience an expansion of commercial solar photovoltaic generation facilities over the next 25 years. A solar facility converts direct current generated by the solar panels to three-phase 60-Hz power that is fed to the grid. This conversion involves sequential processing of the direct current through an inverter that produces low-voltage three-phase power, which is stepped up to distribution voltage (~12 kV) through a transformer. This study characterized magnetic and electric fields between the frequencies of 0 Hz and 3 GHz at two facilities operated by the Southern California Edison Company in Porterville, CA and San Bernardino, CA. Static magnetic fields were very small compared to exposure limits established by IEEE and ICNIRP.



Read more: Journal of Occupational and Environmental Hygiene Volume 12, Issue 11, 2015 (Available with AIHA membership)

Distribution Statement A - Approved for public release; distribution unlimited.

Special Interest Articles:

- [T-test](#)
- [Biomarker](#)
- [Processed Meats](#)
- [Construction Fatalities](#)
- [Skin Notation](#)

DOEHRS Super Star

Contents:



- [Hazardous Substance..... 1](#)
- [Radiation.....8](#)
- [Ventilation.....9](#)
- [PPE.....10](#)
- [Noise.....12](#)
- [Preventive Medicine.....13](#)
- [Environmental Health.....15](#)
- [Ergonomics.....17](#)
- [Safety.....19](#)
- [Emergency Preparedness & Response.....23](#)
- [Deployment Health.....25](#)
- [Nanotech.....26](#)
- [Regulatory Research & IH News.27](#)
- [Training.....31](#)

A One–Two Punch to Bone: Assessing the Combined Impact of Lead and a High-Fat Diet



Lead exposure and obesity each adversely affect bone formation and maintenance, which can potentially lead to low bone mass and an increased risk of fracture.^{1,2} A new study in mice, reported in this issue of EHP,

found that lead exposure combined with a high-fat diet altered metabolic variables as well as bone quality more than either factor alone.¹ The study also identified clues to molecular mechanisms that could explain the observed metabolic and skeletal changes.

Read more:

<http://ehp.niehs.nih.gov/123-A264/>

Case Report Finds Acute Hypersensitivity Pneumonitis in Patient Using E-Cigarettes

Researchers from VA Hospital in White River Junction, Vermont will present a case report of acute inhalation lung injury related to the use of e-cigarettes and a flavored e-cigarette liquid containing diacetyl.

The case study presented involves a 60-year-old cigar-smoking male who was admitted with weakness, chills and cough. No significant radiologic



abnormalities were found, but he was treated with ceftriaxone and azithromycin and discharged after three days feeling normal. One



month later the patient presented with similar symptoms. Additionally, he had a fever and was hypoxemic. On examination, he had bilateral upper lung zone crackles and bilateral upper lobe predominant ground glass opacities on chest CT. After further questioning, the patient reported using strongly-flavored e-cigarettes prior to each admission. The patient was diagnosed with inhalation injury and suspected acute

hypersensitivity pneumonitis related to electronic cigarette use. The patient did not use e-cigarettes again and had no further symptoms. A follow up CT scan and pulmonary function test at 3 months were normal.

Read more:

<http://www.eurekalert.org/publications/2015-10/acoc-crf101915.php>

Manganese Fractionation Using a Sequential Extraction Method to Evaluate Welders' Shielded Metal Arc Welding Exposures during Construction Projects in Oil Refineries



The National Institute for Occupational Safety and Health has conducted an occupational exposure assessment study of manganese (Mn) in welding fume of construction workers rebuilding tanks, piping, and process equipment at two oil refineries. The objective of this study was to evaluate exposures to different Mn fractions using a sequential extraction procedure. Seventy-two worker-days were

monitored for either total or respirable Mn during stick welding and associated activities both within and outside of confined spaces. The samples were analyzed using an experimental method to separate different Mn fractions by valence states based on selective chemical solubility. The full-shift total particulate Mn time-weighted average (TWA) breathing zone concentrations ranged from 0.013–29 for soluble Mn in a mild ammonium acetate solution; from 0.26–250 for Mn_{0,2+} in acetic acid; from non-detectable (ND) – 350 for Mn_{3+,4+} in hydroxylamine-hydrochloride; and from ND – 39 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for insoluble Mn fractions in hydrochloric and nitric acid. The summation of all Mn fractions in total particulate TWA ranged from 0.52–470 $\mu\text{g}/\text{m}^3$. The range of respirable particulate Mn TWA

Army Industrial Hygiene News and Regulatory Summary

concentrations were from 0.20–28 for soluble Mn; from 1.4–270 for Mn_{0,2+}; from 0.49–150 for Mn_{3+,4+}; from ND – 100 for insoluble Mn; and from 2.0–490 µg/m³ for Mn (sum of fractions). For all jobs combined, total particulate TWA GM concentrations of the Mn(sum) were 99 (GSD = 3.35) and 8.7 (GSD = 3.54) µg/m³ for workers inside and outside of confined spaces; respirable Mn also showed much higher levels for welders within confined spaces. Regardless of particle size and confined space work status, Mn_{0,2+} fraction was the most abundant followed by Mn_{3+,4+} fraction, typically >50% and ~30–

40% of Mn(sum), respectively. Eighteen welders' exposures exceeded the ACGIH Threshold Limit Values for total Mn (100 µg/m³) and 25 exceeded the recently adopted respirable Mn TLV (20 µg/m³). This study shows that a welding fume exposure control and management program is warranted, especially for welding jobs in confined spaces.

Read more: Journal of Occupational and Environmental Hygiene Volume 12, Issue 11, 2015 (Available with AIHA membership)

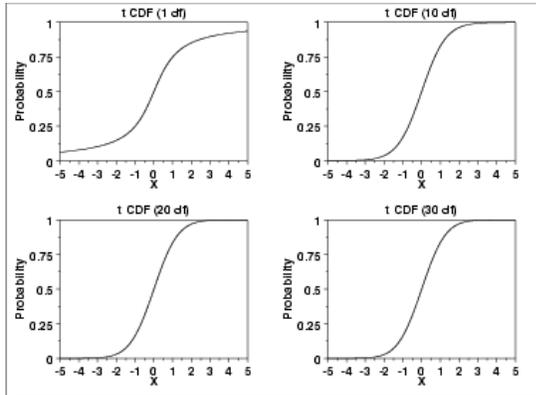
POPs and Pubertal Timing: Evidence of Delayed Development

Endocrine disruptors have been eyed as potential drivers of a steady trend toward earlier puberty among girls worldwide in recent decades, particularly with regard to breast development.^{1,2,3,4} However, when the authors of a study in this issue of EHP evaluated serum levels of three common classes of hormonally active persistent organic pollutants (POPs) in relation to the timing of pubertal onset in girls, they found, contrary to initial hypotheses, that higher exposures were associated with later puberty, not earlier.⁵

Read more: <http://ehp.niehs.nih.gov/123-A266/>



Performing T-tests to Compare Autocorrelated Time Series Data Collected from Direct-Reading Instruments



