February 2021
Issue 113

Army Industrial Hygiene News and Regulatory Summary

Hazardous Substances

A Breast Cancer Rates Higher Among African American Women from Disproportionate Chemical Exposure

Special Interest Articles:

A University of Michigan study finds a link between elevated rates of breast cancer incidents and chemical exposure from pesticides among African American women. Breast cancer is the most common cancer among women, causing the second most cancer-related deaths in the United States. However, breast cancer outcomes differ significantly among women of various races/ethnicities, with African American women being 40 percent more likely to die from breast cancer than women of any other race. Furthermore, incidences of triple-negative breast cancer (TNBC)—an aggressive breast cancer subtype lacking remediation—is approximately three-fold higher in non-Hispanic Black women (NHBW) compared to non-Hispanic White women (NHWW). Although past studies suggest genetic and environmental factors interact to produce these differences in breast cancer outcomes, genetic factors only play a minor role while disparities (differences) in

external factors (i.e., chemical exposure) may play a more notable role.

Read more:
https://beyondpesticides.org/dailynewsblog/2021/02/breast-cancer-rates-higher-among-african-american-women-from-disproportionate-chemical-exposure/

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

Contents:

PM2.5 Concentration and Composition in Subway Systems in the Northeastern United States

Objectives:
The goals of this study were to assess the air quality in subway systems in the northeastern United States and estimate the health risks for transit workers and commuters.

Methods:
We report real-time and gravimetric $PM_{2.5}$ concentrations and particle composition from area samples collected in the subways of Philadelphia, Pennsylvania; Boston, Massachusetts; New York City, New York/New Jersey (NYC/NJ); and Washington, District of Columbia. A total of 71 stations across 12 transit lines were monitored during morning and evening rush hours.

Results:
We observed variable and high $PM_{2.5}$ concentrations for on-train and on-platform measurements during morning (from 0600 hours to 1000 hours) and evening (from 1500 hours to 1900 hours) rush hour across cities. Mean real-time $PM_{2.5}$ concentrations in underground stations were 779±249, 548±207, 341±147, 327±136, and 112±46.7 $\mu g/m^3$ for the PATH-NYC/NJ; MTA-NYC; Washington, DC; Boston; and Philadelphia transit systems, respectively. In contrast, the mean real-time ambient $PM_{2.5}$ concentration taken above ground outside the subway stations of PATH-NYC/NJ; MTA-NYC; Washington, DC; Boston; and Philadelphia were 20.8±9.3, 24.1±9.3, 12.01±7.8, 10.0±2.7, and 12.6±12.6 $\mu g/m^3$, respectively.

Read more:
https://ehp.niehs.nih.gov/doi/10.1289/EHP7202

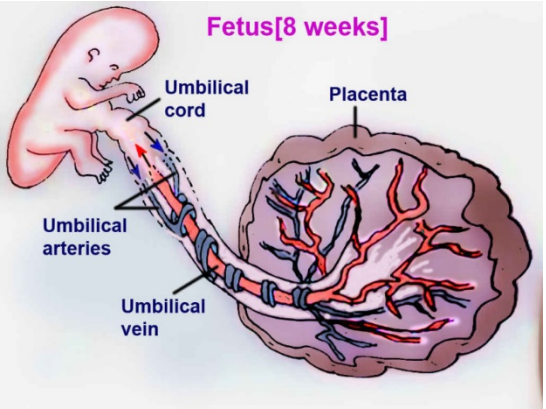
Bisphenol S and Epidermal Growth Factor Receptor Signaling in Human Placental Cytotrophoblasts

Background:
Bisphenol S (BPS) is an endocrine-disrupting chemical and the second most abundant bisphenol detected in humans. *In vivo* BPS exposure leads to reduced binucleate cell number in the ovine placenta. Binucleate cells form by cellular fusion, similar to the human placental syncytiotrophoblast layer. Given that human placental syncytialization can be stimulated through epidermal growth factor (EGF), we hypothesized that BPS would reduce human cytotrophoblast syncytialization through disruption of EGF receptor (EGFR) signaling.

Objective:
We tested whether BPS interferes EGFR signaling and disrupts human cytotrophoblast syncytialization.

Methods:
We first tested BPS competition for EGFR using an EGF/EGFR AlphaLISA assay. Using human primary term cytotrophoblast cells (hCTBs) and MDA-MD-231 cells, a breast cancer cell line with high EGFR expression, we evaluated EGFR downstream signaling and tested whether BPS could inhibit the EGF response by blocking EGFR activation. We also evaluated functional end points of EGFR signaling, including EGF endocytosis, cell proliferation, and syncytialization.

Results:
BPS blocked EGF binding in a dose-dependent manner and reduced EGF-

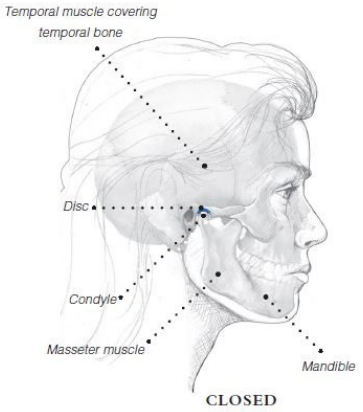


mediated phosphorylated EGFR in both cell types. We further confirmed that BPS acted as an EGFR antagonist as shown by a reduction in EGF internalization in both hCTBs and MDA-MD-231 cells. Finally, we demonstrated that BPS interfered with EGF-mediated cell processes, such as cell proliferation in MDA-MD-231 cells and syncytialization in hCTBs. EGF-mediated, but not spontaneous, hCTB syncytialization was fully blocked by BPS (200 ng/mL), a dose within urinary BPS concentrations detected in humans.

Conclusions:
Given the role of EGFR in trophoblast proliferation and differentiation during placental development, this study suggests that exposures to BPS at environmentally relevant concentrations may result in placenta dysfunction, affecting fetal growth and development.

Read more:
https://ehp.niehs.nih.gov/doi/10.1289/EHP7297

Exposure to Periods of Low Oxygen Can Result In Underdeveloped Jaw Cartilage



Breathing in adequate amounts of oxygen is critical for human life. However, certain disorders can cause individuals to go through periods where they are exposed to periodical low levels of oxygen, called intermittent hypoxia (IH). This is common in people who suffer from some sleep disorders like obstructive sleep apnea. Although we know IH can cause neurological development issues, it is not clear how it affects cartilage. Now, researchers at Tokyo Medical and Dental University (TMDU) have shown that IH can result in underdeveloped jaw cartilage in rats.

