February 2023
Issue 137

Army Industrial Hygiene News and Regulatory Summary

Hazardous Substances

Association of P-Phenylenediamine Exposure with Alterations of Pulmonary Function, Pruritus and Health-Related Quality of Life In Hair Dye Factory Workers: A Cross-Sectional Study

Special Interest Articles:

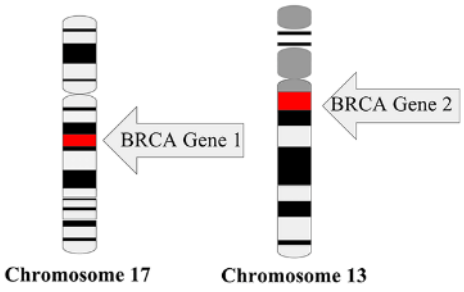
P-Phenylenediamine (PPD) is a common component of hair dye, which can cause skin contact allergy and asthma with impaired pulmonary function. However, the adverse effects of occupational exposure to different dose PPD was rarely mentioned. We recruited 124 workers from a hair dye factory to explore the association of occupational PPD exposure on pulmonary function, pruritus and health related quality of life (HRQL). We categorized exposure to PPD into 3 levels: lower exposure group (< 0.00001 mg/m^3); middle exposure group (0.00001–0.00033 mg/m^3); higher exposure group (0.00033–0.047 mg/m^3). The HRQL and subjective pruritus of the workers were assessed by the short form 36 health survey (SF-36) and Visual analogue scale (VAS) of pruritus, respectively. In the high PPD-exposed group, the percentage of FEV1 (FEV1%) was lower in higher exposure group compared with lower exposure group. The FEV1/FVC was also lower in comparison to the higher exposure and middle exposure groups ($p < 0.05$). PPD levels were negatively correlated with vitality and mental health

($p < 0.01$). The structural equation model showed the positive effects of PPD on VAS level (β = 0.213, $p < 0.001$), and indicated partly negative effects of PPD on total score of SF-36 (β = − 0.465, $p = 0.002$), respectively. Our results indicate that occupational exposure to PPD might be associated with pulmonary function impairment, poor HRQL, and subjective pruritus of the workers.

Read more:
https://www.nature.com/articles/s41598-023-29721-7

Contents:

Those With the BRCA1 Gene Mutation May Face Greater Risk for Aggressive Cancer Caused by Asbestos Exposure



A group of researchers from Nagoya University in Japan used a rat model to show that the BRCA1 mutation, which affects 1 in 500 people, increases the risks of malignant mesothelioma (MM), a cancer linked to asbestos exposure. Their findings were reported in Cancer Science.

MM is an aggressive form of cancer most commonly caused by asbestos exposure. The tumor develops in the mesothelium, a thin layer of tissue that covers most internal organs. Although there are several treatments for MM, it is often fatal.

MM is particularly dangerous because it uses the body's normal defenses to create an environment conducive to its growth. One important defense against cancer is ferroptosis, which uses iron to cause cell death and is important for tumor suppression. However, MM can accumulate iron itself, which causes breaks in the body's DNA strands, causing genomic changes in the mesothelium that favor the tumor.

Read more:
https://medicalxpress.com/news/2023-02-brca1-gene-mutation-greater-aggressive.html

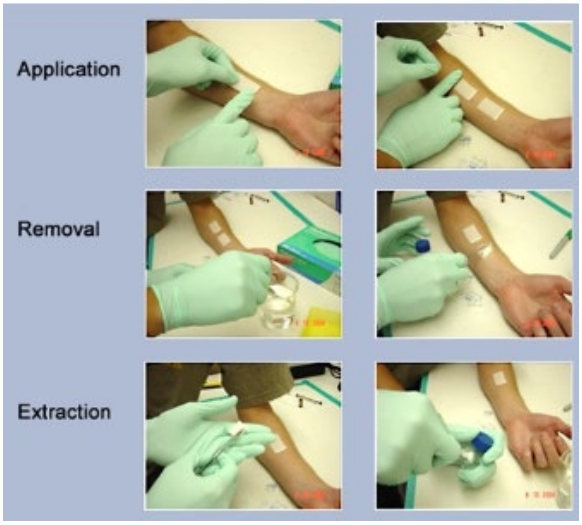
Chemical Characterisation of Combustion Engine Exhaust and Assessment of Helicopter Deck Operator Occupational Exposures on an Offshore Frigate Class Ship

Diesel engine exhaust (DE) consists of a complex mixture of gases and aerosols, originating from sources such as engines, turbines, and power generators. It is composed of a wide range of toxic compounds ranging from constituents that are irritating to those that are carcinogenic. The purposes of this work were to characterise DE originating from different engine types on a ship operating offshore, and to quantify the potential exposure of workers on the ship's helicopter deck to select DE compounds. Sampling was conducted on a Norwegian Nansen-class frigate that included helicopter operations. Frigate engines and generators were fueled by marine diesel oil, while the helicopter engine was fueled by high flash point kerosene-type aviation fuel. Exhaust samples were collected directly from the stack of the diesel engine and one of the diesel generator exhaust stacks, inside a gas turbine exhaust stack, and at the exhaust outlet of the helicopter. To characterise the different exhausts sources, non-targeted screening of volatile and semi-volatile organic compounds was performed for multiple chemical classes. Some of the compounds detected at the sources are known irritants, such as: phthalic anhydride, 2,5-dyphenyl-p-benzoquinone, styrene, cinnoline, and phenyl maleic anhydride. The exhaust from the diesel engine and diesel generator were found to contain the

highest amounts of particulate matter and gaseous compounds, while the gas turbine had the lowest emissions. Personal exposure samples were collected outdoors in the breathing zone of a helicopter deck operator over nine working shifts, simultaneously with stationary measurements on the helicopter deck. Elemental carbon, nitrogen dioxide, and several volatile organic compounds known to be present in DE, such as formaldehyde, acrolein and phenol were specifically targeted. Measured DE exposures of the crew on the helicopter deck were variable, but less than the current European occupational exposure limits for all compounds, except elemental carbon, in which concentration varied between 0.5 to 37 µg/m3 over nine work shifts. These findings are among the first published for this type of working environment..

