September 2022

Issue 132

Army Industrial Hygiene News and Regulatory Summary

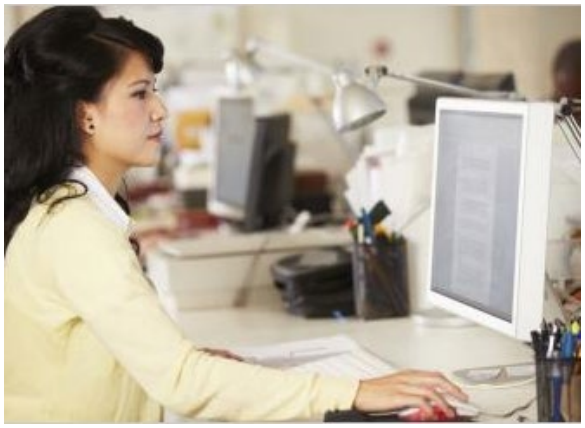
Hazardous Substances

People Generate Their Own Oxidation Field and Change the Indoor Air Chemistry around Them

Special Interest Articles:

People typically spend 90 percent of their lives inside, at home, at work, or in transport. Within these enclosed spaces, occupants are exposed to a multitude of chemicals from various sources, including outdoor pollutants penetrating indoors, gaseous emissions from building materials and furnishings, and products of our own activities such as cooking and cleaning. In addition, we are ourselves potent mobile emission sources of chemicals that enter the indoor air from our breath and skin.

But how do the chemicals disappear again? In the atmosphere outdoors, this happens to a certain extent naturally by itself, when it rains and through chemical oxidation. Hydroxyl (OH) radicals are largely responsible for this chemical cleaning. These very reactive molecules are also called the detergents of the atmosphere and they are primarily formed when UV light from the sun interacts with ozone and water vapor.



Indoors, on the other hand, the air is of course far less affected by direct sunlight and rain. Since UV rays are largely filtered out by glass windows it has been generally assumed that the concentration of OH radicals is substantially lower indoors than outdoors and that ozone, leaking in from outdoors, is the major oxidant of indoor airborne chemical pollutants.

Read more:
https://www.sciencedaily.com/releases/2022/09/220901151703.htm

Contents:

EPA Designates PFOS and PFOA as Hazardous Substances

On September 6, the United States Environmental Protection Agency (EPA) issued a notice of proposed rulemaking to designate perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).[1] PFOA and PFOS are long-chain per- and polyfluoroalkyl substances (PFAS) with numerous oil-resistant, grease-resistant and water-resistant applications. PFOS and PFOA were voluntarily phased out of production by chemical manufacturers in the United States in 2002 and 2015. But they are now at the center of the EPA's and the Biden administration's PFAS regulatory efforts. PFOA and PFOS have been the subject of new health advisory levels (HALs) and proposed maximum contaminant limits (MCLs) under the Safe Drinking Water Act, proposed regulation as hazardous wastes under the Resource Conservation and Recovery Act (RCRA), and potential designation as hazardous air pollutants under the Clean Air Act.

Read more:
https://www.jdsupra.com/legalnews/epa-designates-pfos-and-pfoa-as-4662925/

Firefighters and Supporters Are Pushing Hard For PFAS-Free Turnout Gear

Firefighting is an occupation that comes with inherent risks. In addition to the physical demands, there are also health risks associated with the job. For instance, the rate at which firefighters develop cancer outpaces the general population by 9 percent, and their risk of dying from cancer is 14 percent higher, according to a study published by the National Institute for Occupational Safety and Health (NIOSH).

It turns out, though, that some of the equipment used to keep firefighters safe also puts them at risk. Firefighters rely on turnout gear and other personal protective

equipment, such as a breathing apparatus, to keep them safe when battling flames, high temperatures, smoke and other elements associated with firefighting.

Read more:
https://www.northcarolinahealthnews.org/2022/09/13/firefighters-are-pushing-for-pfas-free-turnout-gear/

A Method to Assess Dermal Absorption Dynamics of Chemical Warfare Agents: Finite Doses of Volatile Compounds

Chemical warfare agents are absorbed into the body from various entry routes and may have detrimental effects on human health. As many chemical compounds in this group are lipophilic, the outer layer of the skin is at an elevated risk. This contribution explores the dynamics of skin penetration for risk assessment. A previously validated model was applied to describe how an agent is transported across the stratum corneum following dermal exposure to a finite dose of a chemical. A mathematical construct was implemented for estimating the time constants and the cumulative amount of permeant entering the bloodstream or being released into the environment. Empirical equations were selected to determine the ratio of the steady-state evaporation rate to the steady-state dermal absorption rate and the physicochemical properties of the chemical warfare agents. Wolfram Mathematica was employed to run the simulations. The results from the newly derived expressions for the time constants matched those

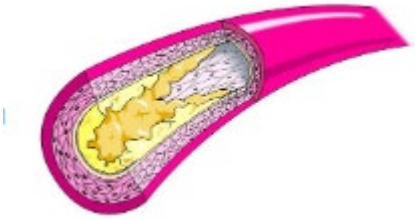
directly obtained from the validated model. For example, sarin gas had steady-state evaporation to an absorption rate of 991.25, and a total fractional absorption and evaporation of 5.1% and 94.9%, respectively. Combined with occupational exposure limits, the findings can help researchers assess an individual's risk level and develop protection programs.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 06 Sep 2022 (Available with an AIHA membership)

Elevated Cholesterol Found in GenX Exposure Study Participants

Elevated levels of per- and polyfluoroalkyl substances (PFAS) were associated with higher total cholesterol and non-HDL cholesterol in GenX Exposure Study participants' blood. The legacy PFAS chemicals PFOS and PFNA were most strongly associated with elevated cholesterol compared to the other chemicals, and the effects were more pronounced in older people.

In a new paper detailing findings from North Carolina State University's GenX Exposure Study, researchers found that elevated levels of per- and polyfluoroalkyl substances (PFAS) were associated with higher total cholesterol and non-HDL



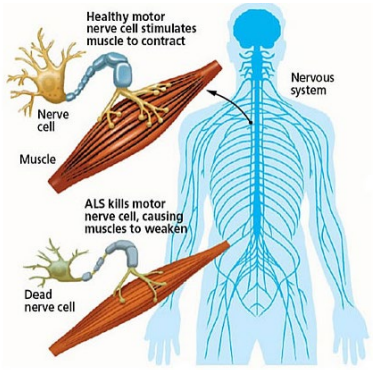
cholesterol in participants' blood. They also found that the legacy PFAS chemicals PFOS and PFNA were most strongly associated with elevated cholesterol compared to the other chemicals, and that the effects were more pronounced in older people.

Read more:
https://www.sciencedaily.com/releases/2022/09/220907133218.htm

Occupational Exposures Tied to ALS Risk

Occupational exposures may increase the risk for amyotrophic lateral sclerosis (ALS), according to a study recently published in the International Archives of Occupational and Environmental Health.

Stephen A. Goutman, M.D., from University of Michigan in Ann Arbor, and colleagues identified occupational exposures that are associated with a higher risk for ALS using both survey and standard occupational classification coding procedures. The analysis included 381 ALS and 272 control participants.

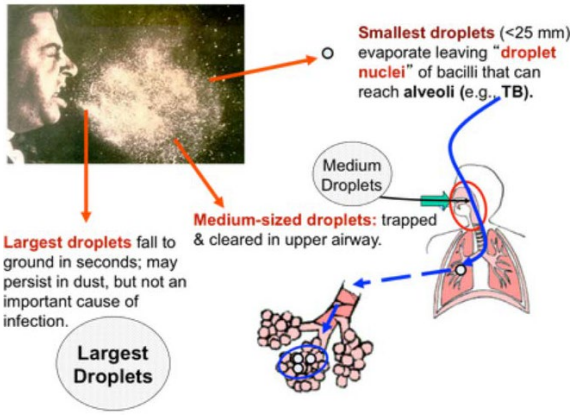


The researchers found that ALS participants reported higher duration-adjusted occupational exposure to particulate matter (odds ratio [OR], 1.45), volatile organic compounds (OR, 1.22), metals (OR, 1.48), and combustion and diesel exhaust pollutants (OR, 1.20) prior to ALS diagnosis, when adjusting for sex, age, and military service. Only occupational exposure to metals remained a significant risk (OR, 1.56) in multivariable models, although in an adaptive elastic net model, particulate matter (OR, 1.203), pesticides (OR, 1.015), and metals (OR, 1.334) were all selected as risk factors.