In an article published in *Scientific Reports*, researchers from TMDU revealed the inhibitory effects of IH on the growth of cells in the condylar cartilage of the mandible, which is the cartilage found at the rounded end of the jawbone. Previous work had primarily focused on how IH affects only bone growth.

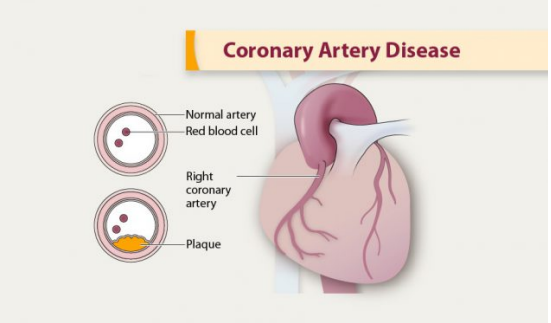
Read more: https://www.news-medical.net/news/20210301/Exposure-to-periods-of-low-oxygen-can-result-in-underdeveloped-jaw-cartilage.aspx

Associations between Blood Lead Levels and Coronary Artery Stenosis Measured Using Coronary Computed Tomography Angiography

Background:
Lead exposure is a risk factor for increased blood pressure and cardiovascular disease, even when blood lead levels (BLLs) are within the normal range.

Objective:
This study aimed to investigate the association between BLL and coronary artery stenosis (CAS) in asymptomatic adults using 128-slice dual-source coronary computed tomography (CT) angiography.

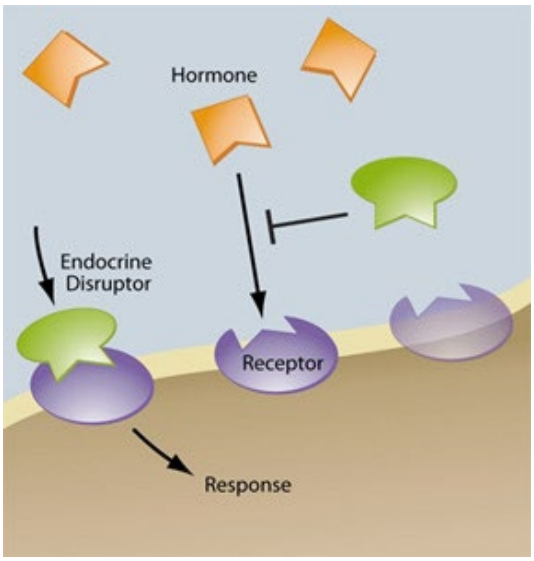
Methods:
We analyzed medical records data from 2,193 adults (1,461 men and 732 women) who elected to complete a screening health examination, coronary CT angiography, and BLL measurement during 2011–2018 and had no history of CAS symptoms, cardiovascular disease, or occupational exposure to lead. Logistic regression models were used to estimate associations between moderate-to-severe CAS (≥25% stenosis) and a 1-μg/dL increase in blood lead, with and without adjustment for age, sex, hypertension, diabetes mellitus, dyslipidemia, body mass index, regular



exercise, smoking status, and alcohol drinking.

Read more:
https://ehp.niehs.nih.gov/doi/10.1289/EHP7351

New 'E-Morph' Test Method Replaces Animal Experiments to Detect Hormone-Like Effects



Endocrine disruptors (EDs) are hormone-like substances that can have undesirable effects on health. For example, chemicals can increase the risk of breast cancer if they act in a manner similar to the female sex hormone estrogen. Animal experiments are still required to detect the hormonal effects of chemical substances.

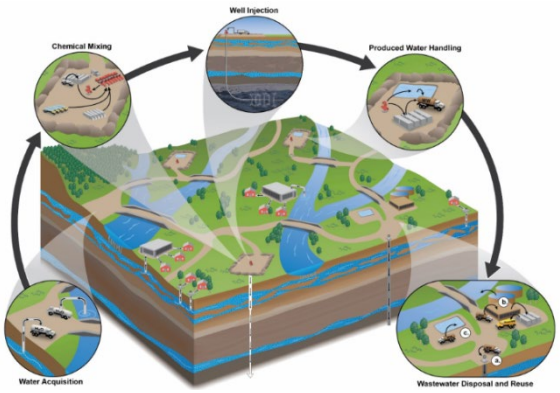
A test has now been developed at the German Centre for the Protection of Laboratory Animals (Bf3R) that tests the effects of hormones on cultured human cells. The center is part of the German Federal Institute for Risk Assessment (BfR). With the help of microscopy and artificial intelligence, the "E-Morph" test reliably identifies substances that can have estrogen-like or even opposing effects, according to the research team's report in the specialist journal "Environment International".

Read more: https://www.news-medical.net/news/20210226/New-E-Morph-test-method-replaces-animal-experiments-to-detect-hormone-like-effects.aspx

Research Uncovers Mechanism Responsible For Formation of Toxic Fracking Byproducts

Hydraulic fracturing, also known as "fracking," relies on water, sand and other chemicals to clear the way for engineers to remove oil or gas from shale -; porous rocks below the ground.

Engineers know what they are pumping into the ground, but they haven't understood why they have found certain highly dangerous compounds in flowback -; the mixture of water, salt and other chemicals that flows back to the surface after being pumped through the shale.
Now, research from the lab of Kimberly Parker, assistant professor in the Department of Energy, Environmental & Chemical Engineering at the McKelvey School of Engineering at Washington University in St. Louis, shows that underground presence of halogen radicals is a key to the formation of these halogenated



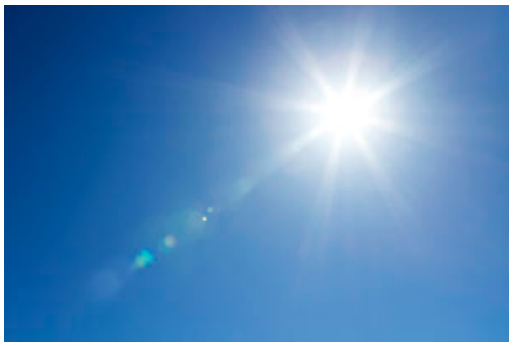
organic compounds, which are dangerous for human health and damaging to the environment.