Read more: Journal of Occupational and Environmental Hygiene, Published online: 14 Feb 2023(Available with an AIHA membership)

Accuracy of Professional Judgments for Dermal Exposure Assessment Using Deterministic Models



The accuracy of exposure judgments, particularly for scenarios where only qualitative information is available or a systematic approach is not used, have been evaluated and shown to have a relatively low level of accuracy. This is particularly true for dermal exposures, where less information is generally available compared to inhalation exposures. Relatively few quantitative validation efforts have been performed for scenarios where dermal exposures are of interest. In this study, a series of dermal exposure judgments were collected from 90 volunteer U.S. occupational health practitioners in a workshop format to assess the accuracy of their judgments for three specific scenarios. Accuracy was defined as the ability of the participants to identify the correct reference exposure category, as defined by the quantitative exposure banding categories utilized by the American Industrial Hygiene Association (AIHA). The participants received progressively additional information and training regarding dermal exposure assessments and scenario-specific information during the workshop, and the relative accuracy of their category judgments over time was compared. The results of the study indicated that despite substantial education and training in exposure assessment generally, the practitioners had very little experience in performing dermal exposure assessments and a low level of comfort in performing these assessments. Further, contrary to studies of practitioners performing inhalation exposure assessments demonstrating a trend towards underestimating exposures, participants in this study consistently overestimated the potential for dermal exposure without quantitative data specific to the scenario of interest. Finally, it was found that participants were able to identify the reference or “true” category of dermal exposure acceptability when provided with relevant, scenario-specific dermal and/or surface loading data for use in the assessment process. These results support the need for additional training and education of practitioners in performing dermal exposure assessments. A closer analysis of default loading values used in

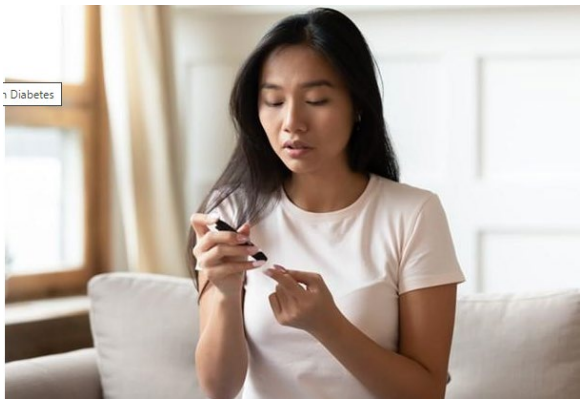
dermal exposure assessments to evaluate their accuracy relative to real-world or measured dermal loading values, along with consistent improvements in current dermal models, is also needed.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 30 Jan 2023 (Available with an AIHA membership)

Phthalate Exposure May Increase Diabetes Risk in Women

Endocrine-disrupting chemicals (EDCs) in plastics may contribute to diabetes risk in women, according to a new study published in the Journal of Clinical Endocrinology & Metabolism. Phthalates are chemicals widely used in plastics such as personal care products, children's toys, and food and beverage packaging. Phthalate exposure is associated with reduced fertility, diabetes and other endocrine disorders.

"Our research found phthalates may contribute to a higher incidence of diabetes in women, especially White women, over a six-year period," said Sung Kyun Park, Sc.D., M.P.H., of the University of Michigan School of Public Health in Ann Arbor, Mich. "People are exposed to phthalates daily increasing



their risk of several metabolic diseases. It's important that we address EDCs now as they are harmful to human health."

Read more: https://medicalxpress.com/news/2023-02-phthalate-exposure-diabetes-women.html

Characterization of Perceived Biohazard Exposures, Personal Protective Equipment, and Training Resources among a Sample of Formal US Solid Waste Workers: A Pilot Study

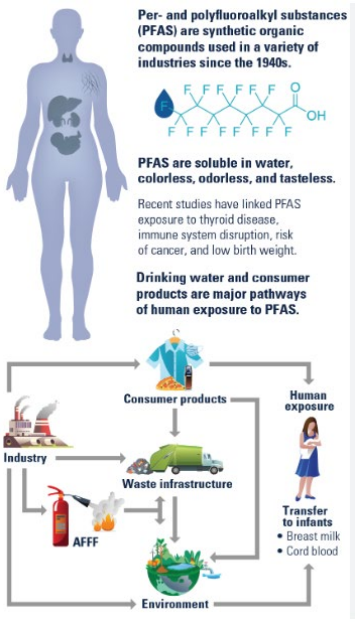
In the United States, the majority of waste workers work with solid waste. In solid waste operations, collection, sorting, and disposal can lead to elevated biohazard exposures (e.g., bioaerosols, bloodborne and other pathogens, human and animal excreta). This cross-sectional pilot study

aimed to characterize solid waste worker perception of biohazard exposures, as well as worker preparedness and available resources (e.g., access to personal protective equipment, levels of training) to address potential biohazard exposures. Three sites were surveyed: 1) a family-owned, small-scale waste disposal facility, 2) a county-level, recycling-only facility, and 3) an industrial-sized, large-scale facility that contains a hauling and landfill division. Survey items characterized occupational biohazards, resources to mitigate and manage those biohazards, and worker perceptions of biohazard exposures. Descriptive statistics were generated. The majority of workers did not report regularly coming into contact with blood, feces, and bodily fluids (79%). As such, less than one-fifth were extremely concerned about potential illness from biological exposures (19%). Yet, most workers surveyed (71%) reported an accidental laceration/cut that would potentially expose workers to biohazards. This study highlights the need for additional research on knowledge of exposure pathways and perceptions of severity of exposure among this occupational group.

Read more:
Journal of Occupational and Environmental Hygiene, Published online: 14 Feb 2023 (Available with an AIHA membership)

Study Finds 'Forever Chemicals' Disrupt Key Biological Processes

A team of researchers from the Keck School of Medicine of USC found that exposure to a mixture of synthetic chemicals found widely in the environment alters several critical biological processes, including the metabolism of fats and amino acids, in both children and young adults. The disruption of these biological processes is connected to an increased risk of a very broad range of diseases, including developmental disorders, cardiovascular disease, metabolic disease and many types of cancer.
Known as per- and polyfluoroalkyl substances, or PFAS, these man-made chemicals are used in a wide range of consumer and industrial products. PFAS are sometimes called "forever chemicals" because they break down very slowly and



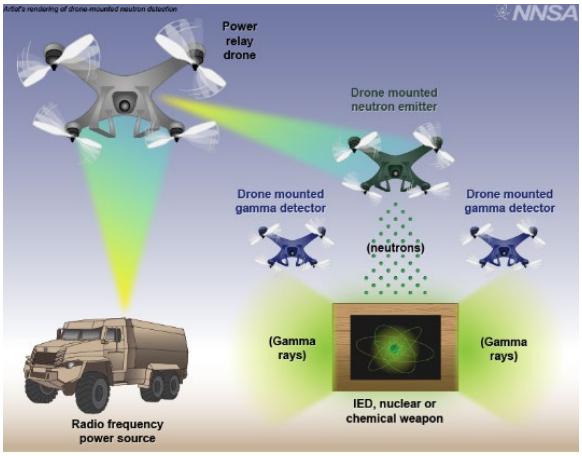
accumulate in the environment and human tissue.