Industrial hygienists now commonly use direct-reading instruments to evaluate hazards in the workplace. The stored values over time from these instruments constitute a time series of measurements that are often autocorrelated. Given the need to statistically compare two occupational scenarios using values from a direct-reading instrument, a t-test must consider measurement autocorrelation or

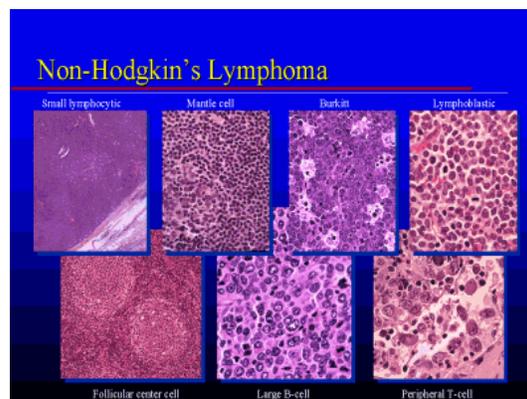
the resulting test will have a largely inflated type-1 error probability (false rejection of the null hypothesis). A method is described for both the one-sample and two-sample cases which properly adjusts for autocorrelation. This method involves the computation of an “equivalent sample size” that effectively decreases the actual sample size when determining the standard error of the mean for the time series. An example is provided for the one-sample case, and an example is given where a two-sample t-test is conducted for two autocorrelated time series comprised of lognormally distributed measurements.

Read more: Journal of Occupational and Environmental Hygiene Volume 12, Issue 11, 2015 (Available with AIHA membership)

Analysis of Environmental Chemical Mixtures and Non-Hodgkin Lymphoma Risk in the NCI-SEER NHL Study

Background: There are several suspected environmental risk factors for non-Hodgkin lymphoma (NHL). The associations between NHL and environmental chemical exposures have typically been evaluated for individual chemicals (i.e., one-by-one).

Objectives: We determined the association between a mixture of 27 correlated chemicals measured in house dust and NHL risk.



Methods: We conducted a population-based case-control study of NHL in four National Cancer Institute-Surveillance, Epidemiology, and End Results centers—Detroit, Michigan; Iowa; Los Angeles County, California; and Seattle, Washington—from 1998 to 2000. We used weighted quantile sum (WQS) regression to model the association of a mixture of chemicals and risk of NHL. The WQS index was a sum of weighted quartiles for 5 polychlorinated biphenyls (PCBs), 7 polycyclic aromatic hydrocarbons (PAHs), and 15 pesticides. We estimated chemical mixture weights and effects for study sites combined and for each site individually, and also for histologic subtypes of NHL.

Results: The WQS index was statistically significantly associated with NHL overall [odds ratio (OR) = 1.30; 95% CI: 1.08, 1.56; p = 0.006; for one quartile increase] and in

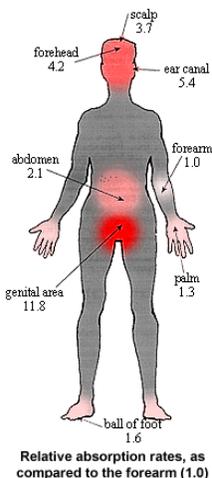
the study sites of Detroit (OR = 1.71; 95% CI: 1.02, 2.92; p = 0.045), Los Angeles (OR = 1.44; 95% CI: 1.00, 2.08; p = 0.049), and Iowa (OR = 1.76; 95% CI: 1.23, 2.53; p = 0.002). The index was marginally statistically significant in Seattle (OR = 1.39; 95% CI: 0.97, 1.99; p = 0.071). The most highly weighted chemicals for predicting risk overall were PCB congener 180 and propoxur. Highly weighted chemicals varied by study site; PCBs were more highly weighted in Detroit, and pesticides were more highly weighted in Iowa.

Conclusions: An index of chemical mixtures was significantly associated with NHL. Our results show the importance of evaluating chemical mixtures when studying cancer risk.

Read more:

<http://ehp.niehs.nih.gov/1408630/>

Exploring a Little-Known Pathway: Dermal Exposure to Phthalates in Indoor Air



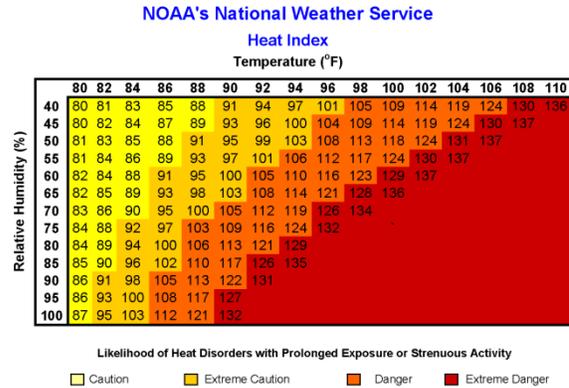
The purpose of this project was to develop Certain phthalate esters used widely in vinyl plastics and other consumer products have been associated with impaired neurodevelopment,¹ altered genital development,² and respiratory problems³ in people. Studies of

dermal absorption of phthalates have largely focused on direct contact of the skin with the chemicals, but some models predict that transdermal uptake directly from ambient air may be a potentially important route of exposure.⁴ In this issue of EHP, researchers confirm experimentally in humans that dermal uptake from indoor air may be a meaningful exposure pathway for some phthalates.⁵

Read more: <http://ehp.niehs.nih.gov/123-A267/>

Comparison of Single-Point and Continuous Sampling Methods for Estimating Residential Indoor Temperature and Humidity

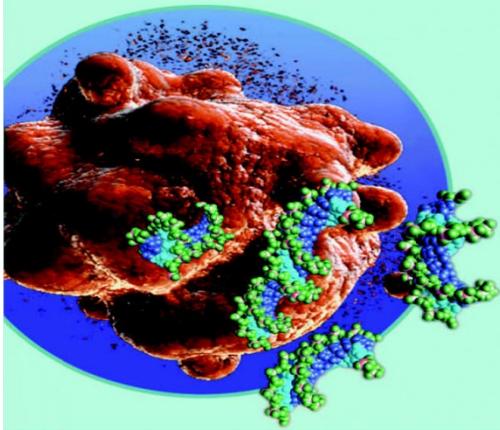
Residential temperature and humidity are associated with multiple health effects. Studies commonly use single-point measures to estimate indoor temperature and humidity exposures, but there is little evidence to support this sampling strategy. This study evaluated the relationship between single-point and continuous monitoring of air temperature, apparent temperature, relative humidity, and absolute humidity over four exposure intervals (5-min, 30-min, 24-hr, and 12-days) in 9 northern Utah homes, from March-June 2012. Three homes were sampled twice, for a total of 12 observation periods. Continuous data-logged sampling was conducted in homes for 2–3 wks, and simultaneous single-point measures (n = 114) were collected using handheld thermo-hygrometers. Time-centered single-point measures were moderately correlated with short-term (30-min) data logger mean air temperature ($r = 0.76$, $\beta = 0.74$), apparent temperature ($r = 0.79$, $\beta = 0.79$), relative humidity ($r = 0.70$, $\beta = 0.63$), and absolute humidity ($r = 0.80$, $\beta = 0.80$). Data logger 12-day means were also moderately correlated with single-point air temperature ($r = 0.64$, $\beta = 0.43$) and apparent



temperature ($r = 0.64$, $\beta = 0.44$), but were weakly correlated with single-point relative humidity ($r = 0.53$, $\beta = 0.35$) and absolute humidity ($r = 0.52$, $\beta = 0.39$). Of the single-point RH measures, 59 (51.8%) deviated more than $\pm 5\%$, 21 (18.4%) deviated more than $\pm 10\%$, and 6 (5.3%) deviated more than $\pm 15\%$ from data logger 12-day means. Where continuous indoor monitoring is not feasible, single-point sampling strategies should include multiple measures collected at prescribed time points based on local conditions.

