July 2020
Issue 106

Army Industrial Hygiene News and Regulatory Summary

Hazardous Substances

Boron Nitride Destroys PFAS 'Forever' Chemicals PFOA, GenX

Special Interest Articles:

Rice University chemical engineers found an efficient catalyst for destroying PFAS "forever" chemicals where they least expected.

"It was the control," said Rice Professor Michael Wong, referring to the part of a scientific experiment where researchers don't expect surprises. The control group is the yardstick of experimental science, the baseline by which variables are measured. "We haven't yet tested this at a full scale, but in our benchtop tests in the lab, we could get rid of 99% of PFOA in four hours," Wong said of boron nitride, the light-activated catalyst he and his students stumbled upon and spent more than a year testing.

Their study, which is available online in the American Chemical Society Journal Environmental Science and Technology Letters, found boron nitride destroyed PFOA (perfluorooctanoic acid) at a faster clip than any previously reported photocatalyst. PFOA is one of the most prevalent PFAS (perfluoroalkyl and polyfluoroalkyl substances), a family of more than 4,000 compounds developed in the 20th century to make coatings for waterproof clothing, food packaging, nonstick pans and countless other uses. PFAS have been dubbed forever chemicals for their tendency to linger in the environment, and scientists have found them in the blood of virtually all Americans, including newborns.

Read more:
https://www.cdc.gov/niosh/enews/enewsv18n2.html#research-in

Contents:

The Application of Novel Field Measurement and Field Evaluation Protocols for Assessing Health Care Workers' Exposure Risk to Antineoplastic Drugs

Contamination of multiple antineoplastic drugs (ADs) on work surfaces presents an exposure concern for health care workers. Surface wipe sampling is a recognized method to evaluate the degree of contamination present. Our research team has previously reported on wipe sampling and analytical methods to simultaneously detect 10 commonly used ADs from a single wipe. Our objectives here were: to field test a protocol consisting of the wipe sampling method and an accompanying wipe sample collection tool kit and confirm this protocol can be effectively used by health care workers to assess drug contamination levels in their facilities; and, to confirm the potential for simultaneous exposure to multiple antineoplastic drugs. Three facilities within one health authority in British Columbia, Canada participated in this field study. In collaboration with the site health and safety advisors, up to 25 surfaces within each facility were considered for sampling. Collected wipe samples were analyzed using HPLC-MS/MS to quantify the 10 analyte, resulting in 750 potential analyses. Following the sampling, each of the three facilities' safety advisors provided feedback regarding the usability of the protocols. Among the 72 wipe samples actually collected (or 720 analyses conducted), detectable levels and simultaneous contamination of work surfaces of five of the 10 analytes were found at all three participating sites: 5-fluorouracil, cyclophosphamide, vincristine, paclitaxel, and methotrexate; (range < LoD to 33.0 ng/cm^2)

with 5-fluorouracil having the highest concentration in every instance. Drug contamination was found on a variety of different work surfaces in pharmacies and patient care areas among all three sites. Users of the sampling protocols were generally satisfied with the wipe sample collection toolkit with some minor suggestions for improvement. Our findings support the hypothesis that health care workers may be simultaneously at risk of exposure to several ADs. Our toolkit was found to be user-friendly and manageable by those who were not experienced in collecting wipe samples to monitor contamination of ADs on the work surfaces in their facilities.

Read more:
Journal of Occupational and Environmental Hygiene
Published online: 02 Jul 2020

Biomonitoring for Occupational Exposure to Diisocyanates: A Systematic Review

Diisocyanates are a group of chemicals that are widely used in occupational settings. They are known to induce various health effects, including skin- and respiratory tract sensitization resulting in allergic dermatitis and asthma. Exposure to diisocyanates has been studied in the past decades by using different types of biomonitoring markers and matrices. The aim of this review as part of the HBM4EU project was to assess: (i) which biomarkers and matrices have been used for biomonitoring diisocyanates and what are their strengths and limitations; (ii) what are (current) biomonitoring levels of the major diisocyanates (and metabolites) in workers; and (iii) to characterize potential research gaps. For this purpose we conducted a systematic literature search for the time period 2000–end 2018, thereby focussing on three types of diisocyanates

which account for the vast majority of the total isocyanate market volume: hexamethylene diisocyanate (HDI), toluene diisocyanate (TDI), and 4,4'-methylenediphenyl diisocyanate (MDI). A total of 28 publications were identified

which fulfilled the review inclusion criteria. The majority of these studies (93%) investigated the corresponding diamines in either urine or plasma, but adducts have also been investigated by several research groups. Studies on HDI were mostly in the motor vehicle repair industry [with urinary hexamethylene diamine result ranging from 0.03 to 146.5 µmol mol^{-1} creatinine]. For TDI, there is mostly data on foam production [results for urinary toluene diamine ranging from ~0.01 to 97 µmol mol^{-1} creatinine] whereas the available MDI data are mainly from the polyurethane industry (results for methylenediphenyl diamine range from 0.01 to 32.7 µmol mol^{-1} creatinine). About half of the studies published were prior to 2010 hence might not reflect current workplace exposure.