Read more: https://www.news-medical.net/news/20210215/Research-uncovers-mechanism-responsible-for-formation-of-toxic-fracking-byproducts.aspx

Radiation

Occupational Exposure to Solar Ultraviolet B Radiation and Risk of Subtypes of Breast Cancer in Danish Women

Objectives Previous epidemiological studies have indicated that solar ultraviolet B radiation (UVR) may have a protective effect on breast cancer. However, the evidence remains inconclusive. Despite the fact that outdoor work history may be considered a reliable measure of long-term UVR exposure, objective information on lifetime employment has not been included



in previous investigations focusing on breast cancer. To address this issue, we explored the association between occupational UVR exposure and female breast cancer, including subtypes.

Methods A total of 38 375 women under the age of 70 years were identified with primary breast cancer using the Danish Cancer Registry. Five female controls born on the same year, alive and free of breast cancer at the time of diagnosis of the index case, were randomly selected from the Danish Civil Registration System. The Danish Supplementary Pension Fund Register was used to retrieve full employment history, and a job exposure matrix was used to assess occupational UVR exposure. Conditional logistic regression with adjustment for important confounders was used to estimate the OR.

Read more:
https://oem.bmj.com/content/early/2021/01/14/oemed-2020-107125

Ventilation

Ventilation in Schools and Childcare Programs

Ventilation is one component of maintaining healthy environments, and is an important COVID-19 prevention strategy for schools and childcare programs. Wearing a well-fitting, multi-layer mask helps prevent virus particles from entering the air or being breathed in by the person wearing a mask. Good ventilation is another step that can reduce the number of virus particles in the air. Along with other preventive actions, ventilation can reduce the likelihood of spreading disease. Below are ways you can improve ventilation in

your school or childcare program, whether in a large building or in a home:
Read more:
https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/ventilation.html

PPE

From the Hard Hat to the Helmet

Over the past several years, hard hats received a small yet significant change: rated chinstraps. Now, more than ever, manufacturers are producing climbing-style helmets with a rated chinstrap. What are the histories of the hard hat and the current helmet trend, and what could the future bring?

History Lesson
Nearly 100 years ago when he came back from World War I, Edward Bullard noted the rapid increase in city infrastructure. Men moving and working at height were wearing minimal to zero PPE. The Bullard company, originally a mining equipment manufacturer, had already made a less-than-durable mining cap constructed from leather.

Read more:
https://ohsonline.com/articles/2021/03/01/from-the-hard-hat-to-the-helmet.aspx?admgarea=ht.PPE

Noise

Long Island Audiologist: Clear Link between Kidney Disease and Hearing Loss

Hearing aid experts at New York audiology practice I Love Hearing are raising awareness of the deep connection between kidney disease and hearing loss throughout National Kidney Month.

According to Dr. Amy Sapodin, an audiologist at I Love Hearing, the average

American is unaware that one of these conditions can be a telltale sign of the other.

"Nobody expects to be asked about kidney disease when they get their hearing checked, since many have no idea that the two are even connected," said Sapodin. "However, it is a fact that those with kidney disease are much more likely to have hearing loss."

Sapodin said the kidney and the ear are structurally, functionally, and biologically similar, so conditions that affect one may affect the other. Some of these issues can begin as early as in utero.

Read more:
https://finance.yahoo.com/news/long-island-audiologist-clear-between-135000110.html

Preventive Medicine

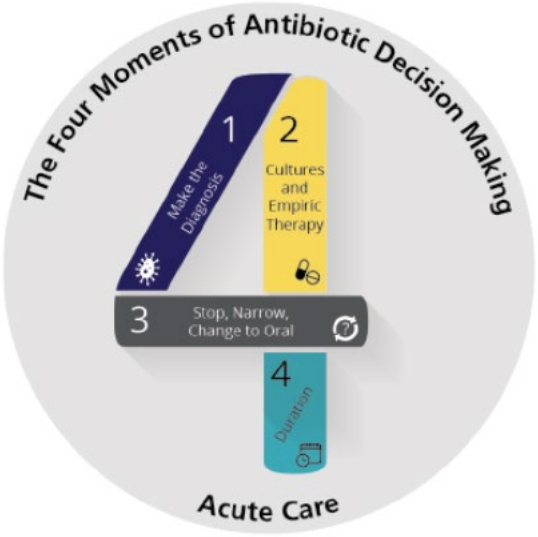
Male 'Night Owls' More Likely to Retire Early Due to Disability

Male 'night owls' face an increased risk of early retirement because of disability, a study has suggested.
According to a University of Finland study, which has been published in the journal Occupational & Environmental Medicine, people with an evening chronotype (E-types) are more likely to underperform at work and stop working due to disability than morning chronotypes.
A person's chronotype – whether they perform better during the evening or morning, depending on their preferred sleep cycle – can be influenced by environmental and age-related factors, as well as their genetics.

Read more:
https://www.personneltoday.com/hr/male-night-owls-more-likely-to-retire-early-due-to-disability/

National Safety Program Linked to Reduced Hospital Antibiotic Use

Implementation of a national safety program that helps US hospitals to establish antibiotic stewardship programs (ASPs) and clinicians to improve their antibiotic decision-making was associated with reduced antibiotic use and fewer hospital-onset *Clostridioides difficile* infections, according to a study today in *JAMA Network Open.*



The study, conducted by researchers with the Johns Hopkins University School of Medicine, the University of Chicago, and the Agency for Healthcare Research and Quality (AHRQ), evaluated the impact of AHRQ's Safety Program for Antibiotic Use, which was established in 2017 to support hospitals in their efforts to establish ASPs and successfully implement stewardship principles. ASPs have been associated with reduced antibiotic use in individual hospitals across the country.

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Read more:
https://www.cidrap.umn.edu/news-perspective/2021/02/national-safety-program-linked-reduced-hospital-antibiotic-use

A Nationally Representative Study of Law Enforcement Shiftwork and Health Outcomes

The purpose of this study was to estimate the effect of past and current rotating shift assignments on U.S. law enforcement officers' health outcomes. In a nationally representative sample of 2,867 officers, with an oversample of female officers, we estimated models of sleep quality and fatigue, physical health outcomes, and psychological health outcomes. Further, we examined individual and agency-level

factors associated with officers who reported currently working a rotating shift, to investigate what patterns there may be in shift assignments. A history of rotating shift assignments was positively associated with lower sleep quality, and with hypertension, diabetes, and high cholesterol, but not with gastrointestinal disorders, perceived stress, emotional well-being, or suicidality. The associations of shiftwork with health outcomes did not vary by gender. Demographic characteristics did not predict current rotating shift assignments, but a longer history of shiftwork and more working hours did predict a current shift assignment. Attention to mitigating shift system designs as well as the effect of cumulative years of working a rotating shift for the benefit of officer health outcomes is warranted.