Read more: Journal of Occupational and Environmental Hygiene Volume 12, Issue 11, 2015 (Available with AIHA membership)

Uses of NHANES Biomarker Data for Chemical Risk Assessment: Trends, Challenges, and Opportunities



The CDC National Health and Nutrition Examination Survey (NHANES) is designed to assess the health and nutritional well-being of children and adults in the United States ([CDC 2014a](#)). Participation in NHANES is voluntary and confidential, and follows a complex, multistage, probability cluster design. Therefore, weighted NHANES data are considered representative of the entire U.S. (noninstitutionalized,

civilian) population. Thousands of volunteers are invited each year to participate via interviews, questionnaires, and examinations. “Spot” biological samples (e.g., blood and urine at a single time point) are provided by many participants and analyzed for chemical biomarker levels. These biomarker data are published in the National Reports on Human Exposure to Environmental Chemicals (NER) stratified by age group, sex, and race/ethnicity ([CDC 2014d](#)). They are also made publically available online alongside demographic information, questionnaire responses, medical examination results, and other laboratory data ([CDC 2014c](#)).

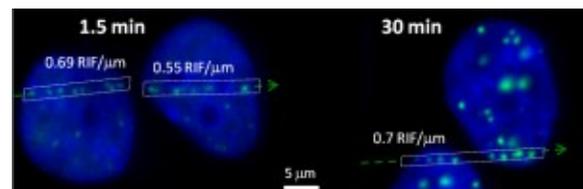
Read more:

<http://ehp.niehs.nih.gov/1409177/>

Radiation

Study: Low Doses of Ionizing Radiation Increase Cancer Risks

Protracted exposure to low doses of ionizing radiation in the workplace can increase the risk of death from solid cancers, according to the results from a study published yesterday in *The BMJ* (formerly the *British Medical Journal*). Researchers found that, both for workers exposed to protracted low doses and for



those exposed to high and acute doses, the association between dose and solid cancer risk is similar per unit of radiation dose. The

Army Industrial Hygiene News and Regulatory Summary

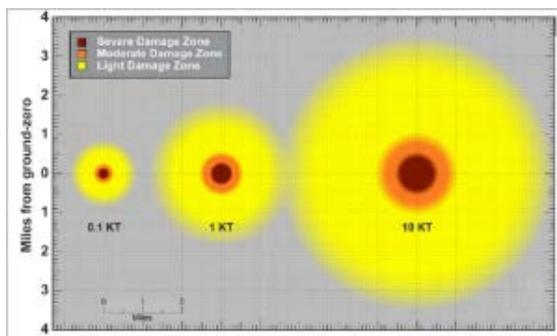
study showed that the risk of death from solid cancers, or abnormal cellular growths in “solid” organs such as the breast or prostate, increased by approximately 5 percent per 100 milligray (mGy). The study, which was coordinated by the International Agency for Research on Cancer (IARC), evaluated more than 300,000 nuclear

workers’ exposures in France, the U.K., and the U.S. between 1943 and 2005.

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/Study-Low-Doses-of-Ionizing-Radiation-Increase-Cancer-Risks.aspx>

HHS Launches Redesigned Online Radiation Treatment Resource



Health care professionals now can easily find reliable guidance to help diagnose and treat patients who have been exposed to radiation.

The first major redesign of the Radiation Emergency Medical Management (REMM) website since it launched in 2007 is available at <http://www.remm.nlm.gov/>.

REMM gives health care personnel key information about the diagnosis and treatment of radiation injuries and access to interactive clinical tools and data. The site was developed by two agencies of the U.S. Department of Health and Human Services (HHS): the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) and the National Library of Medicine (NLM), part of the National Institutes of Health.

Read more:

<http://www.phe.gov/Preparedness/news/Pages/remm.aspx>

Ventilation

A New Way to Analyze Fan Systems for Optimal Performance, Cost Savings

High-performance fan systems are essential to efficient industrial processes. Within the air-movement-and-control industry, most

fans designed to provide critical ventilation in commercial and industrial facilities, such as laboratories, automotive plants, and

Army Industrial Hygiene News and Regulatory Summary

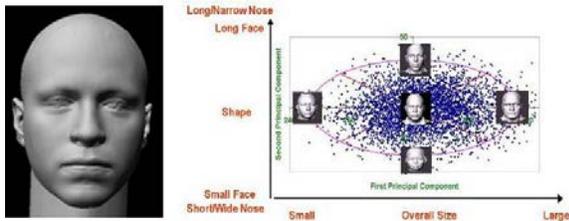
semiconductor fabs, have been tested carefully by manufacturers to meet industry standards. Despite conscientious testing and precisely calculated ratings, however, many fans do not operate as anticipated after they are installed; they simply fail to achieve the flow and static-pressure rating indicated by the manufacturer's performance curve. This leads to system inefficiencies and a derated system that must be addressed sooner rather than later, possibly affecting production and almost always increasing costs.

Read more: <http://hvac.com/iaq-ventilation/new-way-analyze-fan-systems-optimal-performance-cost-savings>



PPE

Inward Leakage Variability between Respirator Fit Test Panels – Part I. Deterministic Approach



Inter-panel variability has never been investigated. The objective of this study was to determine the variability between different anthropometric panels used to determine the inward leakage (IL) of N95 filtering facepiece respirators (FFRs) and elastomeric half-mask respirators (EHRs). A total of 144 subjects, who were both experienced and non-experienced N95 FFR users, were recruited. Five N95 FFRs and five N95 EHRs were randomly selected from among those models tested previously in our laboratory. The PortaCount Pro+

(without N95-Companion) was used to measure IL of the ambient particles with a detectable size range of 0.02 to 1 μm . The Occupational Safety and Health Administration standard fit test exercises were used for this study. IL test were performed for each subject using each of the 10 respirators. Each respirator/subject combination was tested in duplicate, resulting in a total 20 IL tests for each subject. Three 35-member panels were randomly selected without replacement from the 144 study subjects stratified by the National Institute for Occupational Safety and Health bivariate panel cell for conducting statistical analyses. The geometric mean (GM) IL values for all 10 studied respirators were not significantly different among the three randomly selected 35-member panels. Passing rate

was not significantly different among the three panels for all respirators combined or by each model. This was true for all IL pass/fail levels of 1%, 2%, and 5%. Using 26 or more subjects to pass the IL test, all three panels had consistent passing/failing results for pass/fail levels of 1% and 5%. Some disagreement was observed for the 2% pass/fail level. Inter-panel variability exists, but it is small relative to the other sources of variation in fit testing data. The

concern about inter-panel variability and other types of variability can be alleviated by properly selecting: pass/fail level (IL 1–5%); panel size (e.g., 25 or 35); and minimum number of subjects required to pass (e.g., 26 of 35 or 23 of 35).