Read more:
https://academic.oup.com/annweh/article/64/6/569/5822987

Fentanyl and Carfentanil Permeation through Commercial Disposable Gloves

In 2018, the Centers for Disease Control and Prevention reported that opioid overdose deaths (including fentanyl and carfentanil) comprised 46,802 (69%) of the 67,367 total drug overdose deaths. The opioid overdose epidemic affects Americans not only at home but also in the workplace. First responders may be at risk of opioid exposure during incidents such as vehicle searches and responses to overdose calls. To reduce direct exposure to opioids and other hazardous drugs, first responders rely in part on personal protective equipment (PPE) as their last line of defense. First responders seek guidance from the National Institute for Occupational Safety and Health (NIOSH) regarding appropriate PPE selection for potential opioid exposure. There is limited empirical glove performance data for illicit drugs. Empirical data are needed to validate NIOSH's current recommendations regarding gloves to help prevent exposure to illicit drugs (i.e., powder-free nitrile gloves with a minimum thickness of 5 ± 2 mil [0.127 ± 0.051 millimeters]); however, no industry standard or test method currently exists for specifically evaluating PPE performance against fentanyl and its analogs. To understand the permeation qualities of gloves when challenged against fentanyl and carfentanil solutions, the ASTM International (formerly American Society for Testing and Materials) ASTM D6978-19 standard for chemotherapy drug glove

permeation was adapted to test fentanyl and carfentanil hydrochloride solution permeation through twelve disposable glove models, including five models in which the manufacturers claim fentanyl protection. No nitrile glove models showed fentanyl or carfentanil permeation rates above the chemotherapy drug threshold criterion of 0.01 µg/cm^2/min (i.e., thereby meeting the performance requirement) as calculated using the ASTM D6978-19 standard within the 240-min test. Latex and vinyl glove materials exhibited fentanyl and carfentanil permeation with permeation rates above this threshold. These findings are among the first empirical data to support NIOSH's current opioid glove recommendations and define procedures that could be used to support industry standards for evaluating opioid permeation through air-impermeable PPE materials

Read more: Journal of Occupational and Environmental Hygiene, Published online: 13 Jul 2020 (Available with AIHA membership)

The Prevalence of Cardiovascular Risk Factors in Different Occupational Groups in New Zealand

Objectives
Although cardiovascular disease (CVD) risk has been shown to differ between occupations, few studies have specifically evaluated the distribution of known CVD risk factors across occupational groups. This study assessed CVD risk factors in a range of occupational groups in New Zealand, stratified by sex and ethnicity.

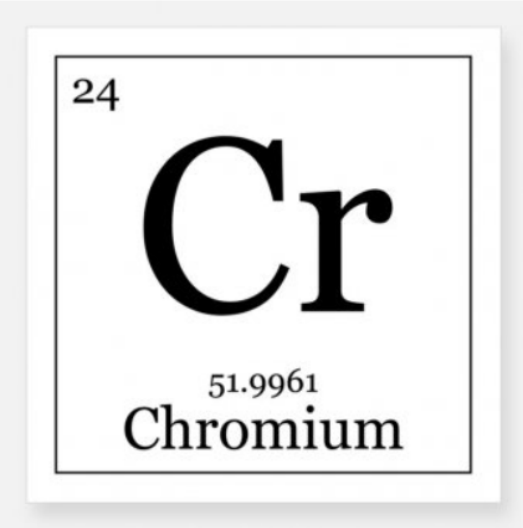
Methods
Two probability-based sample surveys of the general New Zealand adult population (2004–2006; *n* = 3003) and of the indigenous people of New Zealand (Māori; 2009–2010; *n* = 2107), for which occupational histories and lifestyle factors were collected, were linked with routinely collected health data. Smoking, body mass index, deprivation, diabetes, high blood pressure, and high cholesterol were dichotomized and compared between occupational groups using age-adjusted logistic regression.

Results
The prevalence of all known CVD risk factors was greater in the Māori survey than the general population survey, and in males compared with females. In general for men and women in both surveys 'Plant and machine operators and assemblers' and

'Elementary workers' were more likely to experience traditional CVD risk factors, while 'Professionals' were less likely to experience these risk factors. 'Clerks' were more likely to have high blood pressure and male 'Agricultural and fishery workers' in the general survey were less likely to have high cholesterol, but this was not observed in the Māori survey. Male Māori 'Trades workers' were less likely to have high cholesterol and were less obese, while for the general population survey, this was not observed.

Read more:
https://academic.oup.com/annweh/article-abstract/64/6/645/5823567?redirectedFrom=fulltext

Bioaccessibility of Nickel and Cobalt Released from Occupationally Relevant Alloy and Metal Powders at Simulated Human Exposure Scenarios



Nickel (Ni) and cobalt (Co) release from chromium-alloy powders (different stainless steels and a nickel-based Inconel alloy) compared with Ni and Co metal powders was investigated at simulated human exposure scenarios (ingestion, skin contact, and inhalation) between 2 and 168 h. All investigated powders consisted of particles sized within the respirable range. The powder particles and their surface reactivity were studied by means of nitrogen adsorption and electrochemical, spectroscopic (X-ray photoelectron spectroscopy and atomic absorption spectroscopy), light scattering, and microscopic techniques. The release of both Ni and Co was highest in the acidic and complexing fluids simulating the gastric environment and an inhalation scenario of small powders (artificial lysosomal fluid). Relatively high corrosion resistance and lower levels of released Ni and Co were observed in all fluids for all alloy powders compared with the corresponding pure metals. The extent of released metals was low for powders with a passive surface oxide. This study strongly emphasizes the importance of considering alloying effects in toxicological classification and/or regulation of Ni and Co in alloys and metals.