Read more: Journal of Occupational and Environmental Hygiene, Published online: 10 Feb 2021 (Available with AIHA membership)

Swedish Study Finds Hospital Wastewater Selects For Multidrug-Resistance

A new study conducted in Sweden provides evidence that hospital wastewater selects for multidrug-resistant strains of bacteria while killing antibiotic-sensitive bacteria. In the study, published late last week in *Environment International*, a team led by researchers from Sweden's University of Gothenburg conducted a series of laboratory experiments to test whether filtered wastewater from a major Swedish hospital, as well as treated and untreated municipal wastewater, select for antibiotic resistance. Compared with the municipal wastewater, the hospital wastewater had the highest concentrations of antibiotics (including cefadroxil, ciprofloxacin, linezolid, and amoxicillin).

Read more: https://www.cidrap.umn.edu/news-perspective/2021/02/asp-scan-weekly-feb-19-2021

An Origami-Inspired Medical Patch for Sealing Internal Injuries

Many surgeries today are performed via minimally invasive procedures, in which a small incision is made and miniature cameras and surgical tools are threaded through the body to remove tumors and repair damaged tissues and organs. The process results in less pain and shorter recovery times compared to open surgery.

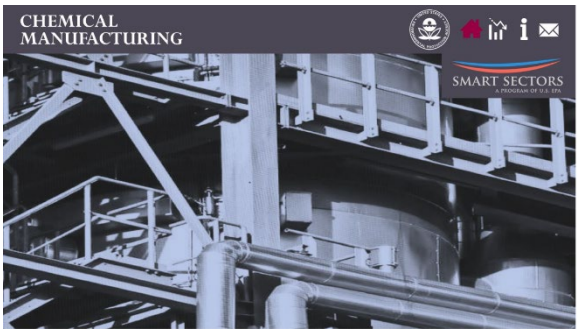
While many procedures can be performed in this way, surgeons can face challenges at an important step in the process: the sealing of internal wounds and tears. Taking inspiration from origami, MIT engineers have now designed a medical patch that can be folded around minimally invasive surgical tools and delivered through airways, intestines, and other narrow spaces, to patch up internal injuries. The patch resembles a foldable, paper-like film when dry. Once it makes contact with wet tissues or organs, it transforms into a stretchy gel, similar to a contact lens, and can stick to an injured site.

Read more:
https://www.eurekalert.org/pub_releases/2021-02/miot-aom020221.php

Environmental Health

Discovery May Reduce the Environmental Impact of Chemical Manufacturing

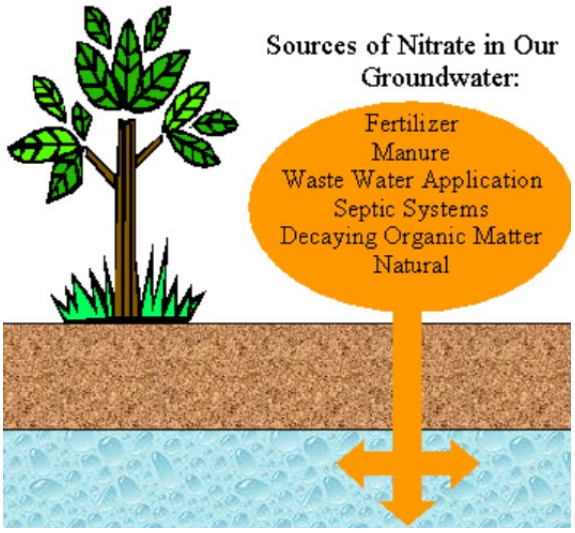
Chemical manufacturers frequently use toxic solvents such as alcohols and benzene to make products like pharmaceuticals and plastics. Researchers are examining a previously overlooked and misunderstood phenomenon in the chemical reactions used to make these products. This discovery brings a new fundamental understanding of catalytic chemistry and a steppingstone to



practical applications that could someday make chemical manufacturing less wasteful and more environmentally sound.
The study led by University of Illinois Urbana-Champaign researcher David Flaherty, University of Minnesota, Twin Cities researcher Matthew Neurock and Virginia Tech researcher Ayman Karim is published in the journal *Science*.

Read more: https://www.news-medical.net/news/20210205/Discovery-may-reduce-the-environmental-impact-of-chemical-manufacturing.aspx

Prenatal Exposure to Nitrate from Drinking Water and Markers of Fetal Growth Restriction: A Population-Based Study of Nearly One Million Danish-Born Children



Background:
High levels of nitrate (NO_3) in drinking water cause methemoglobinemia in infants; however, few studies have examined the potential effects of low-level exposure on fetal growth, and the results have been inconsistent.

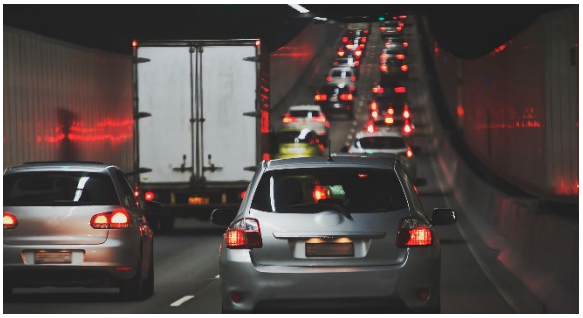
Objectives:
We sought to assess the association between maternal exposure to nitrate in drinking water during pregnancy and offspring size at birth in a nationwide study of full-term (≥37 wk gestation) live-born singletons.

Methods:
We estimated maternal nitrate exposure for 898,206 births in Denmark during 1991–2011 by linkage of individual home address(es) with nitrate data from the national monitoring database. Maternal address during pregnancy, infant size at birth [i.e., birth weight, low birth weight (LBW), body length, and birth head circumference] and covariates were compiled from the Danish Civil Registration System, the Danish Medical Birth Register, and The Integrated Database for Longitudinal Labor Market Research. Linear and logistic models with generalized estimating equations were used to account for multiple births to an individual. Nitrate exposure was modeled using five categories

and as a log-transformed continuous variable.