Read more:
https://consumer.healthday.com/occupational-exposures-tied-to-als-risk-2658315093.html

Generation, Characterization and Comparison of Human Exhaled and Technical Aerosols for the Evaluation of Different Air Purifying Technologies against Infectious Aerosols

In light of the COVID-19 pandemic, the importance of protective measures against infectious aerosols has drastically increased, as the transmission of diseases via airborne particles is impacting many aspects of everyday life. The protective measures against such infections is determinant in the operation of schools and kindergartens, hygiene in hospitals and medical facilities, in offices, administrative and production facilities, hotels and the event industry, amongst others. To test these protective measures, suitable test aerosols and processes are needed. These aerosols ought to be similar to aerosols exhaled by humans as those carry the pathogens and thus need to be removed from the air or inactivated.



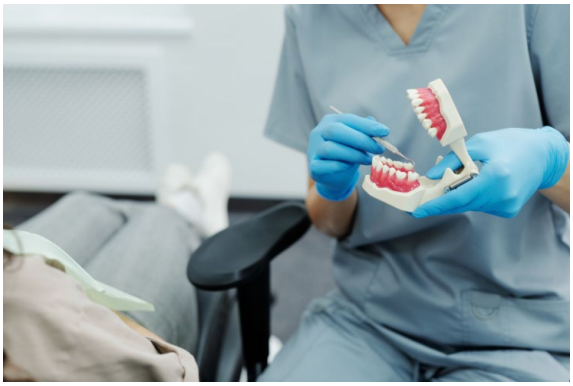
The exhaled aerosols of several healthy test subjects were characterized regarding their particle concentration and size distribution. In accordance with previous studies, it was found that exhaled particle concentration varies significantly from subject to subject and most of the particles can be found in

the submicron size range. Aerosols technically generated through nebulization were emitted by the generators in particle concentrations several orders of magnitude higher than those exhaled by humans, independent of aerosol generation method and nebulized fluid. The particle size distribution generated by the two nebulizers used however, was quite similar to the measured size distributions of the human aerosols, with most of the particles below 1 µm in size. Consequently, the used aerosol generators are not suitable to mimic single individuals as active aerosol sources, but rather to provide a sufficient amount of aerosol similar to human aerosols in size distribution, which can be used in the testing of air purification technologies.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 19 Sep 2022 (Available with an AIHA membership)

Radiation

ADASRI Examines Use of Cement in Detecting Radiation Exposure



Radiation exposure could become easier to detect, thanks to research by the American Dental Association Science & Research Institute.

Researchers from the ADASRI and National Institute of Standards and Technology studied the magnetic properties of a cement resembling the primary component of teeth, finding it could be used to measure radiation absorption.

The study, "Electron Paramagnetic Resonance Characterization of Sodium- and Carbonate-Containing Hydroxyapatite Cement," was published in August by Inorganic Chemistry, a journal of the American Chemical Society.

Using a method developed by ADA scientists Laurence Chow, Ph.D., and Shozo Takagi, Ph.D., in the 1980s, the researchers synthesized carbonated hydroxyapatite cement, which has a microstructure and composition similar to biological hydroxyapatite — the main component of calcified tissues, such as tooth enamel and bones. The cement previously received U.S. Food and Drug Administration approval as the first commercially available material to treat craniofacial defects and bone fractures.

Read more: https://www.ada.org/publications/ada-news/2022/september/adasri-examines-use-of-cement-in-detecting-radiation-exposure

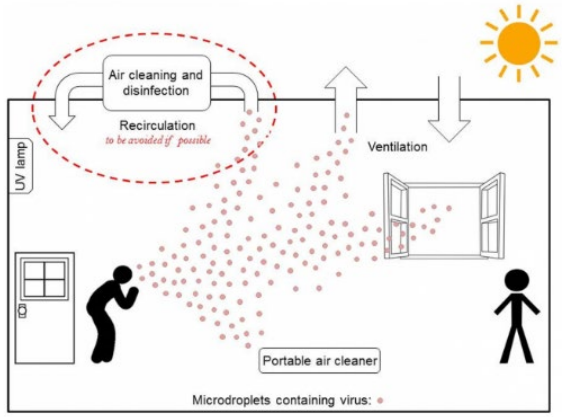
Ventilation

What Is the Association between Air Ventilation and Pathogen Transmission?

In a recent study posted to the medRxiv* preprint server, researchers assessed the association between indoor air respiratory pathogens and natural ventilation, carbon dioxide (CO2) levels, and air filtration. Currently, little is known about the effects of indoor climate, human activity, ventilation, and air filtration on the detection and concentration of respiratory pathogens. The capacity to quantify bioaerosols in indoor air to monitor respiratory infections and transmission risk is hampered by this lack of knowledge and hence requires extensive research.

About the study
In the present study, researchers pinpoint the host, pathogen, behavioral, and environmental variables that are associated with a higher respiratory pathogen bioaerosol burden in indoor ambient air.

Between October 2021 and April 2022, the team collected 341 ambient air samples at 21 sampling locations. By treating the quantitative polymerase chain reaction

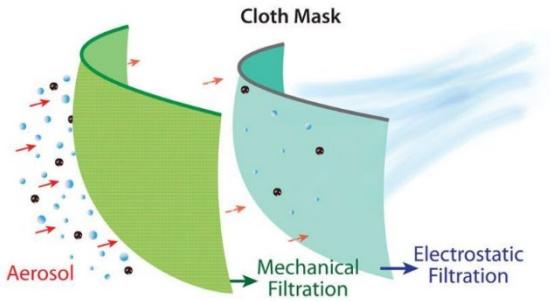


(qPCR) results of each pathogen in a sample as a single observation, the team examined the independent impacts of a variety of variables on airborne pathogen detection and concentration. The generated models had within-sample correlation adjustments and included pathogen type as a covariate.

Read more: https://www.news-medical.net/news/20220927/What-is-the-association-between-air-ventilation-and-pathogen-transmission.aspx

PPE

Comparison of Measurement Systems for Assessing Number- and Mass-Based Particle Filtration Efficiency



Schematic showing filtration of aerosol particles using a combination of mechanical and electrostatic filtration from a combination of fabrics.

The particle filtration efficiency (PFE) of a respirator or face mask is one of its key properties. While the physics of particle filtration results in the PFE being size-dependent, measurement standards are specified using a single, integrated PFE, for simplicity. This integrated PFE is commonly defined concerning either the number (NPFE) or mass (MPFE) distribution of particles as a function of size. This relationship is non-trivial; it is influenced by both the shape of the particle distribution and the fact that multiple practical definitions of particle size are used. This manuscript discusses the relationship between NPFE and MPFE in detail, providing a guide to practitioners. Our discussion begins with a description of the theory underlying different variants of PFE.

We then present experimental results for a database of size-resolved PFE (SPFE) measurements for several thousand candidate respirators and filter media, including filter media with systematically varied properties and commercial samples that span 20%–99.8% MPFE. The observed relationships between NPFE and MPFE are discussed in terms of the most-penetrating particle size (MPPS) and charge state of the media. For the sodium chloride particles used here, we observed that the MPFE was greater than NPFE for charged materials and vice versa for uncharged materials. This relationship is observed because a shift from NPFE to MPFE weights the distribution toward larger sizes, while charged materials shift the MPPS to smaller sizes. Results are validated by comparing the output of a pair of automated filter testers, which are used in gauging standards compliance, to that of MPFE computed from a system capable of measuring SPFE over the 20 nm–500 nm range.