Read more:
https://academic.oup.com/annweh/article/64/6/659/5823825

Radiation

'Space Sunblock' Made From SKIN Pigment Could Shield Astronauts from Lethal Doses of Radiation While Traveling to Mars and Beyond

Scientists developed a protectant for astronauts against dangerous radiation by pulling inspiration from beach-goers – a 'space sunblock.'

By synthesizing a new form of melanin enriched with selenium, the team developed a biomaterial called selenomelanin that protects human tissues once applied.
During lab experiments, cells treated with the 'sunscreen' exhibited a normal cycle after being shot with a lethal dose of radiation.

https://www.dailymail.co.uk/sciencetech/article-8569813/Space-sunblock-SKIN-pigment-shield-astronauts-lethal-doses-radiation.html

Read more:

Ventilation

COVID-19 Study: School Ventilation Systems Could Play Role in Stopping Spread

As more schools across the U.S. push back reopening or opt for online learning amid the COVID-19 pandemic, a new simulation shows how the coronavirus could spread in the classroom and what you may be able to do to prevent it.

Researchers at the University of Minnesota, who are studying the spread of the

coronavirus, focused on the placement of ventilation units, desks and people.

They demonstrated two simulated classrooms. The first one had the teacher directly below the ventilation system. The second one showed the ventilation system in the back of the room.

The scenario assumes the teacher is an asymptomatic carrier of COVID-19.

As the simulation begins, the particles move around the classroom, the virus spreads significantly less in the classroom where the teacher is directly below the vent. Red areas indicated hot zones where the virus could be collected. In the simulation, the classroom where the teacher and vent were on opposite sides appeared all red.

Read more: https://abc13.com/ventilation-covid-spread-covid-19-study/6342910/

PPE

Combat Stress Techniques Help Military Providers during COVID Pandemic

Among the images from the heroic response to the coronavirus pandemic are the faces of medical professionals bruised by personal protective equipment worn during long hospital shifts. Anyone in the military who has done field training exercises in protective gear knows that equipment can be uncomfortable and in some cases, cause panic attacks and other claustrophobic symptoms. These symptoms can lead to noncompliance with guidelines for wearing personal protective equipment, or could result in a member of the medical team being temporarily unable to provide medical services to those in need.

Researchers at the Walter Reed Army Institute of Research developed a six-step, peer-based intervention to treat panic attacks or severe claustrophobic symptoms

in warfighters wearing protective gear. This protocol, called iCover, helps medical providers on the front lines of the COVID-19 pandemic

Read more:
https://japan.stripes.com/community-news/combat-stress-techniques-help-military-providers-during-covid-pandemic

Noise

A Quantitative General Population Job Exposure Matrix for Occupational Noise Exposure

Occupational noise exposure is a known risk factor for hearing loss and also adverse cardiovascular effects have been suggested. A job exposure matrix (JEM) would enable studies of noise and health on a large scale. The objective of this study was to create a quantitative JEM for occupational noise exposure assessment of the general working population. Between 2001–2003 and 2009–2010, we recruited workers from companies within the 10 industries with the highest reporting of noise-induced hearing loss according to the Danish Working Environment Authority and in addition workers of financial services and children day care to optimize the range in exposure levels. We obtained 1343 personal occupational noise dosimeter measurements among 1140 workers representing 100 different jobs according to the Danish version of the International Standard Classification of Occupations 1988 (DISCO 88). Four experts used 35 of these jobs as benchmarks and rated noise levels for the remaining 337 jobs within DISCO 88. To estimate noise levels for all 372 jobs, we included expert ratings together with sex, age, occupational class, and calendar year as fixed effects, while job and worker were included as random effects in a linear mixed regression model.

Read more:
https://academic.oup.com/annweh/article-abstract/64/6/604/5822986?redirectedFrom=fulltext

Preventive Medicine

Medical Expenditures Attributed to Asthma and Chronic Obstructive Pulmonary Disease among Workers

Summary

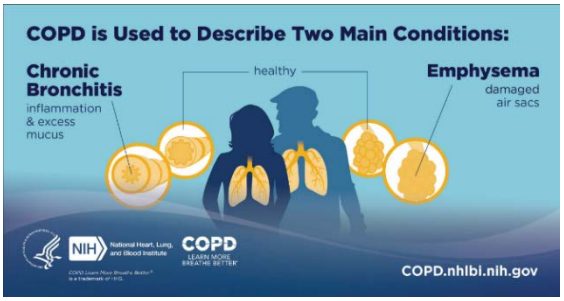
What is already known about this topic?

Asthma and chronic obstructive pulmonary disease (COPD) are associated with substantial economic and health costs among U.S. workers.

What is added by this report?

During 2011–2015, total annualized medical expenditures among U.S. workers were $7 billion ($901 per person) for asthma and $5 billion ($681 per person) for COPD. Inpatient visits were associated with the highest average per-person expenditures for both conditions. Insured workers incurred higher expenditures than did uninsured workers.

What are the implications for public health practice?



Early identification and reduction of risk factors, including workplace exposures (e.g., vapors, gas, dusts, and fumes), and implementation of proven interventions are needed to reduce the adverse health and economic impacts of asthma and COPD among workers.