Read more: Journal of Occupational and Environmental Hygiene Volume 12, Issue 11, 2015 (Available with AIHA membership)

Development of a Cobinamide-Based End-Of-Service-Life Indicator for Detection of Hydrogen Cyanide Gas

We describe an inexpensive paper-based sensor for rapid detection of low concentrations (ppm) of hydrogen cyanide gas. A piece of filter paper pre-spotted with a dilute monocyanocobinamide [CN(H₂O)Cbi] solution was placed on the end of a bifurcated optical fiber and the reflectance spectrum of the CN(H₂O)Cbi was monitored during exposure to 1.0-10.0 ppm hydrogen cyanide gas. Formation of dicyanocobinamide yielded a peak at 583 nm with a simultaneous decrease in reflectance from 450-500 nm. Spectral changes were monitored as a function of time at several relative humidity values: 25, 50, and 85% relative humidity. With either cellulose or glass fiber papers, spectral changes occurred within 10 s of exposure to 5.0 ppm hydrogen cyanide gas (NIOSH recommended short-term exposure limit).

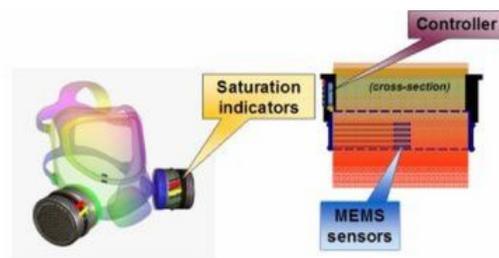


Figure 1. Respirator with ESL indicator system

We conclude that this sensor could provide a real-time end-of-service-life alert to a respirator user.

Read more:

<http://www2a.cdc.gov/nioshtic-2/BuildQyr.asp?s1=20046505&f1=%2A&Staryear=&Adv=0&terms=1&EndYear=&Limit=10000&sort=&D1=10&PageNo=1&RecNo=1&View=f&>

Noise

Reducing the Risk of Hearing Loss While Ensuring Compliance



At least 4 million workers go to work each day in damaging noise and 10 million people in the United States have a noise-related hearing loss. As many as 22 million workers are exposed to potentially

damaging noise each year, according to the CDC.

Occupational hearing loss is the most commonly recorded occupational illness in manufacturing accounting for one in nine recordable illnesses, according to NIOSH. Although a traumatic noise exposure may cause an immediate hearing loss in some cases, most occupational hearing losses occur so gradually that workers are unaware they are losing their hearing, adds the document. With continued exposure, the hearing loss spreads into those frequencies most needed to understand speech.

Read more: <http://ehstoday.com/hearing-protection/reducing-risk-hearing-loss-while-ensuring-compliance>

Loud Noise Exposure Linked to Heart Disease Risk

People with long-term exposure to loud noise at work or in leisure activities may be at increased risk of heart disease, a U.S. study finds.

Researchers found the strongest link in working-age people with high-frequency hearing loss, which is typically the result of chronic noise exposure.

“Compared with people with normal high-frequency hearing, people with bilateral high-frequency hearing loss were approximately two times more likely to have coronary heart disease,” said lead author Dr. Wen Qi Gan of the University of Kentucky College of Public Health in Lexington.

Army Industrial Hygiene News and Regulatory Summary

Past research has already linked noise exposure, especially in workplaces, to coronary heart disease, high blood pressure and other illnesses, Gan and his colleagues write in *Occupational and Environmental Medicine*. But many of these studies lacked individual information about actual noise exposure, relying instead on average decibel levels in the person's environment.



Read more:

<http://www.reuters.com/article/2015/10/02/us-health-heartdisease-noise-exposure-idUSKCNORW27Y20151002>

[2/us-health-heartdisease-noise-exposure-idUSKCNORW27Y20151002](http://www.reuters.com/article/2015/10/02/us-health-heartdisease-noise-exposure-idUSKCNORW27Y20151002)

Preventive Medicine

CDC Launches Improved Online Foodborne Outbreak Search Tool



The CDC released a redesigned online tool making it easier to search data on foodborne disease outbreaks. The updated Foodborne Outbreak Online Database Tool (FOOD Tool) lets users search nearly 20 years of outbreak data by state, food or germ.

Originally developed in 2009, the FOOD Tool includes national foodborne outbreak data reported to CDC from 1998 to 2014. New interactive features such as maps, graphs, and tables now allow users to search by specific foods and ingredients,

view a "quick stats" display, and get case counts for multistate outbreaks.

An estimated 1 in 6 Americans get sick from foodborne illness every year. Tracking and reporting outbreak information is critical to understanding how foodborne illness affects America's health. During an outbreak, public health investigators can use the database to help point them toward possible contaminated food sources by searching foods, and the germs, implicated in past outbreaks. Reporters and members of the public can use the database to understand the history of recent or ongoing outbreaks of foodborne illness.

Read more:

<http://www.infectioncontroltoday.com/news/2015/10/cdc-launches-improved-online-foodborne-outbreak-search-tool.aspx>

States Could Be Sanctioned for Public Health Failings: WHO Boss



A U.N. panel is considering ways to hold governments to account for failing to stick to global health rules, World Health Organization Director-General Margaret Chan said on Tuesday.

pose a risk to their neighbors and beyond," she told a news conference.

A global health crisis review set up by U.N. Secretary-General Ban Ki-moon is looking at how to make them accountable, according to Chan.