Read more: Journal of Occupational and Environmental Hygiene, Accepted author version posted online: 06 Sep 2022 (Available with an AIHA membership)

Facemask Can Detect Viral Exposure from a 10-Minute Conversation with an Infected Person

Scientists have created a face mask that can detect common respiratory viruses, including influenza and the coronavirus, in the air in droplets or aerosols. The highly sensitive mask, presented September 19 in the journal Matter, can alert the wearers via their mobile devices within 10 minutes if targeted pathogens are present in the surrounding air.

"Previous research has shown face mask wearing can reduce the risk of spreading and contracting the disease. So, we wanted to create a mask that can detect the presence of virus in the air and alert the wearer," says Yin Fang, the study's corresponding author and a material scientist at Shanghai Tongji University.

Read more: https://medicalxpress.com/news/2022-09-facemask-viral-exposure-minute-conversation.html

Noise

The Difference between White Noise, Pink Noise, and Brown Noise—and Which May Boost Your Memory While You Sleep

The low hum of an air conditioner, the din of falling rain, the whoosh of a fan—you might consider any of these sounds, colloquially, to be white noise, or a consistent and continuous sound that could help you drift off to sleep. But, while any of these sounds could certainly offer that mind-numbing benefit, they're not all necessarily classified as "white" noise, technically speaking. In fact, many of the most soothing tones fall into other sound-color categories of pink or brown noise, as

opposed to white noise (and its typical radio-static hiss).

To be scientific, the difference between white, pink, and brown noise has to do with the power or intensity of sound waves across different frequencies. You can envision white noise as a sound where the intensity of all the different waves across the spectrum of audible sound is equal: one constant "shh" sound that gets its sleepiness-inducing power from its sheer evenness. Though pink and brown noise similarly contain all the waves of audible sound—also the reason why these colorful noises are collectively called "broadband" sound—the energetic power of their different frequencies diminishes with each higher octave, by three decibels for pink noise and six for brown.

Read more:
https://www.wellandgood.com/white-pink-brown-noise/

Preventive Medicine

Twice-Daily Nasal Irrigation Reduces COVID-Related Illness, Death

Starting twice daily flushing of the mucus-lined nasal cavity with a mild saline solution soon after testing positive for COVID-19 can significantly reduce hospitalization and death, investigators report.

They say the technique that can be used at home by mixing a half teaspoon each of salt and baking soda in a cup of boiled or distilled water then putting it into a sinus rinse bottle is a safe, effective and inexpensive way to reduce the risk of severe illness and death from coronavirus infection that could have a vital public health impact.

Read more:
https://www.eurekalert.org/news-releases/964449

Researchers Develop Virus-Killing Degradable Plastic

Researchers at Queen's University Belfast in Northern Ireland have developed a ground-breaking plastic film that can kill viruses that land on its surface with room light.

The self-sterilizing film is the first of its kind – it is low cost to produce, can be readily scaled and could be used for disposable aprons, tablecloths, and curtains in hospitals.

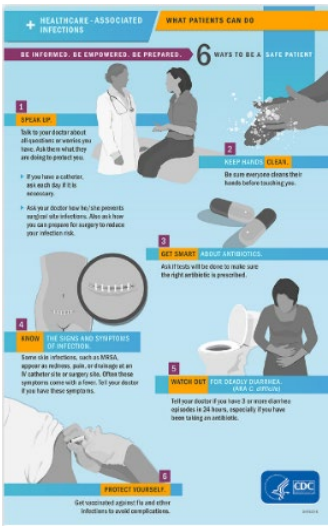
It is coated with a thin layer of particles that absorb UV light and produce reactive oxygen species – ROS. These kill viruses, including SARS2 (COVID-19).

The technology used to create the film also ensures it is degradable – unlike the current disposable plastic films it would replace,

which is much more environmentally friendly.

Read more:
https://www.hstoday.us/industry/emerging-innovation/researchers-develop-virus-killing-degradable-plastic/

Environmental Sampling for Infection Control at Health Care Facilities



Nosocomial infections are infections that are acquired while at a health care facility and are not present at the time of admission. Nosocomial infections are many times also called hospital acquired infections (HAI).

The Centers for Disease Control and Prevention (CDC) estimates that one in 31 hospital patients and one in 43 nursing home residents has an HAI on any given day. This translates to approximately 2,000,000 HAIs per year in the U.S. The latest CDC estimate for overall direct costs related to HAIs was $35.7 billion to $45 billion.

Read more:
https://ohsonline.com/Articles/2022/09/01

/Environmental-Sampling-for-Infection-Control.aspx?admgarea=ht.IndustrialHygiene&Page=1

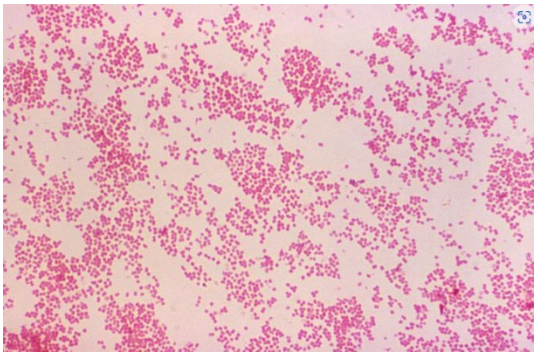
Study Finds Damage in the Lungs of Chronic E-Cigarette Users

Chronic use of e-cigarettes, commonly known as vaping, can result in progressive small airway obstruction and asthma-like symptoms such as shortness of breath and chest pains, according to researchers at Massachusetts General Hospital (MGH). In the first study to microscopically evaluate the pulmonary tissue of e-cigarette users for chronic disease, the team found in a small sample of patients fibrosis and damage in the small airways, similar to the chemical inhalation damage to the lungs typically seen in soldiers returning from overseas conflicts who had inhaled mustard or similar types of noxious gases. The study

was published in New England Journal of Medicine Evidence.

Read more:
https://medicalxpress.com/news/2022-09-lungs-chronic-e-cigarette-users.html

Scientists Thought a Bacteria Was Harmless – They Were Wrong



A team of international scientists has discovered that Neisseria — a genus of bacteria that lives in the human body – is not as harmless as previously thought. In fact, it can cause infections in patients with bronchiectasis, asthma, and chronic obstructive pulmonary disease (COPD). In a landmark study, published on September 14, 2022, in Cell Host & Microbe, the team showed conclusive evidence that Neisseria species can cause disease in the lung and are linked to worsening bronchiectasis (a type of lung disease) in patients. The scientists were led by the Nanyang Technological University, Singapore (NTU Singapore).

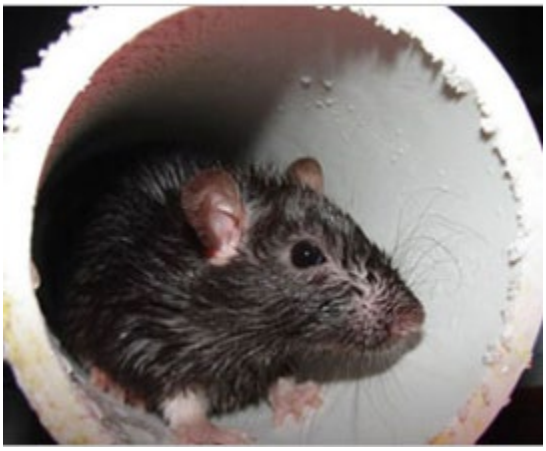
Bronchiectasis is a long-term condition where the airways of the lungs become abnormally enlarged for unknown reasons

in up to 50 percent of Singaporean patients. The disease is up to four times more prevalent among Asians as compared to their Western counterparts and can also occur following recovery from tuberculosis.[1] In Singapore, research at Tan Tock Seng Hospital described 420 incident hospitalized bronchiectasis patients in 2017.[2] The incidence rate is 10.6 per 100,000 and increases strongly with age.