Read more:
https://www.cdc.gov/mmwr/volumes/69/wr/mm6926a1.htm?s_cid=mm6926a1_e&deliveryName=USCDC_921-DM32204

Coronavirus Can Stay Active on Animal Skin for Four Days, Meatpacking Plants Could Facilitate Virus Spread: US Army Study

A study conducted by researchers at the biggest US military bioweapons laboratory has said that the coronavirus can live on animal skin for four days.

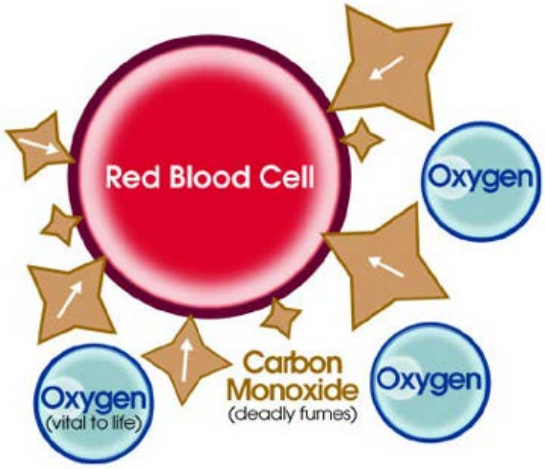
The researchers with the United States Army Medical Research Institute of Infectious Diseases have expressed

concerns regarding the spread of the coronavirus. They have said that meat plants could help the spread of the virus. The team led by David Harbourt, who comes from the base's biosafety division said, "Without an extensive testing and contract tracing programme, transmission around meatpacking plants will likely continue to be an issue."

Read more:
https://swarajyamag.com/insta/coronavirus-could-live-for-four-days-on-animal-skin-meat-plants-could-help-the-virus-spread-us-military-study

Neurobiology -- How Much Oxygen Does the Brain Need?

The brain has a high energy demand and reacts very sensitively to oxygen deficiency. Ludwig-Maximilians-Universitaet (LMU) in Munich neurobiologists have now succeeded for the first time in directly correlating oxygen consumption with the activity of certain nerve cells.
The brain requires a disproportionate amount of energy compared to its body mass. This energy is mainly generated by aerobic metabolic processes that consume considerable amounts of oxygen. Therefore, the oxygen concentrations in the brain are an important parameter that influences the function of nerve cells and glial cells. However, how much oxygen is consumed in the brain and how this is related to neuronal activity was so far largely unknown. LMU neurobiologists Hans Straka, Suzan Özugur and Lars Kunz have now succeeded for the first time in directly measuring this in the intact brain and



correlating it with nerve cell activity. The scientists report on their results in the journal *BMC Biology*.

Read more:
https://www.eurekalert.org/pub_releases/2020-07/lm-n-h070620.php

Relative Contributions of Transmission Routes for COVID-19 among Healthcare Personnel Providing Patient Care

The routes of COVID-19 transmission to healthcare personnel from infected patients is the subject of debate, but is critical to the selection of personal protective equipment. The objective of this paper was to explore the contributions of three transmission routes—contact, droplet, and inhalation—to the risk of occupationally acquired COVID-19 infection among healthcare personnel (HCP). The method was quantitative microbial risk assessment, and an exposure model, where possible model parameters were based on data specific to the SARS-CoV-2 virus when available. The key finding was that droplet and inhalation transmission routes predominate over the contact route, contributing 35%, 57%, and 8.2% of the probability of infection, on average, without use of personal protective equipment. On average, 80% of inhalation exposure occurs when HCP are near patients. The relative contribution of droplet and inhalation depends upon the emission of SARS-CoV-2 in respirable particles (<10 μm) through exhaled breath, and inhalation becomes predominant, on average, when emission exceeds five gene copies per min. The predicted concentration of SARS-CoV-2 in the air of the patient room is low (< 1 gene copy per m^3 on average), and likely below the limit of quantification for many air sampling methods. The findings demonstrate the value of respiratory protection for HCP, and that field sampling may not be sensitive enough to verify the contribution of SARS-CoV-2 inhalation to the risk of occupationally acquired COVID-19 infection among healthcare personnel. The emission and infectivity of SARS-CoV-2 in respiratory droplets of different sizes is a critical knowledge gap for understanding and controlling COVID-19 transmission.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 09 Jul 2020 (Available with AIHA membership)

Injections Are Two-and-A-Half Times Safer When Nurses Use Revamped Guidelines

The UK's National Health Service (NHS) is changing the way it writes its guidelines for giving injections in hospitals, following groundbreaking research from the University of Bath.

The Bath study, funded by the National Institute for Health Research (NIHR), found that hospital nurses make far fewer mistakes when administering medicines intravenously if they follow instructions written with nurses in mind. Researchers used a process called 'user testing', which identifies where mistakes are being made and introduces changes so the instructions are easier to use.

Current NHS guidelines on intravenous injections are written by pharmacists with little input from their primary audience - nurses. These instructions can be confusing or overly complicated, which contributes to 30-50% of intravenous doses being incorrect in some way.

Read more:
https://www.eurekalert.org/pub_releases/2020-07/uob-iat070220.php

Environmental Health

Pesticides Speed the Spread of Deadly Waterborne Pathogens

Widespread use of pesticides and other agrochemicals can speed the transmission of the debilitating disease schistosomiasis while also upsetting ecological balances in aquatic environments that prevent infections, finds a new study led by researchers at the University of California, Berkeley.