Read more: https://ehp.niehs.nih.gov/doi/10.1289/EHP7331

Potential Mechanisms behind Air Pollution Toxicity: Findings from Real-World Chronic Exposures



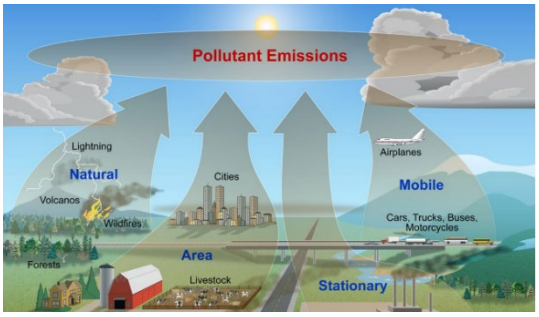
Traffic is one of the major contributors to air pollution in urban areas; the dynamic mixture of gases and particles that results from vehicle exhaust and noncombustion emissions such as road and tire wear is known as traffic-related air pollution (TRAP).[1] The impact of TRAP exposure on human health has been the subject of epidemiological studies for two decades, but the mechanisms by which TRAP-associated particulate matter (PM) alters heart and lung function remain to be elucidated. In a recent pilot study reported in *Environmental Health Perspectives*, investigators sought to address this issue using a real-world model of TRAP exposure in rats.[2]

Worldwide, ambient air pollution is estimated to cause 3.8 million premature deaths per year due to cardiovascular and respiratory diseases.[3,4] Several studies have reported an association between acute exposure to highly concentrated PM and development of cardiopulmonary dysfunction in humans and animals.[5,6,7,8,9]

Read more: https://ehp.niehs.nih.gov/doi/10.1289/EHP8877

Extreme UV Laser Shows Generation of Atmospheric Pollutant

Hokkaido University scientists show that under laboratory conditions, ultraviolet light reacts with nitrophenol to produce smog-generating nitrous acid.
An advanced laser technique has allowed researchers to observe, in real-time, the decomposition of a pollutant into atmospheric nitrous acid, which plays a key



role in the formation of ozone and photochemical smog. The technique, described by Hokkaido University researchers in *The Journal of Physical Chemistry Letters*, could be used in a wide range of applications.

Read more:
https://www.eurekalert.org/pub_releases/2021-02/hu-eul020221.php

Ergonomics

Stiff Neck, Aching Shoulders... Why Your Varifocals Could Be to Blame

As a busy medical secretary, Barbara Smith spent many hours peering at her computer screen typing up doctors' notes and so, when her neck and shoulders became stiff and painful, she assumed the long hours at her desk were taking their toll.
'Some days I would be sitting in front of my screen for 12 hours,' says Barbara, 74.
'A stiffness began at the bottom of my neck and spread along my shoulders, and it wasn't long before I was finding normal, everyday movements difficult.

Read more:
https://www.dailymail.co.uk/health/article-9288575/Stiff-neck-aching-shoulders-varifocals-blame.html

Physical Workload and Increased Frequency of Musculoskeletal Pain: A Cohort Study of Employed Men and Women with Baseline Occasional Pain

Objectives Musculoskeletal pain (MSP) is prevalent among the workforce. This study investigates the long-term association between physical workload (PWL) and increased frequency of MSP among male and female employees with pre-existing occasional MSP.

Methods This study uses the Stockholm Public Health cohort survey data from the baseline 2006. The sample includes 5715 employees with baseline occasional MSP (no more than a few days per month). Eight PWL exposures and overall PWL were estimated using a job-exposure matrix

(JEM). The JEM was assigned to occupational titles from a national register in 2006. Follow-up survey data on frequent MSP (a few or more times a week) were collected from 2010. Logistic regressions produced sex-specific ORs with 95% CIs and were adjusted for education, health conditions, psychological distress, smoking, BMI, leisure-time physical activity and decision authority.

Results Associations were observed between several aspects of heavy PWL and frequent MSP for men (eg, OR 1.57, 95% CI 1.13 to 2.20, among those in the highest exposure quartile compared with those in the lowest quartile for heavy lifting) and women (eg, OR 1.76, 95% CI 1.35 to 2.29, among those in the highest exposure quartile compared with those in the lowest quartile for physically strenuous work).

Read more:
https://oem.bmj.com/content/early/2021/02/04/oemed-2020-107094

Safety

NHS To Launch Mental Health Hubs for Health Workers

The NHS is set to open 40 dedicated mental health support hubs for healthcare workers across England, which will offer confidential advice for frontline staff who have 'pushed their minds and bodies to the limit' over the past year.

Staff can access services over the phone, with onward referral to online and one-to-one support from mental health clinicians,

therapists, recovery workers and psychologists.

NHS staff will be encouraged to reach out directly for help, but hubs will proactively contact staff groups who are most at risk of experiencing poor mental health.

Read more:
https://www.personneltoday.com/hr/nhs-mental-health-support-hubs/

Potentially Harmful Chemicals Found In Plastic Toys

It has long been known that several chemicals used in plastic toys in different parts of the world can be harmful to human health. However, it is difficult for parents to figure out how to avoid plastic toys containing chemicals that may cause possible health risks to their children.

Regulations and labelling schemes are different across regions and countries, and there is no international agreement on which substances should be banned from use in toy materials. For the most part, regulations and international lists of 'chemicals of concern' in toys focus on certain substance groups with known harmful properties, such as phthalates, but do not cover the wider range of chemicals found in plastic toys.

Read more:
https://www.sciencedaily.com/releases/2021/02/210222124552.htm

First Trimester Employment, Working Conditions and Preterm Birth: A Prospective Population-Based Cohort Study

Objectives To explore the association between working conditions during first trimester and total preterm birth (PTB), and subtypes: spontaneous PTB and iatrogenic PTB, additionally to explore the role of hypertension.

Methods Pregnant women from the Amsterdam Born Children and their Development study, filled out a questionnaire between January 2003 and March 2004, two weeks after first prenatal screening (singleton liveborn, n=7561). Working conditions were working hours/week, standing/walking hours/week, physical work load and job strain.