Read more:
https://scitechdaily.com/scientists-thought-a-bacteria-was-harmless-they-were-wrong/

Rodents Are Reservoirs for Life-Threatening Disease, Finds New Study

Fungal diseases in the human population are on the rise, so it is important for health authorities to understand where these pathogens come from. A new study has searched for fungi in the lung tissues of small mammals and found fungal pathogens that cause diseases in humans. This suggests that these rodents can serve as reservoirs, agents of dispersal, and incubators of emerging fungal pathogens.



Fungal diseases in the human population are on the rise, so it is important for health authorities to understand where these pathogens come from. A new study, published in Frontiers in Fungal Biology, has revealed that small mammals could act as a reservoir for these fungal infections.

Read more:
https://www.newswise.com/articles/rodents-are-reservoirs-for-life-threatening-disease-finds-new-study

Environmental Health

Scientists Discover How Air Pollution Triggers Lung Cancer

Scientists said Saturday they had identified the mechanism through which air pollution triggers lung cancer in non-smokers, a discovery one expert hailed as "an important step for science—and for society".

The research illustrated the health risk posed by the tiny particles produced by burning fossil fuels, sparking fresh calls for more urgent action to combat climate change.

It could also pave the way for a new field of cancer prevention, according to Charles Swanton of the UK's Francis Crick Institute.

Swanton presented the research, which has not yet been published in a peer-reviewed journal, at the European Society for Medical Oncology's annual conference in Paris.

Read more
https://medicalxpress.com/news/2022-09-scientists-air-pollution-triggers-lung.html

Indoor Air Quality Experiments Show Exposure Risks While Cooking, Cleaning

When you're cooking or cleaning inside your home, what chemicals are you breathing, and are they potentially harmful? Colorado State University chemists have given us a solid start on the answer.

A large, collaborative research experiment that attempted to map the airborne chemistry of a typical home took place in 2018 and was co-led by Delphine Farmer,

associate professor in the Department of Chemistry at CSU. The experiment, called HOMEChem, brought 60 scientists from 13 universities to a test house at the University of Texas at Austin to perform typical home activities like cooking and cleaning and to use sophisticated instrumentation to document the chemistry that resulted.

In a new paper in Environmental Science & Technology, Farmer's team at CSU has taken the massive amounts of data collected during HOMEChem and sorted it out by health effects. They identified how many compounds they observed that are known human toxins, or, based on newer Environmental Protection Agency models, predicted to be likely human toxins. Most such compounds are emitted in low quantities and can be cleared through proper ventilation. But the health impacts of both the individual compounds and their complex mixtures indoors are not well understood by scientists.

R*ead more*: https://phys.org/news/2022-09-indoor-air-quality-exposure-cooking.html

Understanding the Effect of Wildfires on Air Quality

Wildfires, characterized by unplanned, uncontrolled, and unpredictable fires erupting in areas such as forests, grasslands, and prairies, have recently grown in frequency and intensity. Likely resulting from climate change effects, wildfires are increasingly impacting ecosystems and human lives. While wildfires are considered ecologically beneficial, there have been rising concerns over the negative effects, namely degradation of air quality from the smoke and pollutants released.

In particular, carbon monoxide (CO) and ozone (O3) are major contributors to wildfire-induced air pollution. However, unlike CO, O3 is not directly generated during wildfires. Instead, it is produced from O3 precursors emitted during wildfires and depends on several factors for its production. This, in turn, complicates the O3 production process. Moreover, its presence within wildfire plumes determines the wildfire plume age. Assessing its concentrations is, therefore, necessary to better understand how wildfires affect the air quality, weather, and climate.

Read more:
https://www.labmanager.com/news/understanding-the-effect-of-wildfires-on-air-quality-28772

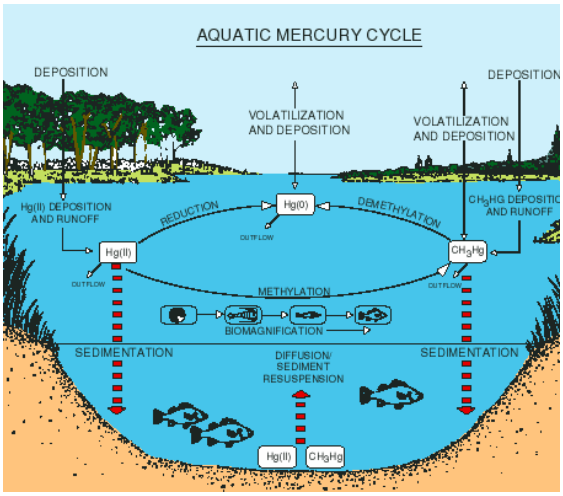
Study of People Exposed to Air Pollution Reveals Greater Effects on Females than Males

The impact of breathing diesel exhaust fumes may be more severe for females than males, according to new research that will be presented at the European Respiratory Society International Congress in Barcelona, Spain.

Researchers looked for changes in people's blood brought about by exposure to diesel exhaust. In both females and males, they found changes in components of the blood related to inflammation, infection and cardiovascular disease, but they found more changes in females than males.

Read more:
https://medicalxpress.com/news/2022-09-people-exposed-air-pollution-reveals.html

Catching Up With Quicksilver: Mxene Material Can Counter Mercury Contamination



Researchers estimate that mercury emissions in the atmosphere have quadrupled since the start of the Industrial Revolution. The heavy metal, generated by burning fossil fuels and the disposal of industrial and medical waste, has become persistent in aquatic environments. Some species of fish are so mercury-contaminated that people should avoid consuming them.

Engineers have been working to develop ways of removing mercury from water. Now, a team at Drexel University and Temple University might have found the right material to efficiently catch the evasive quicksilver — even at low levels — and clean up contaminated bodies of water.

Read more:
https://beta.nsf.gov/news/catching-

quicksilver-mxene-material-can-counter-mercury-contamination

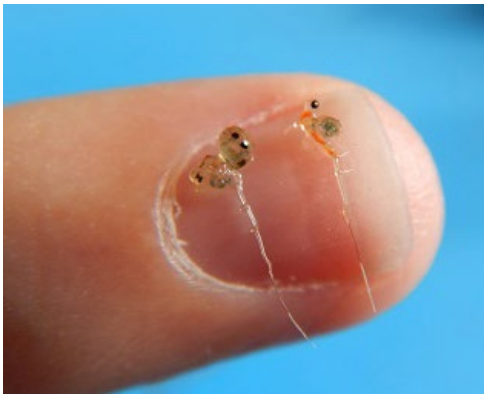
Exposure to Antibacterial Chemical via Lactation Linked to Liver Damage in Newborn Mice

Researchers at the University of California (UC), San Diego found evidence that newborn mice can be exposed to triclosan during lactation, resulting in significant fat build up in their liver — an early sign of liver damage. The study was supported in part by the NIEHS Superfund Research Program (SRP) and by an NIEHS Exploratory/Developmental Research Grant.

Triclosan is an antibacterial chemical associated to numerous health concerns, including endocrine disruption, antimicrobial drug resistance, and nonalcoholic fatty liver disease (NAFLD). In 2016, the U.S. Food and Drug Administration banned triclosan from over-the-counter soaps, but the chemical continues to be found in medical-grade antibacterial soaps, toothpastes, and some cosmetics.

Read more:
https://factor.niehs.nih.gov/2022/9/papers/triclosan-exposure/index.htm

Water Fleas As 'Canaries in a Coal Mine' Offer Key to Managing Chemical Pollution



Water fleas, or Daphnia, could provide an important 'early warning system' for chemical pollution in our lakes and rivers.