Schistosomiasis, also known as snail fever, is caused by parasitic worms that develop and multiply inside freshwater snails. It is transmitted through contact with contaminated water. The infection, which can trigger lifelong liver and kidney damage, affects hundreds of millions of people every year and, in terms of its global impact on human health, is second only to malaria among parasitic diseases.

The U.S. National Science Foundation-funded study, published in *Lancet Planetary Health*, found that agrochemicals can increase the transmission of the schistosome worm in myriad ways: by directly affecting the survival of the waterborne parasite itself; by decimating aquatic predators that feed on the snails that carry the parasite; and by altering the composition of algae in the water, which provides a major food source for snails.

Read more:
https://nsf.gov/discoveries/disc_summ.jsp?cntn_id=300933&org=NSF&from=news

New NRDC Report Argues that Climate Change is Negatively Affecting Workers' Health

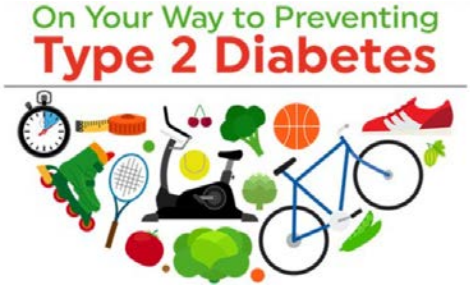
"Workers are often exposed to conditions that the general public can elect to avoid," said Max Kiefer, previous expert for the CDC-NIOSH.
Climate disruption has effects on humans' health and wellbeing, but workers in particular industries facing specific elements often fare worse than the average citizen. Because climate change and global warming has major effects on weather patterns, heat indices, the prevalence of toxic substances and a heightened risk of infectious diseases, a worsening of climate disruption means a worsening of worker health.

Indoor and outdoor workers—such as buildings and ground maintenance workers, transportation and materials-moving workers and farm workers, to name a few—

suffer direct and indirect effects from climate change.

Read more:
https://ohsonline.com/articles/2020/07/30/new-nrdc-report-argues-that-climate-change-is-negatively-affecting-workers-health.aspx?admgarea=ht.DisasterPreparedness

Bisphenol Exposure and Type 2 Diabetes: New Evidence for a Potential Risk Factor



The plasticizer bisphenol A (BPA), used in can linings, thermal paper, and polycarbonate plastics,[1,2] has been associated with a wide range of health outcomes, including type 2 diabetes.[3] Numerous experimental[4] and population-based[5,6] studies over the last decade have explored the BPA–diabetes relationship. Now a longitudinal study published in *Environmental Health Perspectives*, examining not just BPA but also its widely used substitute bisphenol S (BPS), adds to the evidence.[7] The study found positive associations between incidence of diabetes and exposure to both BPA and BPS, independent of traditional risk factors.

Read more:
https://ehp.niehs.nih.gov/doi/10.1289/EHP6637

60-Plus Days of Tear Gas Leaves Lingering Questions about Environmental Impacts

Public agencies are trying to answer a question on the minds of many, including a U.S. congressman and Oregon lawmakers: What will all that tear gas mean for trees, water and wildlife?

For much of the past 60 days, downtown Portland has been enveloped by clouds of tear gas used by federal and local police to disperse protesters and discourage people from gathering.

Recent public accounts describe a strong chemical odor lingering in Lownsdale Square hours after police release gas. Others have seen what appears to be tear gas residue sticking to the dirt and dust

when they've made daylight returns to the area. And they've experienced the return of itchiness in their eyes and scratchiness in their throats from the previous night's protests.

Read more:
https://www.opb.org/article/2020/07/31/tear-gas-environmental-impact-portland/

They Came from the Dust: Indoor Endocrine Disruptors and Thyroid-Hormone Binding

House dust can contain complex mixtures of endocrine-disrupting compounds (EDCs),[1,2]

which can interfere with the synthesis, transport, or actions of thyroid hormones, including thyroxine (T_4).[2,3] In a recent study published in *Environmental Health Perspectives*,[1] researchers assessed the ability of house dust contaminant mixtures to interfere with T_4 binding to transthyretin (TTR), a protein involved in transporting the hormone to target tissues. Extrapolating *in vitro* results to *in vivo* binding potencies, the researchers estimated a slight but potentially meaningful decrease in T_4 binding due to contaminant mixtures.

Read more: https://ehp.niehs.nih.gov/doi/10.1289/EHP7477

Ergonomics

Physical Work Demands of Childcare Workers in Denmark: Device-Based Measurements and Workplace Observations among 199 Childcare Workers from 16 Day Nurseries

Objectives
Childcare workers in Denmark have high prevalence of musculoskeletal pain (MSP) and sickness absence, but the existing knowledge of their physical work demands is limited, hampering preventive initiatives. This study aimed to assess the physical work demands with accelerometers and

workplace observations of childcare workers handling children age 0–3.

Methods
Data collection consisted of an electronic survey, anthropometric measurements, accelerometer measurements providing information of physical activity types and postures with Acti4 software from five consecutive workdays, as well as 4-h visual workplace observation per childcare worker from 16 Danish nurseries.

Results
In total, 199 childcare workers were enrolled in the study. A total of 4181 working hours of accelerometer measurements and 722 h of workplace observations were carried out. Accelerometer measurements showed that they spent about half of the working day (44.8%) in sedentary postures, and the rest standing (22.8%), moving (13.0%), walking (14.6%), running (0.1%), and climbing stairs (0.7%), with 4.1% in knee straining postures (kneeling and squatting) and 4.3% forward trunk inclination >60°. Workplace observations showed that they carried children 1.8% of the working hours.