Although individual PFAS are known to increase the risk of several types of disease, this study, published February 22 in Environmental Health Perspectives, is the first to evaluate which biological processes are altered by exposure to a combination of multiple PFAS, which is important because most people carry a mixture of the chemicals in their blood.

Read more: https://medicalxpress.com/news/2023-02-chemicals-disrupt-key-biological.html

Radiation

Radiation Detection Drones Tested at Belgian Site



Test flights of drones fitted with equipment to identify and measure the radiation being emitted from a plume source have been conducted at the Mol site of Belgium's Nuclear Research Centre (SCK-CEN). Further tests flights are planned for later this year to prove a new, precise measurement technique.

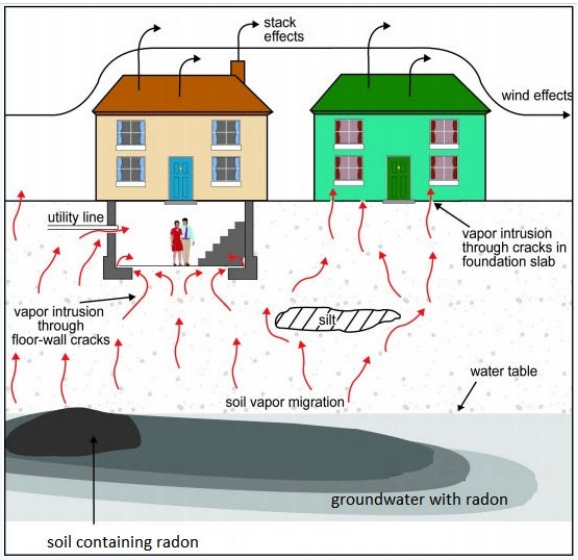
In October last year, a team from Canadian Nuclear Laboratories (CNL) conducted a major drone testing campaign at the BR-1 reactor at Mol as part of a collaboration with SCK-CEN. More than simply airborne plume tracking and measurement, this project explored using drones to identify and measure the radiation being emitted from the plume source.

Read more: https://world-nuclear-news.org/Articles/Radiation-detection-drones-tested-at-Belgian-site

Ventilation

Measurements and Computational Fluid Dynamics Investigation of the Indoor Radon Distribution in a Typical Naturally Ventilated Room

Based on the European Union Basic Safety Standards to protect people against exposure to ionizing radiation, establishing and addressing the reference levels for indoor radon concentrations is necessary. Therefore, the indoor radon concentration should be monitored and control in dwelling and workplaces. However, proper ventilation and sustainability are the major factors that influence how healthy the environment in a building is for its occupants. In this paper, the indoor radon distribution in a typical naturally ventilated room under two scenarios (when the door is closed and open) using the computational fluid dynamics (CFD) technique was studied. The CFD code ANSYS Fluent 2020 R1 based on the finite volume method was employed before the simulation results were compared with analytical calculations as well as passive and active measurements. The average radon concentration from the CFD simulation was found to be between 70.21 and 66.25 Bq m−3 under closed and

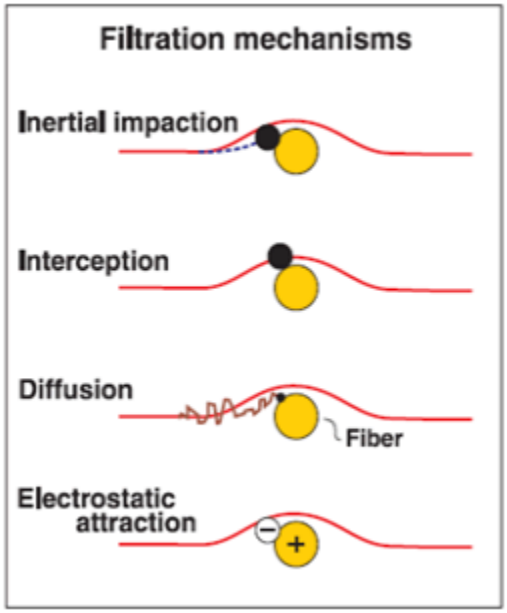


open-door conditions, respectively, at the desired ventilation rate of 1 ACH (Air Changes per Hour).

Read more:
https://www.nature.com/articles/s41598-022-23642-7

PPE

Scientists Engineer a Breath-to-Charge Electrostatic Face Mask for Prolonged Air Filtration



Electrostatic adsorption is an important complement to mechanical filtration for However, the electrostatic charge of the filters decays over time, particularly in humid conditions.

A research team at City University of Hong Kong (CityU) successfully engineered a breath-to-charge electrostatic face mask that can "self-charge" through the user's breathing and continuously replenish its electrostatic charge as the user wears and breathes through the mask. This significantly increase the filtering performance in prolonged use of the mask for up to 60 hours, compared to four hours for a conventional surgical mask. This also benefits the environment.

Face masks are an easy, cost-effective method of preventing COVID-19 and other airborne diseases. Most face masks have three functional layers: a core melt-blown polypropylene (PP) layer as the filter medium and two spun-bonding nonwoven fabrics (generally PP or polyethylene (PE)) as the supporting layers, including a hydrophilic layer, worn inwards, to absorb moisture from breathing and a hydrophobic layer, worn outwards, to repel fluid.

Read more:
https://medicalxpress.com/news/2023-02-scientists-breath-to-charge-electrostatic-mask-prolonged.html

Noise

Loud Offices Are Stressful – But So Are Quiet Ones: Study

A noisy office can increase stress levels. But now researchers are saying that near or complete silence at work isn't so great either.

A team led by the University of Arizona and University of Kansas asked 231 U.S. General Services Administration employees to wear two devices. One measured sound levels in the work environment. The other measured stress levels via changes in heart rates.

The researchers say 50 decibels is the ideal noise level in office environments. That's equivalent to the sound of moderate rain or the hum of a refrigerator. Each 10 dB increase beyond 50 was linked to a nearly 2% "decrease in physiological well-being," according to a UA press release.