In addition, where prevention to pollute has failed, Daphnia could work as a bioremediation agent to help reduce hazards.

Researchers, led by the University of Birmingham, have devised a new framework using high throughput 'omics' technologies to detect the effects of ambient chemical mixtures—of the type and concentration typically found in the environment—on the biology of living organisms. The approach uses Daphnia to understand what chemicals can be toxic to other species and how. This is possible because all animals, including humans, share genes that underpin their responses to environmental changes including exposure to pollution.

Read more: https://phys.org/news/2022-09-fleas-canaries-coal-key-chemical.html

Ergonomics

Intervention Program May Help Reduce Sitting Time for Office Workers

Researchers in England have developed a program they say can, when paired with a height-adjustable desk, reduce office workers' sitting time by more than an hour a day.

The researchers, from the National Institute for Health and Care Research's Leicester Biomedical Research Center, placed 756 desk-based workers from various local government councils into three groups. They gave one group the SMART (Stand More AT Work) Work and Life intervention program, which includes training and educational resources, behavior change support, and a set of mobile apps and software to monitor sitting time on the job.

The second group used the intervention program and was given a height-adjustable desk, while members of the third group

continued with their usual practices. The researchers monitored the workers with a small device worn on the thigh and followed them for 12 months.

Read more: https://www.safetyandhealthmagazine.com/articles/22978-intervention-program-may-help-reduce-sitting-time-for-office-workers

Solutions to Tackle Work-Related MSDS: New White Paper from NSC

A new white paper from the National Safety Council details effective interventions to help prevent or reduce work-related musculoskeletal disorders.

The most common workplace injury, MSDs – such as tendinitis, back strains and sprains, and carpal tunnel syndrome – affect nearly a quarter of the world's population and are the leading cause of worker disability, early retirement and limitations to gainful employment, according to NSC. In addition, they account for nearly a third of unwanted days away from work, totaling around $20 billion in annual costs to U.S. employers.

Read more:
https://www.safetyandhealthmagazine.com/articles/22996-solutions-to-tackle-work-related-msds-new-white-paper-from-nsc

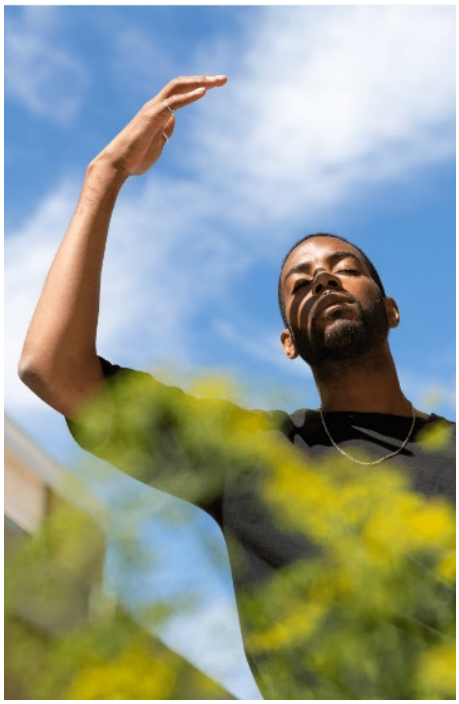
Safety

Do the National Institute for Occupational Safety and Health Recommendations for Work in the Heat Prevent Excessive Hyperthermia and Body Mass Loss in Unacclimatized Males?

The National Institute for Occupational Safety and Health recommendations for work in the heat suggest workers consume 237 mL of water every 15-20 min and allow for continuous work at heavy intensities in hot environments up to 34 °C and 30% relative humidity. The goal was to determine whether the National Institute for Occupational Safety and Health recommendations prevented core temperature from exceeding 38.0 °C and greater than 2% body mass loss during heavy-intensity work in the heat. Eight males consumed 237 mL of water every 20 min during 2 hours of continuous heavy-intensity walking (6.4 kph, 1% grade) in a 34 °C/30% relative humidity environment, in accordance with the National Institute for Occupational Safety and Health recommendations. Projected core temperature and percent body mass loss were calculated for 4 and 8 hr of continuous work. Core temperature rose from baseline (36.8 ± 0.3 °C) to completion of 2 hr of work (38.1 ± 0.6 °C, $p < 0.01$), with two participants reaching the 38.0 °C threshold.

Projected core temperatures remained elevated from baseline ($p < 0.01$), did not change from 2 to 4 hr (38.1 ± 0.7 °C, $p > 0.99$) and 4 to 8 hr (38.1 ± 0.8 °C, $p > 0.99$), respectively, and one participant exceeded 38.0 °C at 4 to 8 hr. There was no change in body mass loss over time ($p > 0.99$). During two hours of continuous heavy-intensity work in the heat, 75% of participants did not reach 38 °C core temperature and 88% did not reach 2% body mass loss when working in accordance with National Institute for Occupational Safety and Health recommendations.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 09 Sep 2022 (Available with an AIHA membership)



Study Shows FFP2/3 Respirators Might Increase Risk of Airway Complications in COVID Patients

Personal protective equipment (PPE) was rarely out of the news throughout the peaks of the COVID-19 pandemic. However, new research published in Anaesthesia shows that use of filtering facepiece (FFP) 2 or 3 respirators by anesthetists is associated with a 38% increased risk of airway complications in the patient.

The study is by Dr. Kariem El-Boghdadly, Consultant, Department of Anaesthesia and Perioperative Medicine, Guy's and St. Thomas' NHS Foundation Trust, London, UK, and colleagues from the AeroComp Trainee Research Networks (a group of trainee research networks across the UK).

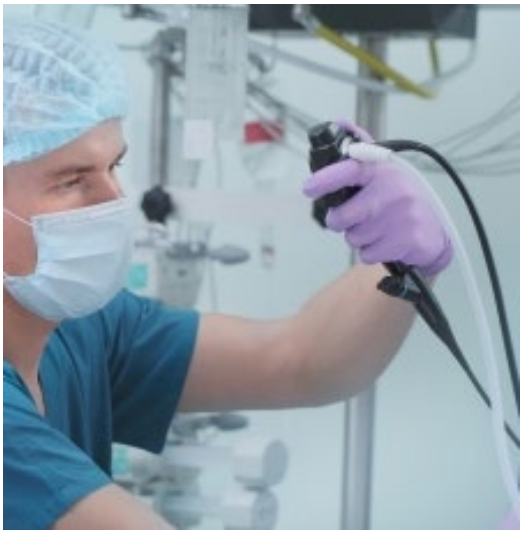
Read more:
https://medicalxpress.com/news/2022-09-

ffp23-respirators-airway-complications-covid.html

Invention of a Flexible Ultra-Thin Endoscope Thinner Than a Needle

A research team has developed a high-resolution holographic endoscope system thinner than an injection needle for microscopic imaging inside a curved passage.

If you are used to getting regular health checkups, you might be familiar with endoscopes. The endoscope is an imaging device consisting of a camera and a light guide attached to a long flexible tube. It is particularly useful for acquiring images of the inside of a human body. For example, stomach and colon endoscopy are widely used for the early detection and diagnosis of diseases such as ulcers and cancers.



Read more: https://www.sciencedaily.com/releases/2022/09/220906114346.htm

On the Rise: Bicycle-Related Deaths and Injuries

In 2020, preventable fatalities from bicycle accidents increased by 16%, according to the National Safety Council (NSC). The NSC also noted that over the last decade, there was a total increase of 44% in preventable bicycle-related deaths.

These figures highlight the ongoing safety crisis for cyclists on American roadways.

Bicycle-related deaths and injuries: the statistics

According to the CDC, bicyclists account for 2% of all motor vehicle crashes. Approximately 1,000 people die each year from these accidents, and 130,000 become injured. These numbers will continue to increase unless widespread measures to

prioritize road safety become implemented nationwide.