Read more:
https://academic.oup.com/annweh/article/64/6/586/5850677

Safety

Study Finds Some Consumer Fireworks Emit High Levels of Lead and Other Toxins

While parents may warn their children to avoid getting too close to fireworks, they may not realize the other health risks of using these showpieces. A new study published in the journal Particle and Fibre Toxicology on Thursday, July 2, found some consumer fireworks release harmful contaminants for both humans and animals. After examining 12 retail fireworks, the study found five of them emitted particles damaging to human cells and animal lungs, as reported by Philadelphia Tribune.
New York University's Grossman School of Medicine Consumers professor and author of the study Terry Gordon said people tend

to forget about the toxins that are released when they set off fireworks.

Read more:
https://www.techtimes.com/articles/25082 1/20200703/study-finds-some-consumer-fireworks-emit-high-levels-of-lead-and-other-toxins.htm

As Coronavirus Cases Rise, the Federal Work Force Heads Back to the Office

Federal employees are being ushered back to office buildings under inconsistent and conflicting reopening plans, against the wishes of leaders in the nation's capital. As coronavirus cases surge around the country and epidemiologists urge caution, the federal government is heading back to work, jeopardizing pandemic progress in one of the few regions where confirmed infections continue to decline: the nation's capital.

At the Energy Department's headquarters, 20 percent of employees — as many as 600 — have been authorized to return on a full- or part-time basis. The Interior Department said in a statement last month that it anticipated about 1,000 workers to soon return daily to its main office near the White House.

Read more:
https://www.nytimes.com/2020/07/06/us/politics/coronavirus-federal-government.html?referringSource=articleShare

EPA Approves Lysol Products for Use against Coronavirus

Lysol is the first surface disinfectant approved by the Environmental Protection Agency to wipe out the coronavirus. Two versions of the common household disinfectant spray were lab tested by the agency, which found they could kill the virus on surfaces, the EPA announced. Lysol Disinfectant Spray, priced at $4.18 at Walmart, and Lysol Disinfectant Max Cover

Mist, priced at $5.48, can kill the virus in under 2 minutes, the agency found.

Read more:
https://www.usatoday.com/story/money/2020/07/08/lysol-first-epa-approved-household-cleaner-kill-coronavirus/5396489002/

Heart Rate Variability in Older Men on the Day Following Prolonged Work in the Heat

Susceptibility to heat illness during physically demanding work in hot environments is greater on the second of two consecutive workdays. While it has been demonstrated that heat storage is exacerbated on the second compared to first workday in older workers (50–65 yr), the effects on heart rate variability (HRV), an established surrogate of cardiac autonomic modulation, remain unclear. This study evaluated HRV in older workers on the day following prolonged work in the heat. Electrocardiogram was recorded in nine older (53–64 yr) males at rest, during three 30-min bouts of semi-recumbent cycling at fixed rates of metabolic heat production (150, 200, 250 W/m^2), each separated by 15-min recovery. Experiments were conducted in hot-dry conditions (40 °C, 20% relative humidity), immediately prior to (Day 1), and on the day following (Day 2), a prolonged work simulation (~7.5 hr) involving moderate intensity intermittent exercise in hot-dry conditions (38 °C, 34% relative humidity). Core temperature, as well as time, frequency, and nonlinear HRV indices were derived for analysis during rest, the final 5-min of exercise at the highest heat production and recovery. The change in core temperature at the end of work (mean ±SD) was

significantly greater on Day 2 (1.0 °C ±0.3) relative to Day 1 (0.8 °C ±0.2; $p < 0.01$). Heart rate, however, did not significantly differ between days 1 and 2 at rest (Day 1, 59 ±11 bpm; Day 2, 62 ±13 bpm), during exercise (Day 1, 113 ±21 bpm; Day 2, 114 ±18 bpm) and at the end of recovery (Day 1, 75 ±16 bpm; Day 2, 76 ±12 bpm). Likewise, there were no significant differences in any HRV indices derived from time, frequency, and nonlinear domains (all $p > 0.05$). Prolonged work in the heat did not modulate next-day heart rhythms, as reflected by HRV, despite augmented core temperature. While HRV can reflect physiological aspects of cardiac autonomic stressors, these findings indicate it does not provide a means to identify exacerbated heat strain in older workers over consecutive work shifts in the heat.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 10 Jul 2020

U.S. Department of Labor Issues Guidance to Ensure Uniform Enforcement of Silica Standards

The U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) recently issued a compliance directive designed to ensure uniformity in inspection and enforcement procedures when addressing respirable crystalline silica exposures in general industry, maritime, and construction. The new directive provides OSHA compliance safety and health officers with guidance on how to enforce the silica standards' requirements, including:

- Methods of compliance
- Table 1 tasks and specified exposure control methods;
- Exposure assessments;
- Housekeeping;
- Respiratory protection;
- Regulated areas;
- Recordkeeping;
- Employee information and training;
- Medical surveillance; and
- Communication of hazards.

Read more:
https://www.osha.gov/news/newsreleases/trade/06262020

Harmful Microbes Found on Sewer Pipe Walls

Can antibiotic-resistant bacteria escape from sewers into waterways and cause disease outbreaks?