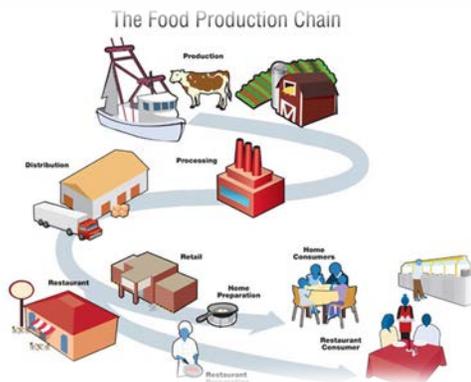
Read more:

<http://www.reuters.com/article/2015/10/20/us-health-who-chan-idUSKCN0SE29S20151020>

"This goes back to governments. If they sign up to the international health regulations they need to honor their commitment. Because if they don't do their part they

Processed Meat Can Cause Cancer

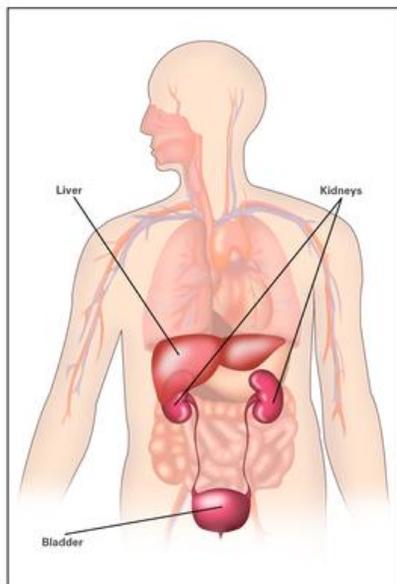
Researchers have evaluated the carcinogenicity of the consumption of red meat and processed meat. They classified the consumption of red meat as probably carcinogenic to humans, based on limited evidence that the consumption of red meat causes cancer in humans and strong mechanistic evidence supporting a carcinogenic effect. Processed meat was classified as carcinogenic to humans.



Read more:

<http://www.sciencedaily.com/releases/2015/10/151027135116.htm>

Examining Contemporary Occupational Carcinogen Exposure, Bladder Cancer



Despite manufacturing and legislative changes to improve workplace hygiene, the risk of occupational bladder cancer appears to be on the rise in some industries, although the profile of at-risk occupations has changed over time, according to an article published online by JAMA Oncology.

Read more:

<http://www.sciencedaily.com/releases/2015/10/151008131044.htm>

Toxins Remain in Your Clothes

Thousands of chemicals are used in clothes manufacturing. Researchers at Stockholm University have examined if there are chemicals in the clothes we buy as well. Several substances related to health risks were identified and not even organic cotton was a guarantee for non-toxic textiles.

In a new thesis 60 garments from Swedish and international clothing chains have been tested. An initial analysis found thousands of chemicals in the clothes and around a hundred chemicals were preliminary identified. Several of the substances were not on the producers' lists and are suspected to be by-products, residues or chemicals added during transport.

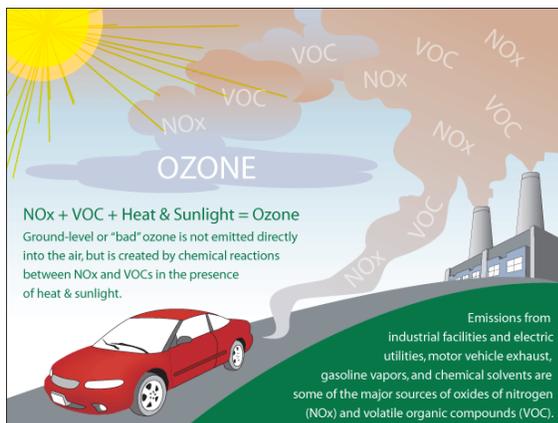


Read more:

<http://www.sciencedaily.com/releases/2015/10/151023084508.htm>

Environmental Health

EPA Strengthens Ozone Standards



EPA on Oct. 1 announced that it is going forward with standards to tighten the National Ambient Air Quality Standards for ground-level ozone to 70 parts per billion (ppb), down from from 75 ppb, in order to

protect public health. Depending on the severity of their ozone problem, areas would have until between 2020 and 2037 to meet the standards.

Ground-level ozone forms when nitrogen oxides (NOx) and volatile organic compounds react in the air.

Read more:

<https://eponline.com/articles/2015/10/01/epa-strengthens-ozone-standards.aspx?admgarea=ht.air>

Study: Climate Change Could Make Workers Less Productive

Water boils at 212 degrees Fahrenheit. Paper is said to burn at 451 degrees (though the jury's still out on the science behind this one). And global economies reach optimum performance levels at 55 degrees, according to a new study released this week by a team of Stanford and University of California, Berkeley researchers.

The report, published Wednesday in the science journal *Nature*, profiled 166 countries around the world over the course of 50 years and found that economic productivity peaks when a region's average annual temperature clocks in around 13

degrees Celsius, or 55 degrees Fahrenheit. Above this point, the authors said, productivity begins "declining strongly."

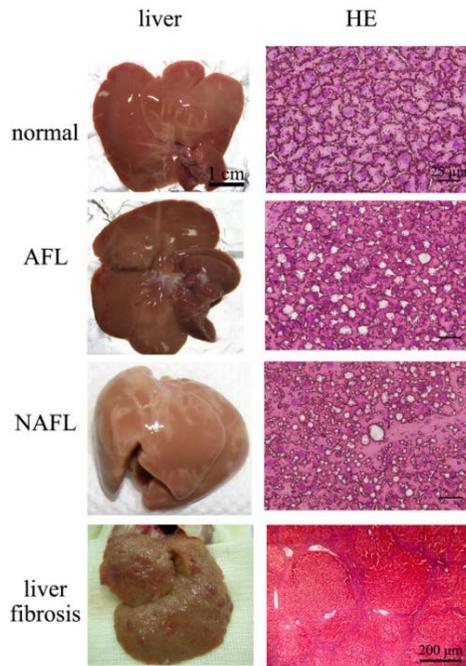


Read more:

<http://www.usnews.com/news/articles/201>

5/10/22/study-climate-change-could-make-workers-less-productive?int=a14709&int=9b5308

Scientists Discover Mechanism for Air Pollution-Induced Liver Disease



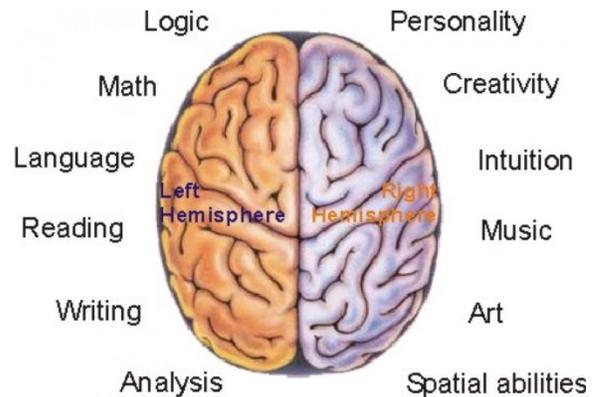
A research team led at the Wayne State University School of Medicine's Center for Molecular Medicine and Genetics, has discovered that exposure to air pollution has a direct adverse health effect on the liver and causes liver fibrosis, an illness associated with metabolic disease and liver cancer.

Read more

<http://www.sciencedaily.com/releases/2015/09/150902155929.htm>

Green Office Environments Linked With Higher Cognitive Function Scores

People who work in well-ventilated offices with below-average levels of indoor pollutants and carbon dioxide have significantly higher cognitive functioning scores -- in crucial areas such as responding to a crisis or developing strategy -- than those who work in offices with typical levels.