Read more:
https://www.natlawreview.com/article/rise-bicycle-related-deaths-and-injuries

Feds Warn of Home Carbon Monoxide Detectors That May Fail to Alarm

Consumers should immediately stop using HECOPRO digital display carbon monoxide (CO) detectors because they can fail to warn about the presence of the dangerous gas, the U.S. Consumer Product Safety Commission (CPSC) said.

The CPSC issued the warning Thursday after detectors sold on Amazon.com failed tests with a CO concentration of 400 ppm, in violation of safety standards. At sustained levels above 150 to 200 ppm, disorientation, loss of consciousness, and death are possible, according to the CPSC.

The detectors in the warning were sold on Amazon.com under ASIN, B07T66J7KJ for between $9 and $13. They are made of white plastic and measure approximately 4.1 by 1.8 by 4.1 inches. They have a digital display. Advertising for the detectors claims

they detect dangerous levels of carbon monoxide and alert with a flashing red LED and a loud alarm.

Read more:
https://consumer.healthday.com/feds-warn-of-home-carbon-monoxide-detectors-that-may-fail-to-alarm-2658325216.html

America's Emergency Medicine Physicians Alarmed by Rising Violence from Patients

The stories grabbed headlines during the pandemic: violent episodes in U.S. emergency departments where patients attacked doctors.

Now, a new poll shows just how widespread the problem has become: Two-thirds of emergency department physicians reported being assaulted in the past year alone, while more than one-third of respondents

said they have been assaulted more than once. Even worse, about 80 percent of emergency department physicians reported an increasing rate of violence, with 45 percent saying it had "greatly increased" during the past five years.

The poll, led by the American College of Emergency Physicians (ACEP), included 2,712 U.S. emergency department physicians and was conducted online between July 25 and Aug. 1.

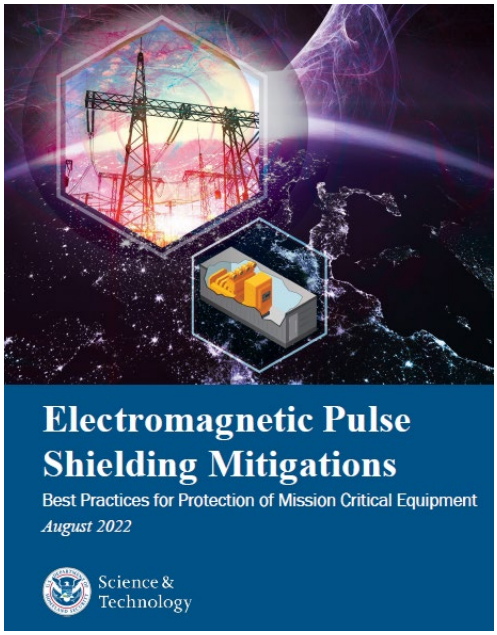
Read more:
https://consumer.healthday.com/america-s-emergency-medicine-physicians-alarmed-by-rising-violence-from-patients-2658329999.html

Emergency Preparedness

DHS Recommends Assessments, Deployment of Protective Equipment or Shelters to Shield National Public Warning System

The U.S. Department of Homeland Security released a report this week entitled Electromagnetic Pulse Shielding Mitigations, which laid out a series of recommendations to best protect the National Public Warning System from the threat of an electromagnetic pulse (EMP).

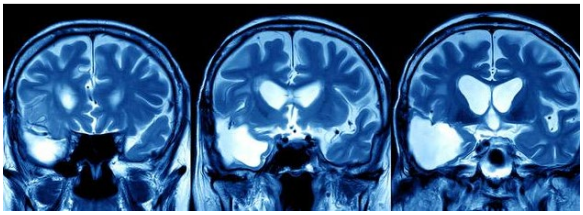
EMPs can be man-made for intentional attacks or erupt as the result of certain natural occurrences – solar storms, for example. Regardless of their source, they can be disruptive and destructive to modern systems, potentially disabling the electrical grid, communications, transportation systems, and more.



Read more:
https://homelandprepnews.com/stories/78296-dhs-recommends-assessments-deployment-of-protective-equipment-or-shelters-to-shield-national-public-warning-system/

Deployment Health

War-Zone Related Stress May Lead to Changes in the Microstructure of the Brain



Military service members who have returned from theaters of war are at increased risk of mental health problems. But few studies have examined the physical effects that war-zone related stress may have on the structure of the brain.

A new study led by investigators at Brigham and Women's Hospital, a founding member of the Mass General Brigham health care system, investigates microstructural changes in the limbic and paralimbic gray matter regions of the brain—areas that control basic emotions and drives.

The team analyzed diffusion-weighted MRI scans from 168 male veterans who had participated in the Translational Research Center for TBI and Stress Disorders (TRACTS) study, which took place in 2010 to 2014 at the Veterans Affair Rehabilitation Research and Development TBI National Network Research Center.

Read more:
https://medicalxpress.com/news/2022-09-war-zone-stress-microstructure-brain.html

VA To Screen All Patients for Toxic Exposure Issues

Veterans Affairs physicians will begin screening all department patients for military-related toxic exposures starting in November, the latest step in efforts to understand the scope and severity of injuries caused by burn pit smoke and other battlefield toxins.

The new screening tool, mandated under legislation passed by Congress this summer, has been used at 15 VA medical center pilot locations over the past few weeks.

VA Under Secretary for Health Dr. Shereef Elnahal told reporters Wednesday that of the more than 13,000 veterans who have gone through the screening so far, about 37% said they have "concerns" about possible toxic exposure issues during their time in the ranks.

Read more: https://www.militarytimes.com/veterans/2022/09/28/va-to-screen-all-patients-for-toxic-exposure-issues/

Nanotechnology

Scientists Report No Evidence of Titanium Dioxide Carcinogenic Activity

Titanium dioxide nanoparticles (TiO2 NPs) have been used in food additives, paints, pharmaceuticals, and cosmetics. Recently, there has been a growing debate on the carcinogenicity of this popularly used nanoparticle. Researchers determined TiO2 NPs carcinogenicity by conducting a twenty-six weeks inhalation exposure experiment using a CByB6F1-Tg(HRAS)2Jic (rasH2) mice model. This study has been published in Scientific Reports.

Importance of Titanium Dioxide

Based on particle size, surface modification, and crystal structure, TiO2 has been categorized into many types. In nature, TiO2 exists as three mineral crystal structures, namely, rutile, anatase, and brookite. Under normal physiological conditions, TiO2 exhibits poor solubility and persists for a prolonged period, even after a short period of exposure.

Before the development of TiO2 NPs, TiO2 had been used as a white pigment for about 100 years. The pigment grade TiO2 has been popularly used in paints due to its natural bright white color and high refractive index. TiO2 NPs, with significant ultraviolet scavenging potential and transparency, have been applied to sunscreens.

Read more: https://www.azonano.com/news.aspx?newsID=39639

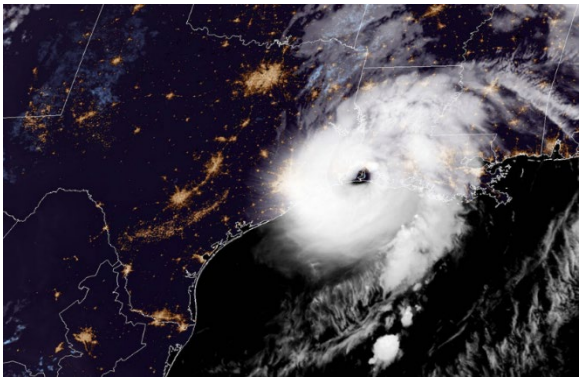
Regulatory Research & Industrial Hygiene Professional News

Congress

New Bill Would Protect Workers Who Walk Off the Job Because Of Climate Disasters

REP. CORI BUSH, D-Mo., is introducing legislation that would provide employees with paid time off during severe weather events certain to be intensified by climate change, as well as protections for those who walk off the job to seek safety during these events.