To answer this question, scientists at Rutgers University built a simulated sewer to examine the microbe-laden biofilms that cling to sewer walls. The research was funded by the National Science Foundation.

The results are published in the journal *Environmental Science: Water Research & Technology*.

The researchers found that biofilms often contain antibiotic-resistant bacteria and can withstand standard treatment used to disinfect sewers. Cleaning with bleach can reduce the density of the biofilms but not entirely remove them, potentially leaving wastewater treatment workers and the public exposed to health risks.

Still, disinfecting a sewer line may be a good idea before sewer maintenance is done, especially following events such as a disease outbreak or bioterrorism incident that might expose sewer lines to high-risk microbes.

Read more:
https://nsf.gov/discoveries/disc_summ.jsp?cntn_id=300894&org=NSF&from=news

Emergency Preparedness

Flood Bot: Scientists Develop New Flood Warning Sensors

Ellicott City, Maryland, suffered devastating floods in 2016 and 2018. The disasters left residents and officials wondering how technology could help predict future severe weather, and save lives and property.
The University of Maryland, Baltimore County's Nirmalya Roy received funding from the National Science Foundation to develop a rapid flood warning system for Ellicott City. The research was scheduled to conclude in August, 2019, but Roy and his team are continuing the work with support from NSF.
The researchers obtained sensor systems from Howard County's Stormwater Management Division to deploy in Ellicott City. After installing the sensors in fall 2019, they moved on to the next phase -- testing their performance, to prepare for the possibility of another flood.
The scientists call the network Flood Bot.

Read more:
https://nsf.gov/discoveries/disc_summ.jsp?cntn_id=300878&org=NSF&from=news

Deployment Health

Air Force Wants a Wearable Performance Tracker to Prevent Neck and Back Pain

The Air Force revealed intentions to purchase a wrist-worn gadget that captures data about wearers' health—and provides individual and team analyses from that data—to address neck and back strains felt by fighter aircrew abroad.

Officials released a request for information Friday, inviting feedback on the department's plans to buy and deploy an "Aircrew Performance Tracker."

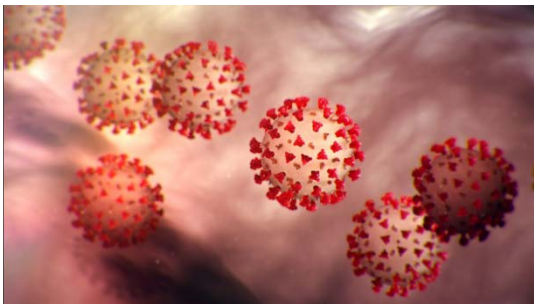
"The U.S. Air Force, 48th Fighter Wing, Royal Air Force Lakenheath, United Kingdom is looking to purchase a wearable device to track our aircrew's performance both in and out of the jet and make them more lethal," according to the statement of work that accompanies the RFI. "This device and its data needs to be tailorable to each aircrew and monitored by our squadron leadership as well as our squadron health care providers."

Read more:
https://www.nextgov.com/emerging-tech/2020/07/air-force-wants-wearable-performance-tracker-address-neck-and-back-pain/167038/

Nanotechnology

Nanotechnology-Based Disinfectants and Sensors for SARS-Cov-2

One thing we have learned so far amid the current coronavirus disease 2019 (COVID-19) pandemic is the degree to which we are limited in our fight against respiratory viral diseases. Up to now SARS-CoV-2 has spread to over 215 countries, with more than 15,000,000 people infected, and over 615,000 deaths to date (Johns Hopkins University Coronavirus Resource Center, 21 July 2020).



Our most important line of defence is our own immune system, however people who are immunocompromized, or people with at least one underlying co-morbidity (that is, cardiovascular diseases/hypertension and diabetes, and other chronic underlying conditions), are highly vulnerable and their sole line of defence is sanitizers, face masks, immune system boosters and drugs that are clinically approved[1].

Scientists around the world have made promising strides towards developing approaches to prevent COVID-19[2]. However, there are still challenges for the development of therapeutics or vaccines, such as regulatory issues, large-scale production and deployment to the public[3]. It will take months before we can have a global answer to this pandemic. Furthermore, we must be prepared for potential outbreak of a second and even a third wave of the virus, which calls for alternative options to reinforce our arsenal against not only COVID-19 but also other viral diseases that can potentially become pandemics. The silver lining amidst this crisis is the state of our technological advances mainly in the field of nanotechnology. So far, a significant body of work has covered the development of nano-based vaccines or anti-viral agents to block SARS-CoV-2, all of which are currently far from public implementation due to lengthy and strict regulatory affairs[4].

Read more:
https://www.nature.com/articles/s41565-020-0751-0

Regulatory Research & Industrial Hygiene Professional News

EPA

Addition of Bromopropane to Hazardous Air Pollutant List a Historical First for EPA

The EPA made history on June 18, 2020, when it granted a petition to add bromopropane to its list of hazardous air pollutants.

Chemicals, solvent testing"With this action, EPA is granting, for the first time, a request through the use of petition to add a

chemical substance to the hazardous air pollutant list under the Clean Air Act," said EPA Administrator Andrew Wheeler in a news release.

Bromopropane, also known as 1-BP or n-propyl bromide (nPB), is used in a wide array of processes and products, including agricultural and pharmaceutical products, dry cleaning, spray adhesive applications, and metal- and electronics-cleaning products. Oven-cleaning and degreaser products are a couple of the most common products utilizing 1-BP.