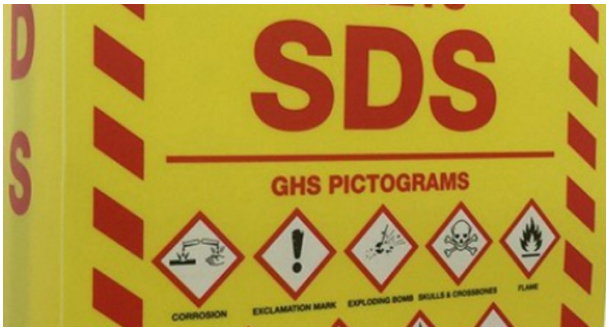
Results Prolonged standing/walking during first trimester was associated with an increased risk for total PTB (OR=1.5; 95% CI 1.0–2.3, after adjustments). Other working conditions were not related to total PTB. The separation into spontaneous and iatrogenic PTB revealed that standing/walking was associated with iatrogenic PTB only (OR=2.09; 95% CI 1.00–4.97). The highest risk was found for the combination of a long workweek with high physical work load (OR=3.42; 95% CI 1.04–8.21).

Read more:
https://oem.bmj.com/content/early/2021/02/24/oemed-2020-107072

Insufficient Respiratory Hazard Identification in the Safety Data Sheets For Cleaning and Disinfection Products Used in Healthcare Organisations Across England and Wales

Background Exposure to cleaning and disinfection products has been associated with respiratory disorders such as asthma in cleaning and healthcare workers. Safety data sheets (SDSs) provide information on hazardous chemicals that are present in products to help users with risk assessment and implement appropriate control measures. However, they have potential limitations in identifying respiratory hazards due to a lack of regulatory test methods for respiratory sensitisation and irritation of chemicals.

Methods SDSs were first used to identify chemicals on the database as respiratory sensitisers and irritants. A quantitative structure–activity relationship (QSAR) model and an asthmagen list established by



the Association of Occupational and Environmental Clinics (AOEC) were used to identify potential respiratory sensitisers and irritants (by the AOEC list only) in the cleaning and disinfection products.

Read more:
https://oem.bmj.com/content/early/2021/02/09/oemed-2020-106881

NSC Survey: 90% of Employers Say 'Impairment' at Work Means More than Just Substances

A National Safety Council survey released today shows 90% of employers are concerned about mental health and chronic stress impacting fitness for duty – in addition to persistent concerns around legal and illicit substance misuse. In response, NSC is becoming the first national organization to call on employers to consider far more than substance misuse when addressing “workplace impairment.” NSC urges that employer policies and procedures outline “workplace impairment” as anything that could impede one’s ability to function normally or safely as a result of a number of factors – from chemical substances, such as alcohol, opioids or cannabis, to physical factors like fatigue, as well as experiencing mental distress and social factors like stress.

Read more:
https://www.nsc.org/newsroom/nsc-survey-90-of-employers-say-impairment-at-work

Emergency Preparedness

Failed Storage Tanks Pose Atmospheric Risks during Disasters

When aboveground storage tanks fail during a storm and their toxic contents spread, the threat to human health can and probably will flow downwind of the immediate area.

Rice University engineers have developed a model to quantify what could happen when a hurricane or other natural disaster causes such damage based on data gathered from the Houston Ship Channel, the largest petrochemical complex in the United States, during and after two hurricanes, Ike in 2008 and Harvey in 2017.

Read more:
https://www.eurekalert.org/pub_releases/2021-02/ru-fst020121.php

Deployment Health

Study Identifies Potential Link between Soldiers Exposed to Blasts, Alzheimer's

Research shows that Soldiers exposed to shockwaves from military explosives are at a higher risk for developing Alzheimer's disease -- even those that don't have traumatic brain injuries from those blasts. A new Army-funded study identifies how those blasts affect the brain.

Researchers at the University of North Carolina at Pembroke in collaboration with the U.S. Army Combat Capabilities Development Command, now known as DEVCOM, the Army Research Laboratory, and the National Institutes of Health found that the mystery behind blast-induced neurological complications when traumatic damage is undetected may be rooted in distinct alterations to the tiny connections between neurons in the hippocampus, the part of the brain particularly involved in memory encoding and social behavior.

Read more:
https://www.army.mil/article/243681/study_identifies_potential_link_between_soldiers_exposed_to_blasts_alzheimers

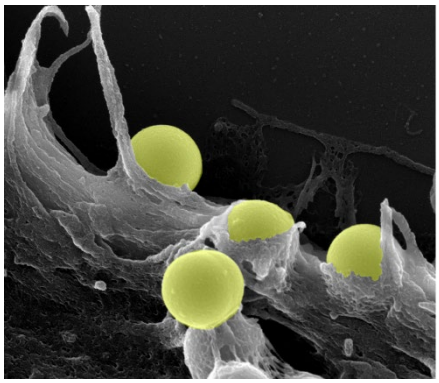
Nanotechnology

Tiny Light-Emitting Probes Give Researchers a Better Option for Noninvasive Imaging of Living Tissue

A polymer that is custom designed to produce light that penetrates murky environments has shown promise in bioimaging trials, where it can detect nano-sized particles underneath the surface of realistic tissue models.

Recent studies have demonstrated that fluorescent probes—light-emitting materials that attach to tiny targets such as cells—are particularly useful for bioimaging when they radiate in the shortwave infrared (SWIR) region of the optical spectrum. Because this type of fluorescent light

penetrates deeper into biological objects without being absorbed or scattered, SWIR probes can be spotted farther into tissue than conventional emitters. These features have enabled SWIR probes to capture high-resolution images of structures located deep within the body, such as brain tissue, without the hazards of X-rays.



Read more: https://phys.org/news/2021-02-tiny-light-emitting-probes-option-noninvasive.html

Nanotech Plastic Packaging Could Leach Silver into Some Types of Foods and Beverages

Antimicrobial packaging is being developed to extend the shelf life and safety of foods and beverages. However, there is concern about the transfer of potentially harmful materials, such as silver nanoparticles, from these types of containers to consumables. Now, researchers reporting in *ACS Applied Materials & Interfaces* illustrate that silver embedded in an antimicrobial plastic can leave the material and form nanoparticles in foods and beverages, particularly in sweet and sugary ones.