The proposal follows a devastating tornado that ripped through an Amazon warehouse in Edwardsville, Illinois, in December 2021, killing six employees — two of whom were Bush's constituents. Amazon warehouse workers were given virtually no workplace safety training for tornadoes or other severe weather events, as The Intercept reported at the time. "Amazon won't let us leave," one of the warehouse employees, a

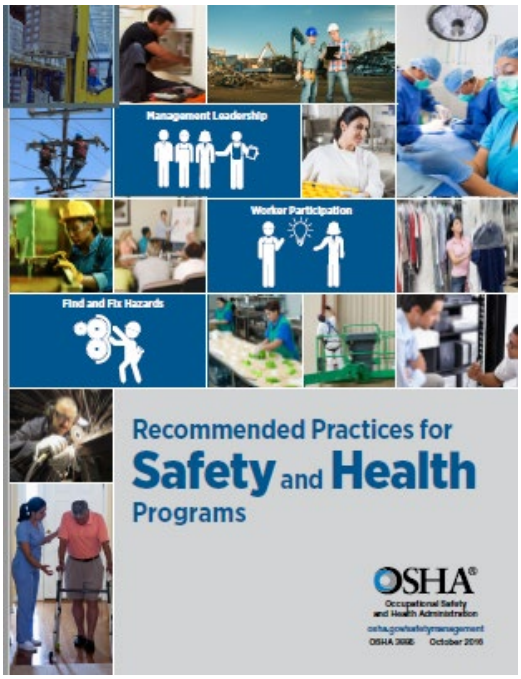


father of four, reportedly texted his girlfriend before a tornado caused the building to collapse, killing him.

Read more:
https://theintercept.com/2022/09/14/cori-bush-bill-climate-disaster-workers/

OSHA

Changes May Be Coming to EPA and Now OSHA Process Safety Requirements



On the heels of the Environmental Protection Agency's (EPA) proposed rule to amend its Risk Management Program (RMP) rule, the Occupational Safety and Health Administration (OSHA) is considering revising its standard on Process Safety Management of Highly Hazardous Chemicals (PSM) according to a new notice. 87 Fed. Reg. 53020 (Aug. 30, 2022). Many of the potential changes that OSHA is considering would expand the scope of covered employers and would echo EPA's proposed RMP amendments.

Read more:
https://www.natlawreview.com/article/changes-may-be-coming-to-epa-and-now-osha-process-safety-requirements

OSHA expands its Severe Violator Enforcement Program

In an effort to enhance enforcement of and compliance with workplace safety standards, OSHA has expanded the criteria for placement in its Severe Violator Enforcement Program to include violations of all hazards and agency standards, OSHA announced Sept. 15.

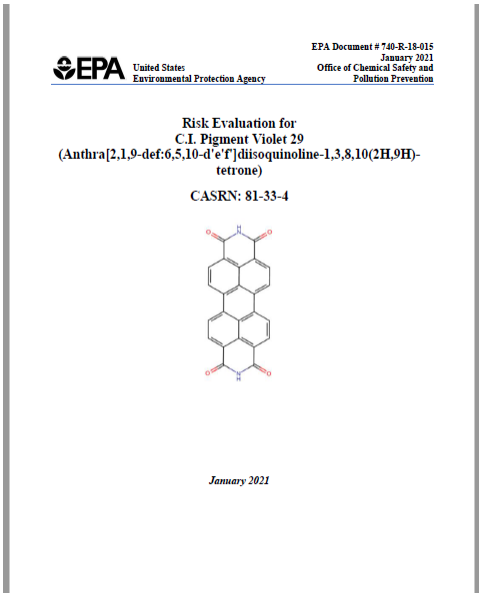
In place since 2010, the program focuses agency enforcement and inspection

resources on employers who demonstrate indifference to their obligations under the Occupational Safety and Health Act of 1970 by committing willful, repeated or failure-to-abate violations. Along with being placed on a public list of the nation's severe violators, employers are subject to follow-up inspections.

Read more:
https://www.safetyandhealthmagazine.com/articles/23028-osha-expands-its-severe-violator-enforcement-program

NIOSH

Risk Evaluation for C.I. Pigment Violet 29


EPA Document # 740-R-18-015
January 2021
Office of Chemical Safety and Pollution Prevention

EPA United States Environmental Protection Agency

Risk Evaluation for
C.I. Pigment Violet 29
(Anthra[2,1,9-def:6,5,10-d'e'f']diisoquinoline-1,3,8,10(2H,9H)-tetrone)

CASRN: 81-33-4

January 2021

EPA evaluated C.I. Pigment Violet 29 (PV29) under the amended Toxic Substances Control Act (TSCA) and issued a final revised risk determination in September 2022 that amends the risk evaluation issued in January 2021. The revised risk determination follows public notice and receipt of comments on a draft revised risk determination for PV29. The revisions to the risk determination were made in accordance with the path forward for the first 10 risk evaluations under TSCA laid out by EPA in June 2021. The final revised risk determination is based on PV29 as a whole chemical substance and does not assume that all workers exposed to PV29 are protected by personal protective equipment.

Read more:
https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-ci-pigment-violet-29

EPA

EPA Report Reveals Long List of Violations at Navy's Red Hill Fuel Facility

New federal records reveal a long list of violations by the Navy at the Red Hill fuel facility in the aftermath of the drinking water crisis.

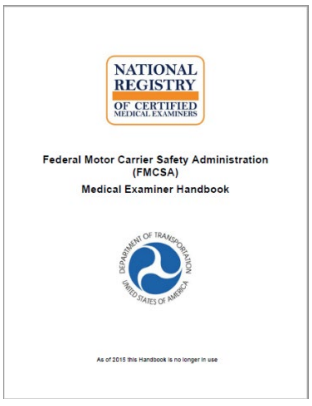
The violations include the lack of a spill response plan for Red Hill's pipeline system and the failure to operate that system in line with good engineering practice.

This is all from the Environmental Protection Agency, which inspected Red Hill earlier this year after thousands of military families got sick from the fuel-tainted water.

Read more:
https://www.hawaiinewsnow.com/2022/09/26/epa-report-reveals-long-list-violations-navys-red-hill-fuel-facility/

DOT

FMCSA Proposes Return of Medical Examiner's Handbook



The Federal Motor Carrier Safety Administration is requesting comment on its plan to revise and restore the agency's Medical Examiner's Handbook, which guides personnel who complete physical exams for commercial motor vehicle drivers.

According to a notice of proposed regulatory guidance published in the Aug. 16 Federal Register, FMCSA withdrew the handbook in 2015 because "some of the information was obsolete" or "prescriptive in nature." Medical examiners and training

organizations were told that the document, first published in 2008, should no longer be construed as agency guidance

Read more:
https://www.safetyandhealthmagazine.com/articles/23002-fmcsa-proposes-return-of-medical-examiners-handbook
.

APHC

Training

As we continue to combat the COVID-19 virus, we are making our best efforts to provide you with Blueprint, Design Review, and Ventilation lessons that otherwise you'd travel to acquire.

Due to the changing MS TEAMS and DCS environments, and the ability to host a live event with hundreds of participants, we've been providing "Pre-recorded" webinar events.

All handouts are made available, and can be downloaded from your Blackboard webinar course shell with recorded material for you to view ad-hoc, and participation certificates awarded for each lesson survey/evaluation completed.

You may ask yourself "what's the difference between a live webinar and a pre-recorded webinar?"

Not only does a pre-recorded webinar allow you to view in your own time zone at a time most convenient for you, it allows us to edit and re-record segments, swap out segments that didn't work so well, add effects, graphics, and more in the post-production stage.

Pre-recorded webinars give a more polished effect than a live webinar. Right now, we're all adjusting to having more remote meetings, watching broadcasts instead of attending live events, and spending a little more time on our computers than doing surveys.