However, when the office noise was below 50 dB, each 10 dB increase was linked to a 5.4% increase in physiological health.

Study author Esther Sternberg, director of the UA Institute on Place, Wellbeing and Performance, says sudden changes in sound can trigger a stress response. That may explain why the mind and body respond better to low and steady sounds.

Read more:
https://www.safetyandhealthmagazine.com/articles/23627-loud-offices-are-stressful-but-so-are-quiet-ones-study

Preventive Medicine

New Antibiotic Cures Superbugs Without Bacterial Resistance

In a potential game changer for the treatment of superbugs, researchers have developed a new class of antibiotics that cured mice infected with bacteria deemed nearly "untreatable" in humans—and resistance to the drug was virtually undetectable.

Developed by a research team of UC Santa Barbara scientists, the study was published in the journal eBioMedicine. The drug works by disrupting many bacterial functions simultaneously -- which may explain how it killed every pathogen tested and why low-level of bacterial resistance was observed after prolonged drug exposure.

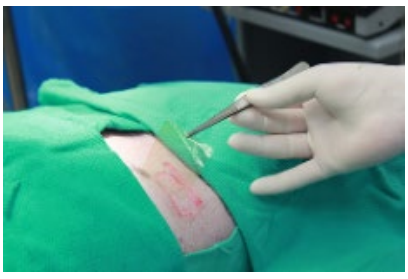
The project was led by professors Michael Mahan, David Low, Chuck Samuel and their research team, Douglas Heithoff, Scott Mahan, Lucien Barnes and Cyril George. Additional contributors include professors Guillermo Bazan (UC Santa Barbara) and Andrei Osterman (Sanford Burnham Prebys Medical Discovery Institute).

The discovery was serendipitous. The U.S. Army had a pressing need to charge cell phones while in the field -- essential for soldier survival. Because bacteria are miniature power plants, compounds were designed by Bazan's group to harness bacterial energy as a "'microbial"' battery. Later the idea arose to re-purpose these compounds as potential antibiotics.

Read more:
https://www.sciencedaily.com/releases/2023/02/230216161214.htm

First Transient Electronic Bandage Speeds Healing By 30 Percent

Northwestern University researchers have developed a first-of-its-kind small, flexible, stretchable bandage that accelerates healing by delivering electrotherapy directly to the wound site. In an animal study, the new bandage healed diabetic ulcers 30% faster than in mice without the bandage.



The bandage also actively monitors the healing process and then harmlessly dissolves—electrodes and all—into the body after it is no longer needed. The new device could provide a powerful tool for patients with diabetes, whose ulcers can lead to various complications, including amputated limbs or even death.
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Read more:
https://news.feinberg.northwestern.edu/2023/02/23/first-transient-electronic-bandage-speeds-healing-by-30-percent/

Physically Demanding Work Tied to Higher Male Fertility, Study Suggests

A new study from researchers from Brigham and Women's Hospital, a founding member of the Mass General Brigham healthcare system, suggests that men who regularly lift heavy objects at work have higher sperm counts. The study, published in Human Reproduction, is part of the Environment and Reproductive Health (EARTH) cohort, a clinical study which aims to explore how exposure to environmental chemicals and lifestyle choices affect reproductive health.

Read more:
https://medicalxpress.com/news/2023-02-physically-demanding-higher-male-fertility.html

Study Shows that COVID-19 Virus Can Be Detected in Tears Sampled by Ocular Swab

Research led by scientists at the University of São Paulo (USP) in Brazil has found that the coronavirus that causes COVID-19 can be detected in tears collected by swabbing. A swab is an absorbent cotton pad on a flexible rod used to clean wounds, apply medication and take specimens.

The researchers analyzed samples from patients diagnosed with the disease by conventional methods and admitted to the Hospital for Rehabilitation of Craniofacial Anomalies (HRAC) run by the Bauru Dental School (FOB-USP). SARS-CoV-2 was detected in 18.2% of the samples, suggesting this method could be an alternative to nasopharyngeal swabbing, which is unpleasant, and that health workers should take steps to protect themselves against infection via patients' tears, although the risk is admittedly low.

Read more:
https://medicalxpress.com/news/2023-02-covid-virus-sampled-ocular-swab.html

Harmful Pollution Boosting Superbug 'Silent Pandemic'

Containing and cleaning up environmental pollution, especially in waterways, is crucial to controlling increasingly bullet-proof superbugs which could kill tens of millions by mid-century, a new UN report said Tuesday.

Superbugs—strains of bacteria resistant to antibiotics—are estimated to have killed 1.27 million people in 2019, and the World Health Organization says antimicrobial resistance (AMR) is one of the top global health threats on the near-term horizon.

Up to 10 million deaths could occur every year by 2050 because of AMR, the UN says.

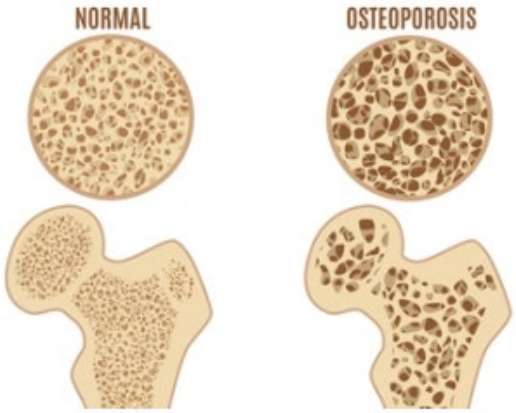
The disinfectants, antiseptics and antibiotics that can help microbes become stronger are everywhere, from toothpaste and shampoo to cow's milk and wastewater.

Read more:
https://medicalxpress.com/news/2023-02-pollution-boosting-superbug-silent-pandemic.html

Environmental Health

Large Study Finds that Air Pollution Speeds Bone Loss from Osteoporosis

Elevated levels of air pollutants are associated with bone damage among postmenopausal women, according to new research led by scientists at Columbia University Mailman School of Public Health. The effects were most evident on the lumbar spine, with nitrous oxides twice as damaging to the area as in normal aging.



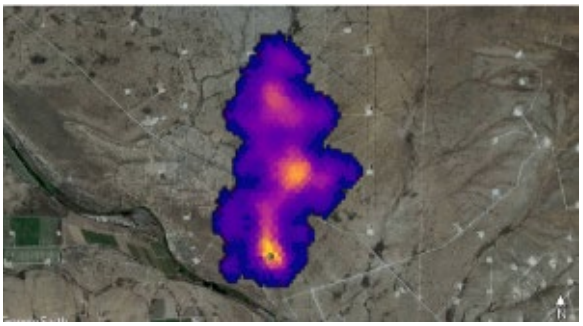
The research findings appear in the journal eClinicalMedicine.