Read more: https://phys.org/news/2021-02-nanotech-plastic-packaging-leach-silver.html

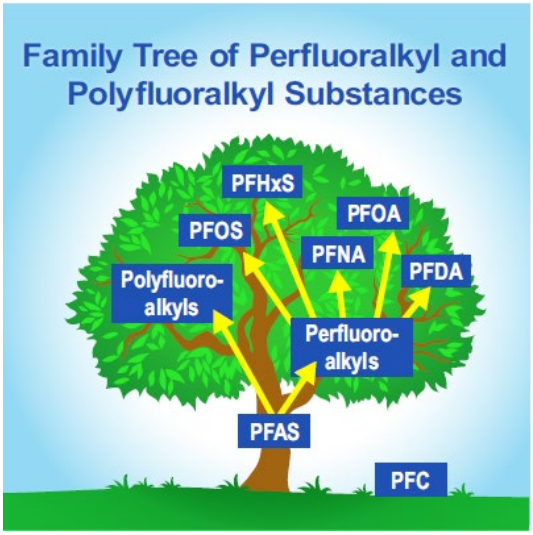
Regulatory Research & Industrial Hygiene Professional News

Executive Order

Bill to Protect Firefighters from PFAS Reintroduced in Congress

Lawmakers have reintroduced legislation which aims at protecting firefighters and the communities they serve from PFAS and other dangerous chemicals.
The Protect Firefighters from Adverse Substances (PFAS) Act was introduced in the Senate Feb. 4 by Sen. Gary Peters, D-Bloomfield Township, and other lawmakers. The PFAS Act was also introduced in the last Congress and was passed by the Senate, but didn't pass the House.
The bill would direct federal agencies to develop training and best practices to limit exposure to PFAS in fire departments nationwide.

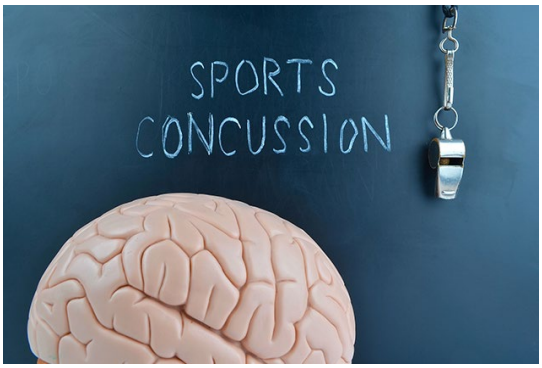
Read more:
https://www.hollandsentinel.com/story/news/environment/2021/02/06/bill-to-protect-firefighters-from-pfas-reintroduced-in-congress/43376361/



FDA

FDA Clears Path for First Rapid Handheld TBI Biomarker Test that Could Change Sports

With the close of the NFL season we've seen some big hits, and weekly examples of the ever-evolving concussion testing and safety protocols in place. Simultaneously, in the first few weeks of 2021 there have been publications linking sports practices to brain trauma given the cumulative risk associated with the number of practices and athletes participating. But what we've not heard a lot about is the almost 5 million people a



year that end up in the emergency room for traumatic brain injuries sustained from accidents, falls and other normal activities of daily life. Visits that in 2021 also put people at high risk for contracting Covid-19.

Read more:
https://www.forbes.com/sites/nicolerobertes/2021/02/06/fda-clears-path-for-1st-rapid-handheld-concussion-test-that-could-change-sport/

NIOSH

NIOSH and NHCA Collaborate in Noise Research Efforts

The National Institute for Occupational Safety and Health (NIOSH), in cooperation with the National Hearing Conservation Association (NHCA), has developed a dedicated supplemental issue of the *International Journal of Audiology* that focuses on expanding the traditional boundaries of hearing loss prevention and sharing knowledge on an international level.

Read more:
https://www.ehstoday.com/industrial-hygiene/article/21912536/niosh-and-nhca-collaborate-in-noise-research-efforts

OSHA

Hazard Communication Standard: A Proposed Rule by the Occupational Safety and Health Administration

OSHA is proposing through this notice of proposed rulemaking (NPRM) to modify the Hazard Communication Standard (HCS) to conform to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Revision 7

(GHS, Rev. 7), to address issues that arose during the implementation of the 2012 update to the HCS, and provide better alignment with other U.S. agencies and international trading partners, without lowering overall protections of the standard. OSHA has preliminarily determined that the proposed revisions to the HCS will reduce costs and burdens while also improving the quality and consistency of information provided to employers and employees regarding chemical hazards and associated protective measures.

Read more:
https://www.federalregister.gov/documents/2021/02/16/2020-28987/hazard-communication-standard

Oregon OSHA Proposes Requirements to Address COVID-19 Risks in Employer-Provided Housing

Oregon OSHA is proposing to extend protective measures against COVID-19 for workers who rely on housing provided by employers, including as part of farming operations. The risk-reducing measures – which include new options and updates – cover everything from physical distancing and ventilation to face coverings and sanitation.

The proposed permanent rule will receive three virtual public hearings later this month and a comment period through April 16. Oregon OSHA expects to repeal the rule once it is no longer needed to address the coronavirus pandemic in the context of labor housing.

Read more:
https://osha.oregon.gov/news/2021/Pages/nr2021-09.aspx

EPA

Updates to the EPA List of Alternative Test Methods to Animal Testing

EPA has updated its list of alternative test methods or strategies (New Approach Methodologies or NAMs) that do not require new vertebrate animal testing. This action helps meet the requirements of the Toxic Substances Control Act to reduce and replace, to the extent practicable and scientifically justified, the use of vertebrate animals in the testing of chemical substances or mixtures.

The updated list incorporates the following changes from the 2019 List:

- Added one new test guideline that relates to human health effects.
- Incorporated two additional EPA guidance documents that reduce the use of animal testing.
- Added version 9.0 of the organic chemicals' module of OncoLogic™, a more user-friendly version of the most widely used piece of this system that evaluates a chemical's potential to cause cancer.

Read more:
https://www.epa.gov/chemicals-under-tsca/updates-epa-list-alternative-test-methods-animal-testing-0

Death of EPA's Controversial 'Censored Science' Rule Delights Researchers

Science and environmental groups are celebrating triumph in their nearly decadelong battle against efforts to limit the kinds of scientific evidence that the Environmental Protection Agency (EPA) can use in writing new regulations.