Read more:

<http://www.sciencedaily.com/releases/2015/10/151026171409.htm>

[5/10/151026171409.htm](http://www.sciencedaily.com/releases/2015/10/151026171409.htm)

Ergonomics

Stand-Up Solution: Sit-Stand Desk Users Sit Less, Burn More Calories



According to a new University of Iowa study, employees with sit-stand desks stood 60 minutes more a day at work compared to their co-workers with sitting desks, and they continued to do so long after their newfangled desks lost their novelty. Plus,

the sit-stand desk users walked an additional six minutes a day at work.

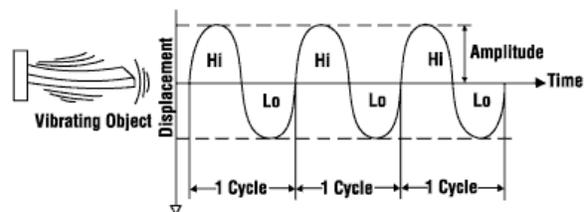
Consequently, the employees with sit-stand desks burned up to 87 more calories a day than their sitting counterparts--a small but significant amount that researchers say could be important in fighting the obesity epidemic in the United States.

Read more:

<http://www.sciencedaily.com/releases/2015/10/151002113556.htm>

Theoretical Foundation, Methods, and Criteria for Calibrating Human Vibration Models Using Frequency Response Functions

While simulations of the measured biodynamic responses of the whole human body or body segments to vibration are conventionally interpreted as summaries of biodynamic measurements, and the resulting models are considered quantitative, this study looked at these simulations from a different angle: model calibration. The specific aims of this study are to review and clarify the theoretical



basis for model calibration, to help formulate the criteria for calibration validation, and to help appropriately select and apply calibration methods. In addition

Army Industrial Hygiene News and Regulatory Summary

to established vibration theory, a novel theorem of mechanical vibration is also used to enhance the understanding of the mathematical and physical principles of the calibration. Based on this enhanced understanding, a set of criteria was proposed and used to systematically examine the calibration methods. Besides theoretical analyses, a numerical testing method is also used in the examination. This study identified the basic requirements for each calibration method to obtain a unique calibration solution. This study also confirmed that the solution becomes more robust if more than sufficient calibration references are provided. Practically, however, as more references are used, more inconsistencies can arise among the

measured data for representing the biodynamic properties. To help account for the relative reliabilities of the references, a baseline weighting scheme is proposed. The analyses suggest that the best choice of calibration method depends on the modeling purpose, the model structure, and the availability and reliability of representative reference data.

Read more: <http://www2a.cdc.gov/nioshtic-2/BuildQyr.asp?s1=20046528&f1=%2A&Staryear=&Adv=0&terms=1&EndYear=&Limit=10000&sort=&D1=10&PageNo=1&RecNo=1&View=f&>

Work, Pedal, and Be Happy



By providing workers with a portable pedaling device under their desks, Lucas Carr, assistant professor of health and human physiology and member of the Obesity Research and Education Initiative at the UI, discovered that people who were once sitting all day were now moving at work without getting up.

Better yet, the study also found that workers who pedaled more were more likely to report weight loss, improved concentration while at work, and fewer sick days than co-workers who pedaled less.

But there's a catch.

Carr says key to the findings was providing workers with a pedaling device that was not only comfortable and easy to use, but was theirs alone to pedal

Read more: <http://www.sciencedaily.com/releases/2015/08/150810091903.htm>

Safety

OSHA Updates Guide on Trenching, Excavation Safety in Construction

OSHA recently published an updated version of its guide Trenching and Excavation Safety, which describes “key elements” of the agency’s applicable standards and the associated requirements for excavation and trenching operations. The guide covers safe work practices intended to help protect workers from cave-ins, hazardous atmospheres, falling loads, and other potential hazards of trenching work. A new section discusses safety factors that employers should consider when bidding on jobs, and expanded sections cover maintenance of materials and equipment used for worker protection systems and additional hazards associated with excavations not included in the previous version.



Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/OSHA-Updates-Guide-on-Trenching,-Excavation-Safety-in-Construction.aspx>

Hospital Routines May Be Making Patients Sicker



Interrupted sleep and withholding of food can make hospitalized patients sicker, according to three U.S. physicians who say patient safety in hospitals is not just a matter of preventing falls and infections.

In a Viewpoint paper in the journal *BMJ Quality and Safety*, they point out that adequate sleep and nutrition are key to keeping the immune system strong, but noisy hospital conditions and long wait times may be compromising the body's defenses.

Army Industrial Hygiene News and Regulatory Summary

The authors, all from Johns Hopkins Hospital in Baltimore, say poor nutrition, present in up to half of all hospital patients - can contribute to inflammation, muscle breakdown and organ damage.

Read more:

<http://www.reuters.com/article/2015/10/21/us-health-hospitals-recovery-idUSKCN0SF2VQ20151021>

CDC Unveils Redesigned Healthy Pets Healthy People Website

CDC launched its redesigned Healthy Pets Healthy People website, with expanded information about diseases people can catch from pets, farm animals, and wildlife. Users can now search alphabetically by animal and learn which zoonotic diseases they may carry. It is a unique “one-stop shop” where people can learn simple actions to protect themselves – and their pets.

The redesigned website offers:

- An alphabetized list and description of diseases that can spread from animals to humans.
- A list of animal species with the description of diseases associated with the animal.
- Specific groups of people that may be more susceptible to diseases from animals.
- Tips for preventing illnesses acquired from pets and other animals.



- Detailed information about the health benefits of owning a pet.

Read more:

<http://www.cdc.gov/media/releases/2015/p1002-healthy-pets.html>

Revised OSHA Manual Addresses Building Design, Emergency Responder Safety



New content in OSHA's Fire Service Features of Buildings and Fire Protection Systems manual is intended to explain how firefighters and other emergency responders can resolve incidents sooner and more safely if a building design is tailored to meet their needs. The manual, which was originally published in 2006,

provides information about how fire personnel and emergency responders typically interact with building features and fire protection systems during fires and other emergencies. The revised manual includes new chapters on water supply and integrating design elements to protect fire personnel during a building's construction, occupancy, and demolition phases; new sections on energy conservation, emergency power, and room and floor numbering; and additional photos to help explain concepts.

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/Revised-OSHA-Manual-Addresses-Building-Design,-Emergency-Responder-Safety.aspx>

Construction Firms Urged to take 13 Steps to Improve Workplace Safety Amid Rise in Construction Fatalities

The Associated General Contractors of America (AGC) and Carolinas Associated General Contractors (CAGC) are urging commercial construction firms across the country to act on 13 specific steps to further improve workplace safety. Association officials said the new safety measures were needed to address a growing influx of new and inexperienced workers that is contributing to an increase



Army Industrial Hygiene News and Regulatory Summary

in the number of construction fatalities nationwide and in the Carolinas.