Previous studies on individual pollutants have suggested adverse effects on bone mineral density, osteoporosis risk, and fractures in older individuals. The new study is the first to explore the connection between air pollution and bone mineral density specifically in postmenopausal women, and the first to explore the effects of air pollution mixtures on bone outcomes.

Read more
https://medicalxpress.com/news/2023-02-large-air-pollution-bone-loss.html

Global Alarm System Watches for Methane Superemitters

Methane is a stealthy greenhouse gas, erupting unpredictably from sources such as pipelines and gas fields. Scientists have wanted to catch these emitters in the act. In the past, watchdogs had to monitor likely sites from the ground or by airplane. Now,



massive, short-lived leaks can be detected automatically, from space, anywhere in the world—a first step toward plugging them and slowing climate change.

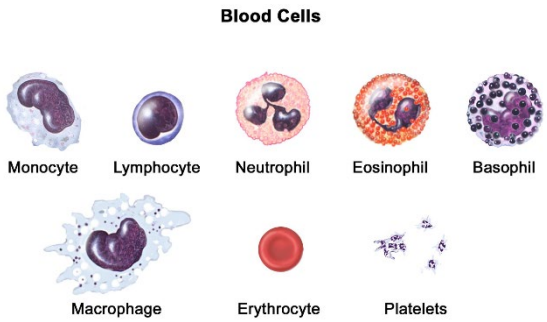
The new technique, which uses artificial intelligence (AI) to scan through the 12 million daily observations collected by a European satellite, could aid future efforts to spot plumes in data collected by satellites, such as the International Methane Emissions Observatory announced in 2021 by the United Nations. Although so far the technique only captures the largest blowouts, there's no better place to begin, says Ilse Aben, an atmospheric scientist at the Netherlands Institute for Space Research (SRON) and co-author of the new work. "That's the low-hanging fruit," she says. "If you're putting in the effort to stop leaks of methane, better to start with the big ones."

R*ead more*:
https://www.science.org/content/article/global-alarm-system-watches-methane-superemitters

PFAS Can Suppress White Blood Cell's Ability to Destroy Invaders

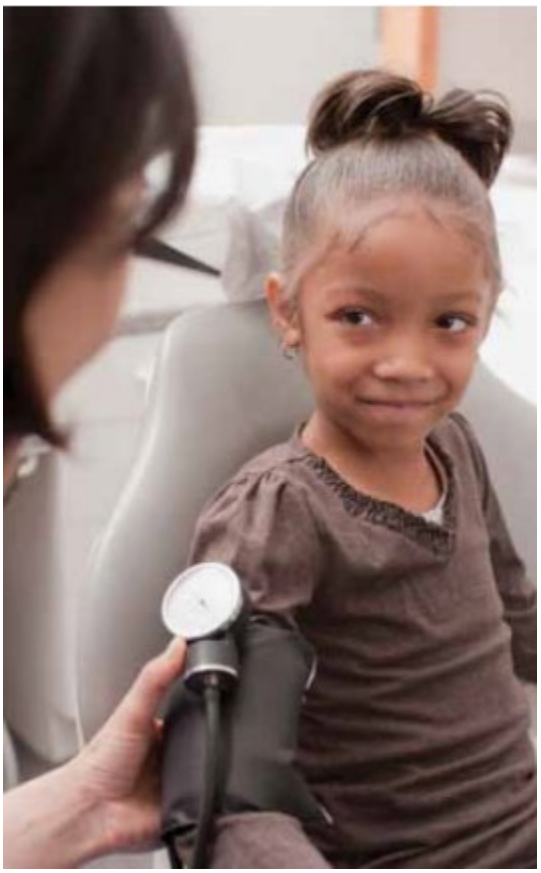
In a new study, researchers found that the PFAS chemical GenX suppresses the neutrophil respiratory burst—the method white blood cells known as neutrophils use to kill invading pathogens. The study is an important first step in understanding how both legacy and emerging PFAS chemicals might affect the body's innate immune system.

PFAS are a class of per- and polyfluoroalkyl chemicals used to make consumer and industrial products more resistant to water, stains and grease. According to the U.S. Environmental Protection Agency, there are more than 12,000 known PFAS, which also include fluoroethers such as GenX.



Read more:
https://medicalxpress.com/news/2023-02-pfas-suppress-white-blood-cell.html

Fine Particles in the Air Associated with Higher Blood Pressure in London Teens



A study of adolescents aged 11–16 in London has found long-term exposure to PM2.5 is associated with higher blood pressure, with stronger associations seen in girls.

Findings also show that exposure to high levels of nitrogen dioxide is associated with lower blood pressure in this group.

The paper, published today in PLOS ONE by researchers from King's College London, examines the possible effects of long-term exposure to air pollution in children attending 51 schools across the capital.

Senior author Professor Seeromanie Harding, from King's College London, said, "This longitudinal study provides a unique opportunity to track exposures of adolescents living in deprived neighborhoods. Given that more than 1 million under 18s live in neighborhoods where air pollution is higher than the recommended health standards, there is an urgent need for more of these studies to gain an in-depth understanding of the threats and opportunities to young people's development."

Read more:
https://medicalxpress.com/news/2023-02-fine-particles-air-higher-blood.html

New Website Offers Hospital Purchasing Decision Makers, Health and Environmental Policy Leaders, Resources to Reduce Greenhouse Gas Emissions, Lower Costs through Increased Use of Reprocessed "Single-Use" Medical Devices

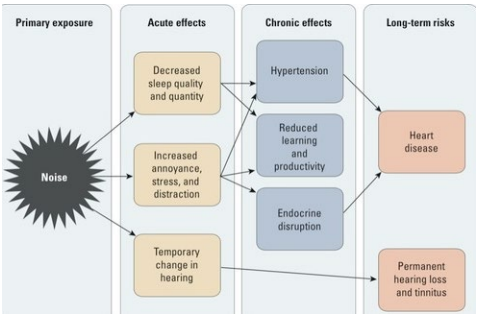
A new website from the Association of Medical Device Reprocessors promises to be a one-stop-shop for all information related to the regulated practice of reprocessing single-use medical devices (SUDs). Available at either www.ResponsibleReuse.org or www.AMDR.org, the site is designed with simple navigation and actionable information for health and environmental policy makers, hospital supply chain purchasers, researchers, journalists, and anyone else who is interested in reducing costs, waste and greenhouse gas emissions in the health sector.