Read more:
https://ehsdailyadvisor.blr.com/2020/07/addition-of-bromopropane-to-hazardous-air-pollutant-list-a-historical-first-for-epa/

NIOSH

NIOSH Compiles Disinfectant Safety, Health Hazard Info Amid COVID-19

Health and flammability hazards and barrier recommendations for common active ingredients in disinfectants

Chemical (concentration) Other names*	CAS No.	GHS Pictogram(s)	Health and Flammability-related Hazard Statements	Recommended Glove Barriers *	Recommended Respiratory Protection**
Acetic acid † Ethanoic acid	64-19-7		• Flammable liquid and vapor. • Harmful in contact with skin or if inhaled. • May be harmful if swallowed. • Causes severe skin burns and eye damage. • May cause respiratory irritation. • Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled.	>8 hours: Butyl rubber	Follow manufacturer's recommendations in the product safety data sheet. NIOSH Pocket Guide to Chemical Hazards respirator guidance for acetic acid.

The National Institute for Occupational Safety and Health (NIOSH) recently collected safety and health information on cleaners and disinfectants that employers can use in their hazard communication programs. The NIOSH material includes a table of health hazards and protective measures for chemicals used as disinfectants.

When used according to manufacturers' instructions, cleaners and disinfectants can be effective control measures for infectious diseases, including Ebola and influenza. Guidelines issued by the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA) since the beginning of the coronavirus disease 2019 (COVID-19) pandemic have referred employers and building owners to the Environmental Protection Agency's (EPA) "List N" of Disinfectants for Use Against SARS-CoV-2 (COVID-19).

Read more:
https://ehsdailyadvisor.blr.com/2020/07/ni

osh-compiles-disinfectant-safety-health-hazard-info-amid-covid-19/

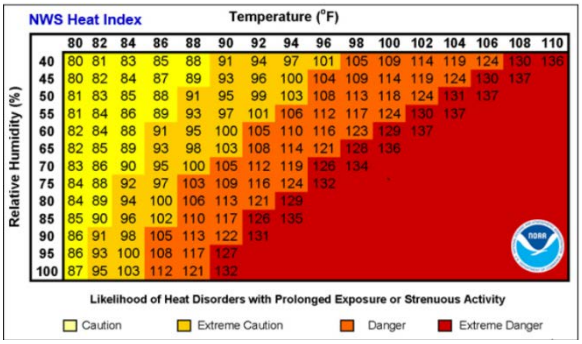
OSHA

Ruling: "No Scientific Basis" to Rely on NWS's Heat Index Chart in OSHA Heat Stress Cases

Most occupational safety and health professionals are familiar with the National Weather Service's (NWS) heat index chart. It's a well-known graphic that is often referenced when discussing heat-related illnesses at work.

In a ruling on July 15, 2020, an administrative law judge of the independent Occupational Safety and Health Review Commission (OSHRC) held that "OSHA failed to show that a document the agency used to prosecute employers in heat stress cases—the NWS heat index chart—has a scientific basis."

The ruling is expected to reverberate widely, as OSHA and its lawyers have many times used the chart as evidence that employers violated the General Duty Clause



of the OSH Act, according to a blog post from law firm Ogletree Deakins, part of the USPS legal team.

Read more: https://www.assp.org/news-and-articles/2020/07/22/ruling-no-scientific-basis-to-rely-on-nws-s-heat-index-chart-in-osha-heat-stress-cases

FDA

FDA Named 75 Hand Sanitizers Contaminated with Toxic Substance Methanol

The Food and Drug Administration (FDA) has named 75 hand sanitizers containing toxic substance methanol or wood alcohol on Friday, July 17.

According to The Independent report, the agency has listed 75 hand sanitizers that are contaminated with methanol, which can be toxic when absorbed through the skin or even deadly when swallowed.

The FDA said in a statement that it is aware of cases of adverse effects of hand sanitizer ingestion, which include hospitalizations, blindness, and even death on both children and adults.

Read more:
https://www.techtimes.com/articles/251255/20200720/fda-named-75-hand-sanitizers-contaminated-toxic-substance-methanol.htm

APHC

Training

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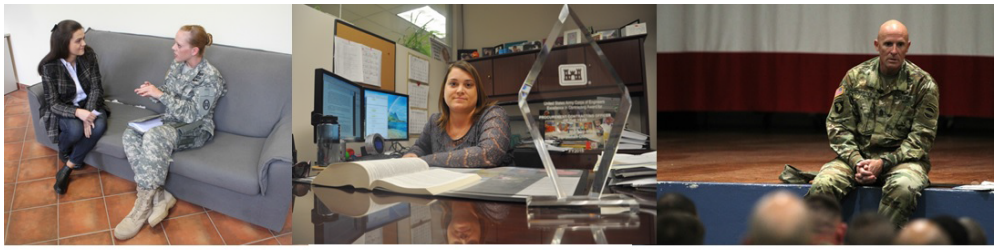

Professional Development and Career Programs

For Army Industrial Hygienists and Industrial Hygiene Technicians, Professional Development is through the Army Safety and Occupational Health (SOH) Career Program, known as Career Program 12 (CP-12).

Career Programs were established to ensure there is an adequate base of qualified and trained professional, technical, and administrative personnel to meet the Army`s current and future needs.

Planned training and development are essential elements to building a successful career.