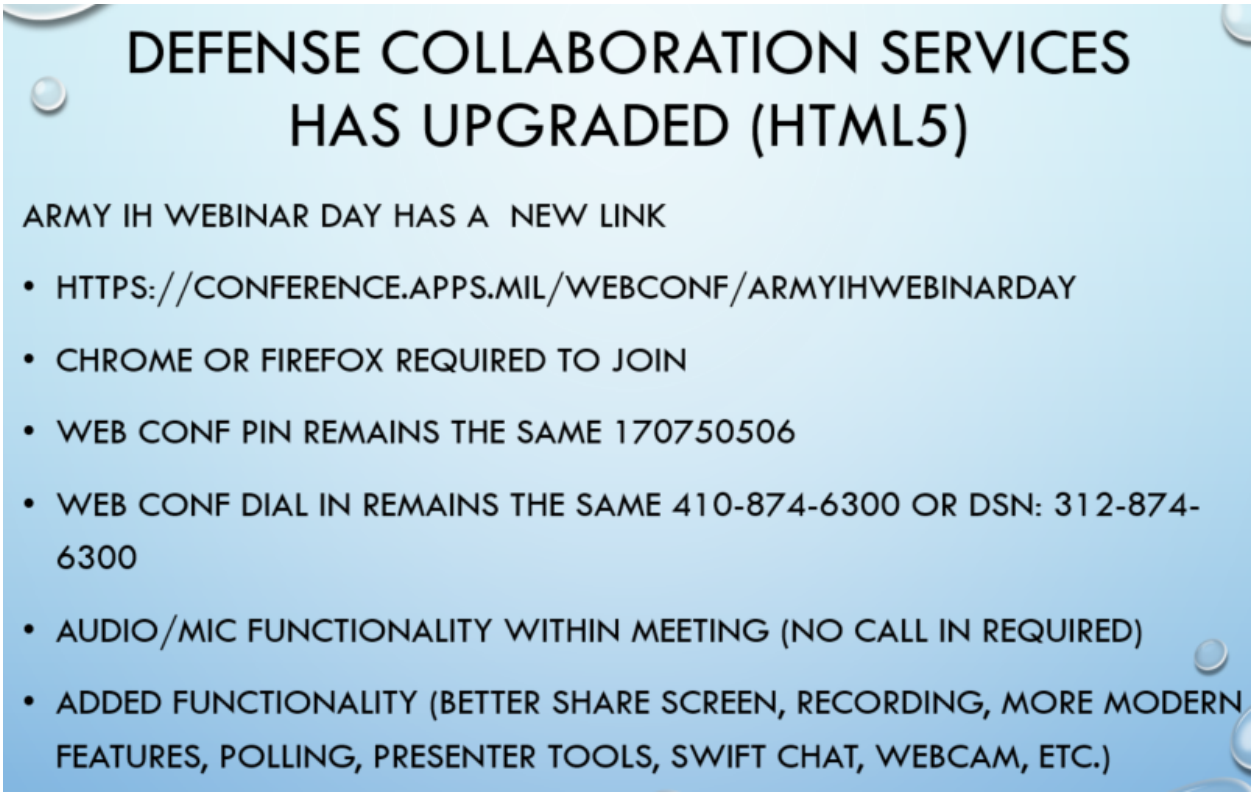
A federal judge this week killed a controversial rule, issued late in former President Donald Trump's administration, that would have allowed EPA to ignore or

downplay data from human health studies resting on confidential medical information that is difficult to make public. The agency has long relied on such nonpublic data in developing new regulations to limit air and water pollution or reduce exposure to toxic substances such as workplace chemicals and cigarette smoke. Conservatives and some companies had long pushed to restrict the practice. But the Trump administration's bid to do so violated procedural rules, ruled Judge Brian Morris of the U.S. District Court of Montana in a lawsuit brought by three environmental groups.

Read more:
https://www.sciencemag.org/news/2021/02/death-epa-s-controversial-censored-science-rule-delights-researchers

APHC

Training



2021 QUARTERLY ARMY IH WEBINAR DAY

HTTPS://CONFERENCE.APPS.MIL/WEBCONF/ARMYIHWEBINARDAY

12/2/2020	Monster	Building Downdraft Tables in DOEHRS-IH	Steven
12/2/2020	Leader	Measuring Downdraft Ventilation	Belden
12/2/2020	SME	Downdraft Ventilation Q/A	Belden
12/2/2020	SME	DOEHRS-IH Report Standardization	Delk
12/2/2020	Leader	Compressed Air use with Heavy Metals	Hueth
3/3/2021	**Leader**	**Vehicle Maintenance Shop Design Reviews**	**Parks**
3/3/2021	**Monster**	**Building Vehicle Exhaust in DOEHRS-IH**	**Steven**
3/3/2021	**Leader**	**Measuring Vehicle Exhaust**	**Parks**
3/3/2021	**SME**	**Vehicle Exhaust Q/A**	**Parks**
3/3/2021	**SME**	**Vehicle Exhaust Ototoxins Q/A**	**Merkley**
6/2/2021	Monster	Building Drive-in/Drive-through Paint Booths in DOEHRS-IH	Steven
6/2/2021	Leader	Measuring Drive-in/Drive-through Paint Booths	Belden
6/2/2021	SME	Drive-in/Drive-through Paint Booth Q/A	Belden
6/2/2021	SME	Letterkenny Paint booth incident/accident	Wisniewski
9/1/2021	**Monster**	**Building Dilution Ventilation in DOEHRS-IH**	**Steven**
9/1/2021	**Leader**	**Measuring Dilution Ventilation**	**Parks**
9/1/2021	**SME**	**Dilution Ventilation Q/A**	**Parks**
9/1/2021	**SME**	**Sampling Qualifiers**	**Secrest**

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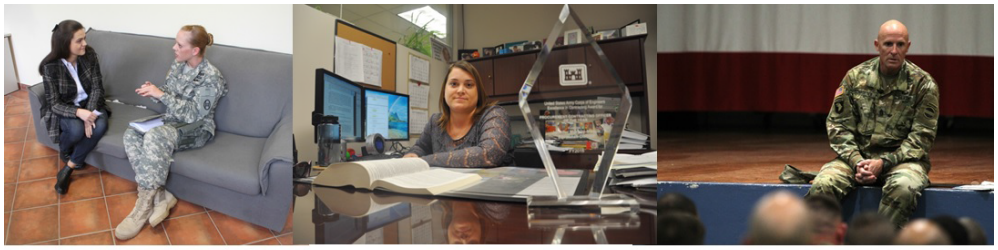

Professional Development and Career Programs

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

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

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

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