The new website is a response to the spike in interest in medical device reprocessing as a low-hanging fruit for hospitals to lower costs and achieve emission reduction goals. In 2022, AMDR serviced a record number

inquiries from policy makers, journalists, and researchers from the US and Europe.

Read more:
https://www.businesswire.com/news/home/20230227005103/en/New-Website-Offers-Hospital-Purchasing-Decision-Makers-Health-and-Environmental-Policy-Leaders-Resources-to-Reduce-Greenhouse-Gas-Emissions-Lower-Costs-through-Increased-Use-of-Reprocessed-%E2%80%9CSingle-Use%E2%80%9D-Medical-Devices

Noise Pollution Can Lead to Sleep Issues, Chronic Health Problems



Noise pollution is a growing problem that can lead to sleep disruption and insomnia as well as chronic health conditions such as heart disease, cognitive impairment, depression, and anxiety, according to experts.

Much noise pollution comes from traffic. Other forms of noise pollution include the sounds of leaf blowers, construction, airplanes taking off and landing, and buzzing drones.

Loud noises can signal to the auditory system that something is wrong, triggering a fight-or-flight-response, which floods the body with stress hormones that cause inflammation and can lead to disease, said Peter James, associate professor in the Department of Environmental Health at Harvard T.H. Chan School of Public Health, in a January 5 Kaiser Health News article.

Low-income communities and those with a large proportion of nonwhite residents are disproportionately impacted by traffic noise, James and colleagues found in a 2017 paper. “We’ve made these conscious or subconscious decision as a society to put minority-race communities who have the least amount of political power in areas near highways and airports,” he said.

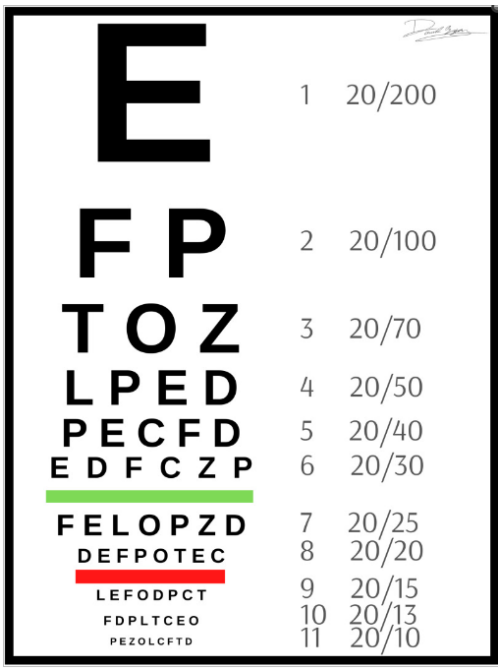
Read more:
https://www.hsph.harvard.edu/news/hsph-in-the-news/noise-pollution-can-lead-to-sleep-issues-chronic-health-problems/

Ergonomics

Digital Content Could Be Altering Your Visual Perception

So much of modern life is spent on screens: Zoom meetings and websites, smartphones and video games, televisions and social media. How are all those pixels and rectangles affecting how we see?

Binghamton University Professor of Psychology Peter Gerhardstein and doctoral candidate Nicholas Duggan explore the phenomenon in "Levels of Orientation Bias Differ Across Digital Content Categories: Implications for Visual Perception," recently published in the journal Perception. Their paper covers the extent to which online content of various types differs from real images of natural, urban and suburban scenes in terms of visual orientation.



Read more:
https://medicalxpress.com/news/2023-02-digital-content-visual-perception.html

Safety

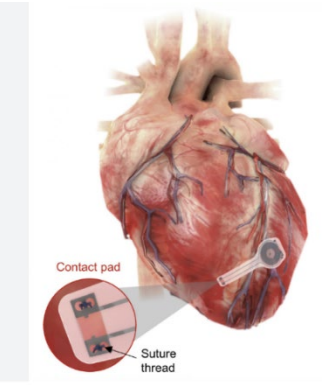
Nanomaterial Boosts Potency of Coronavirus Disinfectants

The use of peroxide-based disinfectants has grown with the emergence of the Covid-19 pandemic. Yet, the extensive use of chemical disinfectants to kill viruses and other pathogens can also threaten human health and ecosystems. Now, a research team led by the George Washington University has engineered a new nanomaterial that can boost the potency of common disinfectants. The team showed that when the nanomaterial-a double-atom catalyst-is mixed with a peroxide-based disinfectant, the disinfectant is two-to-four times more effective in disabling a coronavirus strain compared to when the disinfectant is used alone. The ability to enhance disinfectants with nanomaterials engineered from earth-abundant elements like iron and carbon is more sustainable and cost-effective, say the researchers.

Read more:
https://www.sciencedaily.com/releases/2023/02/230222115904.htm

Shock to the System: Study Shows Certain Wearable Gadgets Could Interfere with Implantable Cardiac Electronic Devices

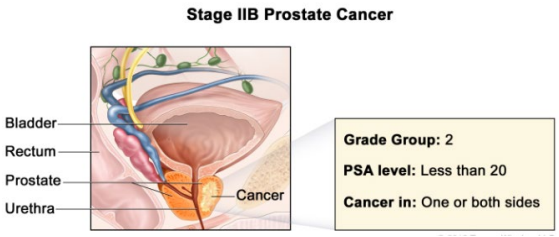
In this high-tech era, wearable devices such as smartwatches have proven to be invaluable companions for the health conscious. But a new study from the University of Utah shows that for a small group of people, some of these electronic fitness gadgets could possibly be risky to their health—even potentially deadly.



University of Utah electrical and computer engineering assistant professor Benjamin Sanchez Terrones and U associate professor of medicine Benjamin Steinberg have published a new study that shows wearable devices such as the Samsung Galaxy watch 4, Fitbit smart scales, or Moodmetric smart rings, among others, have sensing technology that could interfere with cardiac implantable electronic devices (CIEDs) such as pacemakers, implantable cardioverter defibrillators (ICDs), and cardiac resynchronization therapy (CRT) devices.

Read more:
https://medicalxpress.com/news/2023-02-wearable-gadgets-implantable-cardiac-electronic.html

Night Work May Increase the Risk of Aggressive Prostate Cancer in Offshore Petroleum Workers



Many employees in the offshore sector work night shifts. This may make them more susceptible to aggressive prostate cancer than if they only worked during the day.