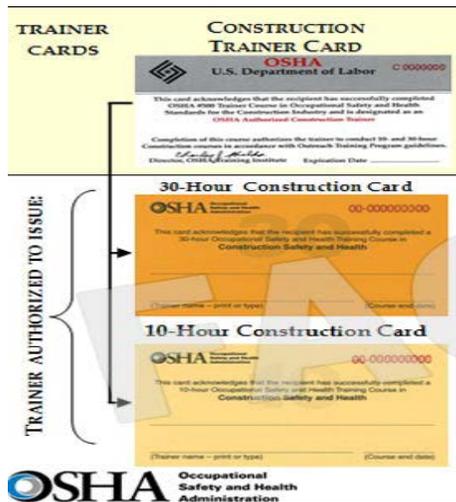
"As new, relatively inexperienced workers come on board, it is becoming increasingly clear that we need to do more as an industry to make sure these workers do not harm themselves or their co-workers," said Brian Turmail, the association's national spokesman. "Our goal with these new recommendations is simple, to make sure

every worker comes home safely to their families, every night."

Read more:

<http://www.prnewswire.com/news-releases/construction-firms-urged-to-take-13-steps-to-improve-workplace-safety-amid-rise-in-construction-fatalities-300165085.html>

NYC Cracking Down on Workers with Fake OSHA Cards to Stop Construction-Related Deaths



Workers are required to take safety courses run by the U.S. Occupational Safety & Health Administration (OSHA) to reduce accidents at job sites, but over the years there's been a growing problem with workers blowing off the courses and using fraudulent OSHA cards to claim they're trained.

Since the beginning of the year, more than 20 workers with allegedly bogus OSHA cards have been busted at city construction sites, sources familiar with the crackdown said.

With the number of construction-related deaths on the rise, city investigators are quietly showing up at job sites and arresting workers with fake safety training cards, the Daily News has learned.

Read more:

<http://www.nydailynews.com/new-york/exclusive-nyc-cracking-workers-fake-osh-cards-article-1.2410821>



Emergency Preparedness & Response

IOM Report Lists Priorities for Emerging ID Countermeasures

The Institute of Medicine (IOM) this week published a report on a 2-day medical countermeasure workshop it held in late March to discuss how to how better develop and deliver medical countermeasures (MCMs) for emerging infectious disease threats, based on challenges that flared up during West Africa's Ebola outbreak.

The workshop brought together three IOM forums: on preparedness for catastrophic events, drug discovery, and microbial threats. It also included participation from public health and private industry stakeholders. According to the 177-page



report, the group examined MCM responses to other recent threats, including pandemic flu and Middle East respiratory syndrome coronavirus (MERS-CoV).

Read more:

<http://www.cidrap.umn.edu/news-perspective/2015/10/news-scan-oct-15-2015>

HHS Launches Resources System to Improve Disaster Preparedness



Health and emergency preparedness professionals now have access to the nation's first and most comprehensive system of resources designed specifically to help communities better prepare for and manage the health impacts of disasters.

Sponsored by the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response (ASPR), the Technical Resources, Assistance Center, and Information Exchange (TRACIE) features resource materials, a help line, just-in-time suggestions and tools to share information gleaned from real-life experiences in preparing for, responding to and recovering from disasters.

Army Industrial Hygiene News and Regulatory Summary

Read more:

<http://www.hhs.gov/news/press/2015pres/>

[09/20150930a.html](http://www.hhs.gov/news/press/2015pres/09/20150930a.html)

Deployment Health

Carter Sounds Nearly Ready to Open Combat Jobs to Women

Defense Secretary Ash Carter sounded like he's nearly made up his mind about opening all combat jobs to women, as he told U.S. troops in Sicily on Tuesday that limiting his search for qualified military candidates to just half the population would be "crazy."

Meanwhile, in memo obtained by The Associated Press, Carter gave the chairman of the Joint Chiefs of Staff until the end of October to forward his review of the services' recommendations on which jobs -- if any -- should remain closed to women. The chairman, Gen. Joseph Dunford, was commandant of the Marine Corps until recently and was the only service chief to recommend that some front-line combat



jobs stay male-only, according to several U.S. officials.

Read more: <http://www.military.com/daily-news/2015/10/07/carter-sounds-nearly-ready-open-combat-jobs-women.html>

The Evolution of US Military Camouflage: from Basic Green and Khaki to Digital Patterns and Beyond



Last summer, the U.S. Army confirmed that soldiers will begin wearing the new Army Combat Uniform (ACU) that bears the Operational Camouflage Pattern (OCP) – also known as Scorpion W2. They are now being issued, and soldiers are expected to retire their prior uniforms by summer 2018.

Army Industrial Hygiene News and Regulatory Summary

This means it's the end of the line for the Universal Camouflage Pattern (UCP), which was known for its digital-like appearance. Camouflage has undergone numerous changes in the past decade, and the new OCP is just the latest effort by the U.S. military to develop the "perfect camouflage."

Read more:

<http://www.foxnews.com/tech/2015/10/21/evolution-us-military-camouflage-from-basic-green-and-khaki-to-digital-patterns-and-beyond.html>

Scarf-Like Mask Can Protect at a Moment's Notice

Army researchers have developed a simple, comfortable, wrap-style respiratory protective mask for protection against riot control agents, and the U.S. Army Edgewood Chemical Biological Center, also known as ECBC, is making it as simple as putting on a surgical mask.

ECBC researchers Dave Caretti, Dan Barker and Doug Wilke developed the idea for the solution from specialized operators, who expressed a need for a protective mask to protect against riot control agents such as 2-chlorobenzalmalononitrile, also known as CS, or tear gas.

The operators also wanted a mask that could protect users who have beards, or

must operate with other unique head-borne equipment.



Read more:

http://www.army.mil/article/157377/Scarf_like_mask_can_protect_at_a_moment_s_notice/

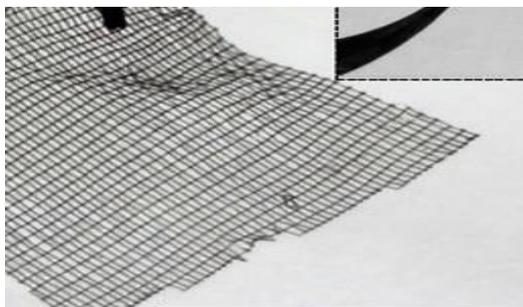
Nanotechnology

Graphene-Coated Fabric Makes for a Wearable Gas Sensor

One of graphene's key properties is its surface area—as a two-dimensional material it really is just all surface. This has

advantages in a number of applications, one of which is sensors.

Army Industrial Hygiene News and Regulatory Summary



Konkuk University in South Korea have found that if they coat fabrics with graphene, they can detect dangerous gases and alert the wearer of their presence by triggering an LED light.