It is our goal to connect with you, getting you the relevant and emerging information you need to help your clients. Our sustainment webinars, whether live or pre-recorded, can help you achieve those goals.

How to participate in a "pre-recorded" webinar:

1. Navigate to your "Army Industrial Hygiene Webinar" shell on our Blackboard site https://aiph-dohs.ellc.learn.army.mil
2. Use the left navigation tile to locate SPECIAL EDITION WEBINARS
3. Select each webinar link to view
4. Record case sensitive code words while viewing
5. Use the left navigation tile to locate COLLECT CERTIFICATES
6. Select the link for your webinar and use code word to initiate certificate

NOTE: Our classroom space is not allowing traditional classroom courses due to the pandemic. We continue our efforts to provide relevant content that aligns with these courses via our webinars.


DOCUMENT LIBRARY
COLLECT CERTIFICATES
NEW WEBINARS
ASK THE SME RECORDINGS
MANAGE YOUR IH MONSTER RECORDINGS
ARMY IH FEILD OP MANUAL RECORDINGS
IH LEADER RECORDINGS
SPECIAL EDITION WEBINAR RECORDINGS
All slide handouts are here
Most recent recordings here
SME recording archive
MONSTER recording archive
FOM recording archive
LEADER recording archive
Special Edition archive


ABOUT THE "ASK THE SME" WEBINARS
These "Ask the SME" Webinars are about communicating freely with subject matter experts.
Most of the subject matter experts have lead in slides to spark conversation, and then take questions from the live a
If you are here, then you probably missed the live event. That's OKAY. This is why we provide recordings.
If you have questions for the subject matter experts that
ot addressed during the live event, we encourage yo
Description
SLIDE HANOUTS: Ask the SME Webinars
Enabled: Statistics Tracking
Attached Files:
11/4/2016 Monster: All About ANOVA (1.918 MB)
11/14/2018 SME: Hexavalent Chromium 48min (451.598 KB)
2/27/2019 SME: Ergonomics 51min (402.939 KB)
8/6/2019 SME: Pharmacy Hazardous Drug Samples 28min (1.569 MB)
3/4/2020 SME: APHC Analytical Lab (1.425 MB)
6/17/20 SME: IH Contract Technical Monitors (1.0hr) (773.407 KB)
OWAS Table.doc (90.5 KB)
Liberty Mutual Tables.pdf (874.9 KB)
OWAS Postures.pdf (135.149 KB)
12/2/20 SME: DOEHRS-IH Report Standardization 90min
Example Standardized Ergo Survey (4.361 MB)
Handouts
Download Handouts
Recordings
12/2/20 SME: DOEHRS-IH Report Standardization 90min
Enabled: Statistics Tracking
Look for slide handouts and a copy of the Army DOEHRS IH Buddy v0.7 in the SLIDE HANDOUTS above, or the DOCUMENT LIBRARY section of this course
12/2/20 SME: Downdraft Ventilation Q/A 7min
Enabled: Statistics Tracking

Downdraft Day	
12/2/20 Monster: Building Downdraft Tables in DOEHRS-IH (52min)	THEME: CONTROLING AIR CONTAMINANTS
12/2/20 Leader: Measuring Downdraft Tables (42min)	THEME: CONTROLING AIR CONTAMINANTS
12/2/20 SME: Downdraft Ventilation Q/A	THEME: CONTROLING AIR CONTAMINANTS
12/2/20 SME: DOEHRS-IH Report Standardization (30min)	THEME: MANAGING ARMY IH
12/2/20 Leader: Compressed Air use with Heavy Metals (30min)	THEME: CONTROLING AIR CONTAMINANTS

Vehicle Maintenance Day	
3/3/21 Monster: Building Vehicle Exhaust Ventilation in DOEHRS-IH (72min)	THEME: CONTROLING AIR CONTAMINANTS
3/3/21 Leader: Measuring Vehicle Exhaust Ventilation (50min)	THEME: CONTROLING AIR CONTAMINANTS
3/3/21 Leader: Vehicle Design Review (2hr)	THEME: CONTROLING AIR CONTAMINANTS
3/3/21 SME: Vehicle Exhaust Ototoxins (40min)	THEME: CONTROLING AIR CONTAMINANTS
3/3/21 SME: IH Manpower Study Survey (14min)	THEME: MANAGING ARMY IH

Coating/Painting Day	
6/2/2021 Monster: Building Paint Booths in DOEHRS-IH (60min)	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 Leader: Measuring Paint Booths (37min)	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 Leader: Paint Spray Design (65min)	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 SME: Data Mining DOEHRS-IH (Paintbooth Accident Investigation) (17min)	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 SME: DOEHRS Cadmium Data/Protecting Against Cadmium 49min	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 SME: Protecting Against Cadmium (combined with Cadmium Data)	THEME: CONTROLING AIR CONTAMINANTS
6/2/2021 Leader: Particle Size Selective Sampling 35min	THEME: SAMPLING
6/2/2021 Leader: IH Professional Sampling Kit 20min	THEME: SAMPLING
6/2/2021 SME: Surface Sampling 18min	THEME: SAMPLING

Laboratory/Healthcare Day	
9/1/2021 Monster: Building Lab Hood Ventilation in DOEHRS-IH (64min)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 Monster: Building Dilution Ventilation in DOEHRS-IH (93min)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 Leader: IH Value Strategy Laboratory Engineering Controls (17min)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 SME: Sampling Qualifiers (15min)	THEME: SAMPLING
9/1/2021 Leader: Laboratory Design (2hr)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 Leader: Methylene Chloride (Workplace, Data Mining, Virtual Tour) (2hr)	THEME: SAMPLING
9/1/2021 Leader: Healthcare Ventilation and Design (3hr)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 Leader: OHS for Laboratory/Healthcare (Overview, Risk Management, IH Role, Virtual Tours) (3hr)	THEME: SAMPLING
9/1/2021 Leader: Modeling Laboratory/Healthcare Exposures in DOEHRS-IH (60min)	THEME: CONTROLING AIR CONTAMINANTS
9/1/2021 Leader: Laboratory/Healthcare Compliance Survey Tour (2hr)	THEME: SURVEY
9/1/2021 SME: Ergonomic Patient Handling (28min)	THEME: HAZARD EVALUATION AND CONTROL

REVIEW	*Recommended Healthcare/Laboratory lessons if you have not already viewed these previously)*
Leader	Adventures in Ventilation at Natick Laboratories (68min)
Monster	Pathology, Grossing, Morgue, Tissue, and Death Care (1.5hr)
SME	Pharmacy Hazardous Drug Samples (28min)
Leader	Audiometric Booth Testing and Certification (17min)

This monthly summary is published by the Industrial Hygiene Program Management Division for the Army Public Health Center.

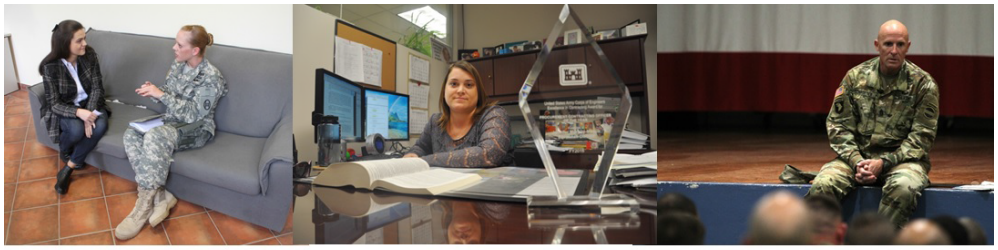
POINTS OF CONTACT:

By Phone or FAX:

Office: (410)436-3161
FAX: (410)436-8795

On the Web:

https://phc.amedd.army.mil/news/Pages/PublicationDetails.aspx?type=Army%20Industrial%20Hygiene%20News%20and%20Regulatory%20Summary



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.