After lung cancer, prostate cancer is the second most frequent cancer among men in the world with about 1.4 million new cases every year. In Norway, more than 5,000 men are diagnosed with prostate cancer yearly, making it the most frequent cancer among men in the country. Previous studies have shown that persons working in the Norwegian offshore petroleum industry have a 20 percent higher risk of getting prostate cancer compared to the rest of the Norwegian population.

Read more:
https://medicalxpress.com/news/2023-02-night-aggressive-prostate-cancer-offshore.html

Urine-Diverting Toilets Expel Fewer Virus Particles than Traditional Toilets, Study Suggests

Parents often give their children useful advice: Wash your hands, cover your cough and put the toilet lid down before flushing. Now, researchers reporting in ACS ES&T Water address that last bit of wisdom, demonstrating that each flush can spit out thousands of virus particles from infected waste. However, the team says this amount of virus won't always lead to an infection, and urine-diverting toilets can reduce a person's exposure compared to traditional systems.

It's a well-known fact that flushing a toilet sprays out tiny droplets of water, as well as urine and feces, into the air. These particles land on nearby surfaces or get breathed in by people nearby. But if it's an infected person's waste that's flushed, contagious pathogens, such as noroviruses, adenoviruses and human polyomaviruses, could also be ejected into the air.

Read more:
https://medicalxpress.com/news/2023-02-urine-diverting-toilets-expel-virus-particles.html

Researchers Say Trial of 4-Day Workweeks Shows Positive Results

Lower levels of work-related stress, as well as fewer sick days. Greater worker retention. And no drop-off in revenue for employers. These are some of the results of a recent trial of four-day workweeks at more than 60 organizations.

An international team of researchers recruited 61 organizations with a combined 2,900 employees for what's being considered the largest four-day workweek trial conducted in the world. The seven-month experiment concluded in December.

"Companies, which included a range of organizations from diverse sectors and sizes, were not required to rigidly deploy one particular type of working time reduction or four-day week, so long as pay was maintained at 100% and employees had a 'meaningful' reduction in work time," the researchers write.

Of the participating organizations, 56 continued with four-day workweeks after the trial. Of them, 18 instituted the change permanently.

Read more:
https://www.safetyandhealthmagazine.com/articles/23625-researchers-say-trial-of-4-day-workweeks-shows-positive-results

Use of Personal Sensors to Monitor Worker Stress May Come with Privacy Issues

Data from personal sensors can be used to help monitor and alleviate worker stress, but privacy concerns over who sees the data and for what purposes are two big challenges to implementation, concludes a recent study led by researchers at Cornell University.

The qualitative study focused on 11 resident physicians in a psychiatry program in a New York City hospital. A psychiatry program was chosen because of the providers' familiarity with stress, burnout and well-being. Formal 60-minute interviews were conducted, followed by "provocation sessions" with five residents and five attending physicians.

To measure the impacts of stress, the researchers developed a well-being tracker – a dashboard featuring behavioral data on the residents' sleep, activity and time

working; self-reported levels of burnout; and a text box in which the residents could describe their well-being.

Read more:
https://www.safetyandhealthmagazine.com/articles/23575-use-of-personal-sensors-to-monitor-worker-stress-may-come-with-privacy-issues

Emergency Preparedness

The Road to Safety: Researchers Work to Improve Access to Special Needs Hurricane Shelters

When Hurricane Michael made landfall in 2018 near Mexico Beach, it was the first time a Category 5 hurricane hit Florida since 1992. It posed a risk for all residents but especially for people whose physical or

cognitive impairments required them to use the state's special needs shelters.

New research from the FAMU-FSU College of Engineering and the Resilient Infrastructure and Disaster Response Center (RIDER) shows how repurposing regular shelters could cut travel times for vulnerable populations.

In work published in the journal Transportation Planning and Technology, researchers showed that repurposing one regular shelter into a special needs shelter in the Panama City area would lower the average travel time to reach it from 28.5 minutes to 7.4 minutes. The travel time went down to 4.3 minutes when three regular shelters were repurposed.

Read more:
https://www.eurekalert.org/news-releases/980301

Deployment Health

Female Soldiers Twice as Likely to Be Diagnosed with Mental Health Conditions in Theater Than Males, Study Finds

Female U.S. Army soldiers were diagnosed with a mental health condition at more than twice the rate of male troops while deployed to a combat theater, and they exceeded the rate for males for all 12 of the mental health categories examined, a new study has found.

From 2008 to 2013 -- a period selected for the study because of its high operations tempo -- female troops who were deployed "consistently had higher rates than their male counterparts" for mental health diagnoses that included stress and adjustment disorders, depression, anxiety, sleep issues and attention-deficit hyperactivity disorder, or ADHD, according to the research, published Wednesday by the Armed Forces Health Surveillance Division.

Read more:
https://www.military.com/daily-news/2023/02/22/female-soldiers-twice-likely-be-diagnosed-mental-health-conditions-theater-males-study-finds.html

Nanotechnology

Researchers Find Nanoparticles of a Rare Earth Metal Used in MRI Contrast Agents Can Infiltrate Kidney Tissue

Physicians routinely prescribe an infusion containing gadolinium to enhance MRI scans, but there is evidence that nanoparticles of the toxic rare earth metal infiltrate kidney cells, sometimes triggering severe side effects, University of New Mexico researchers have found.

In the worst cases, gadolinium, an element that has no biologic function, can trigger nephrogenic systemic fibrosis, a painful disease that affects the skin and organs and is often fatal.

In a new study published in Scientific Reports, a team led by Brent Wagner, MD, MS, associate professor in the UNM Department of Internal Medicine, describes the use of electron microscopy to detect tiny deposits of gadolinium in the kidneys of people who had been injected with contrast agents prior to their MRIs.

Read more:
https://medicalxpress.com/news/2023-02-nanoparticles-rare-earth-metal-mri.html

Regulatory Research & Industrial Hygiene Professional News

States

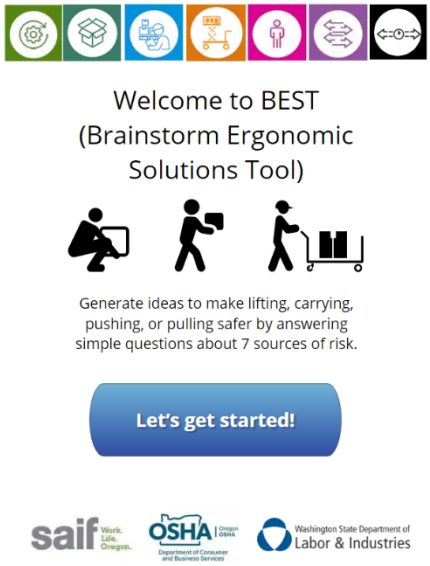
'Brainstorm' E-Tool Targets Sprain and Strain Hazards

Preventing sprains and strains on the job is the aim of a new online tool from the Washington State Department of Labor & Industries.