Read more:

<http://spectrum.ieee.org/nanoclast/semiconductors/materials/graphenecoated-fabric-makes-for-a-wearable-gas-sensor>

Now researchers at the Electronics and Telecommunications Research Institute and

Regulatory Research & Industrial Hygiene Professional News

EPA

EPA Increases Protections against Pesticide Exposure

EPA finalized revisions to its agricultural worker protection standard that will bring health protections for agricultural workers in line with those already in place for workers in other industries. The new revisions strengthen existing regulations on training, pesticide safety and hazard communication information, and use of personal protective equipment. According to the agency, the regulation is intended to reduce the risks of injury and illness resulting from workers' exposure to pesticides on farms, forests, nurseries, and greenhouses.

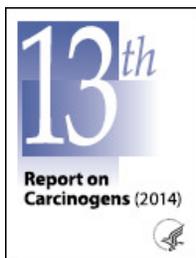


Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/EPA-Increases-Agricultural-Worker-Protections-against-Pesticide-Exposure.aspx>

NTP

NTP Requests Information on Substances Nominated for Inclusion in Report on Carcinogens



The National Toxicology Program (NTP) is requesting information on six substances that have been nominated for possible review for future editions of the Report on Carcinogens (RoC). NTP

plans to use this information to identify nominated substances to propose for formal evaluation for the RoC.

The nominated substances include flame retardants tetrabromobisphenol A and pentabromodiphenyl ether mixture; water

disinfection byproducts dibromoacetonitrile and di- and tri-haloacetic acids; fluoride; and vinylidene chloride. The list is available on NTP's website and in a notice in the Federal Register.

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/NTP-Requests-Information-on-Substances-Nominated-for-Inclusion-in-Report-on-Carcinogens.aspx>

OSHA

OSHA Chief Updates Congress on Challenges of Changing Structure of Work

On Oct. 7, Assistant Secretary of Labor David Michaels testified before the House Subcommittee on Workforce Protections, updating members of Congress on the agency's activities and describing recent challenges related to the changing structure of work. The OSHA chief discussed the dramatic increase in the number of temporary workers in nearly all types of workplaces, and detailed the challenges that arise with the changing structure of



employment relationships in cases where

Army Industrial Hygiene News and Regulatory Summary

multiple employers have a role in preventing workplace injury and illness.

[Pages/OSHA-Chief-Updates-Congress-on-Challenges-of-Changing-Structure-of-Work.aspx](#)

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/>

NIOSH

NIOSH Launches Virtual Center to Promote Lifelong Worker Well-Being



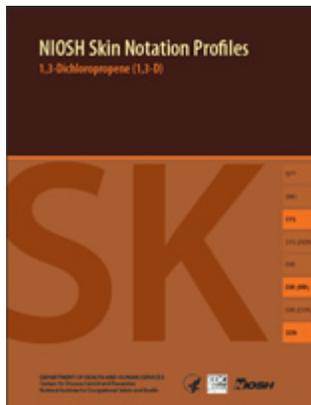
NIOSH's new National Center for Productive Aging and Work (NCPAW) will focus on the safety of workers of all ages, lifetime well-being, and "productive aging," an approach that seeks to provide a healthy and safe work environment for everyone using strategies that allow workers to function

optimally at all ages. The virtual center, which launched yesterday, will also help NIOSH facilitate collaborations with other federal agencies, academic institutions, and stakeholders; develop new interventions; and highlight best practices for creating "aging-friendly" workplaces. NCPAW is hosted by NIOSH's Office for Total Worker Health, which aims to improve integrated workplace practices and advance worker safety, health, and well-being.

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/NIOSH-Launches-Virtual-Center-to-Promote-Lifelong-Worker-Well-being.aspx>

NIOSH Releases New Skin Notation Profiles for Ten Chemicals, Including Nicotine, Chlordane



NIOSH published new skin notation profiles for ten chemicals. NIOSH's skin notation profiles provide information supplemental to chemicals' skin notations,

including summaries of all relevant data used to help determine the hazards associated with skin exposures. Each skin notation profile includes a brief summary of epidemiological and toxicological data associated with skin contact with a chemical and the rationale behind the chemical's hazard-specific skin notation assignment.

Skin notation profiles are now available for the following chemicals:

- phosdrin
- tetraethyl dithionopyrophosphate
- tetraethyl pyrophosphate
- chlordane and technical grade chlordane
- phorate
- methyl parathion
- parathion
- endrin
- nicotine
- azinphos-methyl

For more information on skin notations, visit the NIOSH website.

Read more:

<https://www.aiha.org/publications-and-resources/TheSynergist/Industry%20News/Pages/NIOSH-Releases-New-Skin-Notation-Profiles-for-Ten-Chemicals.aspx>

Army Industrial Hygiene News and Regulatory Summary

Training

APHC

Upcoming Training

-  **October 2015**
 - Oct 1-5 APG, MD DOEHRS-IH Initial Army Course
 - Phase 1 Intermediate Industrial Hygiene Course Ongoing at this time (web)
-  **February 2016**
 - February 22-26 APG, MD DOEHRS-IH Initial Army Course
 - February 29-March 4 APG, MD Industrial Ventilation Course
-  **March 2016**
 - March 7-11 APG, MD Industrial Hygiene Intermediate Course (Phase 2)
-  **May 2016**
 - May 16-20 APG, MD DOEHRS-IH Initial Army Course
-  **August 2016**
 - August 1-5 APG, MD DOEHRS-IH Initial Army Course
-  **October 2016**
 - October 24-28 APG, MD DOEHRS-IH Initial Army Course
-  **August 2016**
 - August 1-5 APG, MD DOEHRS-IH Initial Army Course
-  **TBD 2016**
 - Date/Location TBD Indoor Air Quality Course CP12 Sponsored
-  **February 2017**
 - TBD APG, MD Blueprint Reading & Design Review Course

Army Industrial Hygiene News and Regulatory Summary

This monthly summary is published by the Industrial Hygiene and Medical Safety Management Program (IHMSMP) for the U.S. Army Public Health Command.



Subscription or Comments:

By Email:

ihnews@amedd.army.mil

By Phone or FAX:

Office: (410) 436-3161

FAX: (410) 436-8795

On the Web:

<http://phc.amedd.army.mil/topics/workplacehealth/ih/Pages/default.aspx>



Transitioning to a New Format!

Please be patient while we transition to a new training format. In the past, the APHC Blackboard courses were dependent on Defense Connect Online recordings; however, DCO is no more, our existing material is being converted to a new format that automatically allows recordings to play within Blackboard. Continue to check the training website as we add course material daily. Some courses are already up and running. So visit <https://aiph-dohs.ellc.learn.army.mil> to check their availability.

Articles appearing in this summary are a collection of articles taken verbatim from public sources and do not necessarily represent the opinions/views, policy, or guidance of the Department of the Army, Department of Defense, or the U. S. Government.

The appearance of external hyperlinks does not constitute endorsement by the U.S. Army for the information, products or services contained therein. The U.S. Army does not exercise any editorial control over the information you may find at these locations.

The use of trademarked names does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.