Developed in collaboration with Oregon OSHA, the Brainstorm Ergonomic Solutions Tool features a series of questions that focus on sources of ergonomic risk to help users explore different ways to make lifting, carrying, pushing or pulling safer.

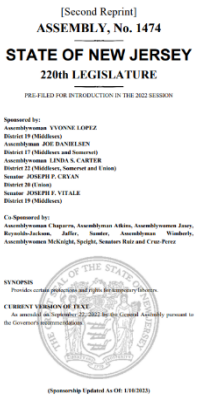
BEST gives workers an opportunity to come up with solutions, making them more invested in creating a safer workplace, Washington L&I says.

The tool examines how solutions can solve seven different sources of ergonomic risk – human, movement, object, process, time, tools and workspace – when lifting, carrying or pushing/pulling. When a task involves pushing and/or pulling, for example, the resource looks at how a change to the workspace or the task itself can enhance worker safety by asking:



Read more:
https://www.safetyandhealthmagazine.com/articles/23611-brainstorm-e-tool-targets-sprain-and-strain-hazards

New Jersey Governor Signs Law Aimed at Protecting Temp Workers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A new law in New Jersey will provide temporary workers with additional rights and protections against unsafe working conditions.

Signed into law by Gov. Phil Murphy (D) on Feb. 6, the Temporary Workers' Bill of Rights includes provisions for personal protective equipment and training in temporary occupations, including food service, landscaping, construction and transportation.

The law prohibits transportation of temporary workers in unsafe motor vehicles. Additionally, vehicles used to transport temporary workers must have a seat and safety belt for each passenger.

Read more:
https://www.safetyandhealthmagazine.com/articles/23565-new-jersey-governor-signs-law-aimed-at-protecting-temp-workers

Federal Leaislation

Trucker Access to Parking and Rest Facilities Part of Supply Chain Bill

Measures for expanded access to parking and rest facilities are included in recently proposed bipartisan legislation aimed at revamping the interstate trucking supply chain system.

Introduced Jan. 24 by Reps. Dusty Johnson (R-SD) and Jim Costa (D-CA), the Safer Highways and Increased Performance for Interstate Trucking Act (H.R. 471) would permit the transportation secretary to issue grants for projects that provide truck parking. Those grants would total $175 million in fiscal year 2023 and a combined $580 million over the next three fiscal years.

In step with a Senate bill (S. 5169) introduced in the previous Congress, entities eligible for grants would be:

Read more:
https://www.safetyandhealthmagazine.com/articles/23530-trucker-access-to-parking-and-rest-facilities-part-of-supply-chain-bill

OSHA

US Department of Labor Cites US Postal Service for Failing to Provide Running Water, Usable Bathroom at Chesapeake Facility for More Than a Month

Citations Issued: One serious violation and one repeat violation

Investigative Findings: The U.S. Department of Labor's Occupational Safety and Health Administration opened an inspection at the U.S. Postal Service's Chesapeake facility on Aug. 30, 2022, responding to an allegation

that the employer did not provide potable water to the facility or an operating bathroom.

OSHA inspectors learned the Postal Service had not paid water and sanitation bills dating back to February 2022, which resulted in late payment fees. In July 2022, the water supply was shut off for non-payment and was not returned to service until the day after OSHA's inspection. Inspectors determined the facility made an employee work there without running water or a usable bathroom for more than a month.

Proposed penalties: $13,840

Read more:
https://www.osha.gov/news/newsreleases/brief/02072023

NIOSH

Whole-Body Vibration Analysis of Golf Course Maintenance Tasks

Request
Management from a golf course requested a health hazard evaluation concerning maintenance employees' exposure to whole-body vibration. Employees reported pain or discomfort in their lower back, shoulders, neck, and knees, which they thought was related to excessive whole-body vibration while doing certain work tasks.

Workplace
The golf course consisted of 36 holes sitting on approximately 335 acres. Each hole consisted of a tee box, concrete cart path, fairway, grass and wooded rough, fairway hazards (bunkers, traps, and water hazards), and a putting green. The maintenance area consisted of an office building and partially covered structures for equipment storage.

Read more:
https://www.cdc.gov/niosh/hhe/reports/pdfs/2018-0137-3385.pdf

EPA

EPA Proposes Rule to Protect Farmworkers and Pesticide Handlers from Exposures

Today, the U.S. Environmental Protection Agency (EPA) announced a proposed rule that would improve and modernize the pesticide Application Exclusion Zone (AEZ) requirements under the 2015 Agricultural Worker Protection Standard (WPS), reaffirming the Agency's commitment to protecting farmworkers, pesticide handlers, their families, and agricultural communities from pesticide exposure during National Pesticide Safety Education Month.

Read more:
https://www.epa.gov/newsreleases/epa-proposes-rule-protect-farmworkers-and-pesticide-handlers-exposures

This monthly summary is published by the Ergonomics and Industrial Hygiene Management Program for the Defense Centers for Public Health – Aberdeen.

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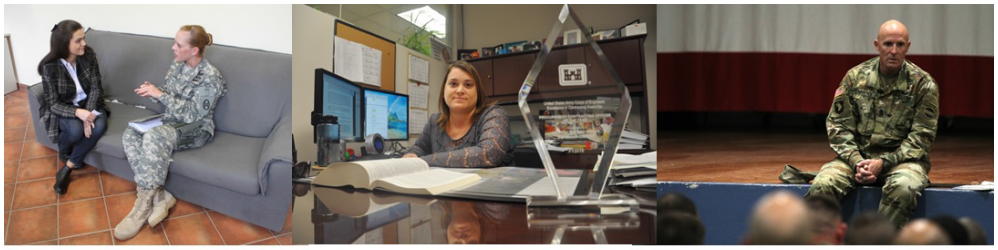
On the Web:
https://phc.amedd.army.mil/news/Pages/PublicationDetails.aspx?type=Army%20Industrial%20Hygiene%20News%20and%20Regulatory%20Summary



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.