EUR. J. ONCOL. ENVIRON. HEALTH; 2025; Vol. 30, No. 1: 18377 - DOI: 10.69137/ejoeh.v29i1.18377 Mattioli 1885

PANEL 1
Perspectives on occupational and environmental health in Latin America: Lessons learned from successful international collaborations

1. Italian-Colombian cooperation in the prevention of asbestos-related diseases, Francesco Forastiere and Pietro Comba, Italy

2. Uncovering asbestos-related health risks in Sibaté: A successful international ongoing collaboration, Juan Pablo Ramos-Bonilla, Colombia

3. Ongoing research efforts in the Amazon Basin, Roberto Lucchini, Italy

4. Promising perspectives of international collaborative efforts in Uruguay, Amalia Laborde, Uruguay

Italian-Colombian cooperation in the prevention of asbestos-related diseases, Francesco Forastiere and Pietro Comba, Italy and Colombia

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Conference Sessions - Session

Policy Discussion Abstract Form

Comba Pietro

Dr. Comba worked at the Italian National Institute of Health between 1980-2019 where he was the Head of the Environmental Epidemiology Unit at the Department of Environment and Health from 1992 until his retirement. His research includes epidemiological studies on exposure to asbestos and toxic wastes. He designed and implemented SENTIERI, an Italian epidemiological survey in National Priority Contaminated Sites. In this frame he developed international cooperation with Latin American countries.

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Background or Purpose

The initial attempts to set up a framework for collaboration between Italy and Latin America in the field of environmental and occupational health concerned asbestos. Italy had been a major producer and user of this substance; estimates of its health impact on workers, family members and residents living in the neighborhood of major asbestos industrial sites were already available before the asbestos ban in 1992. The Italian National Institute of Health (Istituto Superiore di Sanità, ISS) together with the Italian Ministry of Health and the 20 Regional Governments, agreed to implement initiatives for the prevention of asbestos-related diseases, recognizing occupational and environmental asbestos exposures among the priorities of environmental health literacy. International

cooperation played a role in these undertakings also sharing technical documents on asbestos risks and impacts through EU projects.

Content

International cooperation with Colombia, with Prof. Juan Pablo Ramos Bonilla and his coworkers of Universidad de Los Andes (Uniandes), started with the participation to the Latin-American Chapter during the International Society for Environmental Epidemiology (ISEE) conference on 2011. The organization of the Symposium on preventing asbestos-related diseases in Latin America during the ISEE conference on 2015 (Brazil) strengthened the cooperation.

ISS-Uniandes collaboration was consolidated by implementing the Sibaté Project. Cooperation was later extended with visits of Colombian researchers to Casale Monferrato, University of Eastern Piedmont and University of Torino.

Implications for addressing the issue

Some key elements that played a major role in the success of the Sibaté project were:

1. several Memorandum of Understanding between ISS and Uniandes;
2. promotion of a twinning of the communities of Sibaté and Casale Monferrato;
3. adoption in Sibaté of the Casale Monferrato approach to environmental cleanup and waste management; and
4. mutual contribution to define priorities for environmental remediation.

Potential follow-up/actions

Further discussions on how to improve these collaborative efforts within the Collegium, using the presented successful approach as example.

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Uncovering asbestos-related health risks in Sibaté: A successful international ongoing collaboration

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Policy Discussion Abstract Form

Ramos-Bonilla Juan Pablo

Dr. Juan Pablo Ramos-Bonilla is an Associate Professor in the Department of Civil and Environmental Engineering at Universidad de los Andes. He has investigated the occupational and environmental health impacts of asbestos in Colombia. Since 2015, he has led an ongoing investigation into the health impacts of asbestos in Sibaté, a municipality where the asbestos industry began operations in Colombia in 1942.

All authors and affiliations

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Background or Purpose

On 2015, Universidad de los Andes (Uniandes, Bogotá, Colombia) began investigating asbestos-related disease (ARD) cases in Sibaté, Colombia, following residents' complaints. In 2019, a mesothelioma cluster was reported in Sibaté associated with local asbestos-cement production, thanks to collaboration with researchers from Colombia, Italy, and France. This groundbreaking research has had significant policy implications. This presentation outlines the establishment of this collaboration, key factors for its success, ongoing work, and future challenges.

Content

The Sibaté study was initiated by Uniandes on 2015, and by the summer of 2016, over 350 door-to-door surveys indicated a major public health problem. With these preliminary results and through networking by researchers from the Italian Istituto Superiore di Sanità, collaboration with renowned asbestos researchers from Italy and France was established in Rome in September 2016. Over three years, a network of 12+ researchers described a mesothelioma cluster in Sibaté, extensive asbestos contamination, and several mesothelioma cases diagnosed at a young age, suggesting childhood asbestos exposure. The collaboration now includes academic institutions from Italy (University of Turin and University of Eastern Piedmont), a dual-degree doctoral student studying in Italy and Colombia, collaboration with the French CNRS, and the presentation of grant proposals.

Implications for addressing the issue

The international collaboration was crucial for uncovering the public health crisis in Sibaté. Factors contributing to its success included:

1. Shared interest in understanding asbestos impact.
2. Researchers dedicated to rigorous scientific methods.
3. Integrating complementary knowledge.
4. A common goal of influencing public policy.
5. The time and intellectual generosity of renowned international researchers sharing their expertise.

Potential follow-up/actions

Despite the mesothelioma cluster being reported in April 2019 and a national asbestos ban being approved the same year, governmental authorities have done little to address the crisis in Sibaté. Funding shortages have also hindered the investigation. However, the investigation continues with the commitment and dedication of all the collaborators involved.

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Ongoing research efforts in the Amazon Basin

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Conference Sessions - Session

Policy Discussion Abstract Form

Lucchini Roberto

Roberto Lucchini is a professor of Occupational and Environmental Health with research interest in metal neurotoxicity. He conducted human cohort studies on workers, children, Parkinsonian patients, and controls, focusing on neurodevelopmental and neurodegenerative impacts. His work provided scientific evidence for risk assessment and identification of protective standards for manganese, lead, and mercury. In 2023 he started a collaborative scientific effort in the Amazon, by leading a panel of experts in occupational and environmental health.

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Background or Purpose

Gold mining is the anthropogenic activity that contributes the most to mercury contamination in the Amazon, enhanced by deforestation and climate stressors that pose additional threats to human health and ecosystems. The Indigenous people are significantly impacted, raising the need for intervention to eliminate inequalities. The Amazon may become a degraded ecosystem, as recognized at the high-level summit held in Belém, Brazil in August 2023. The eight Amazonian countries agreed on a protection plan for the forest illustrated in the Belem Declaration. The implementation of this plan is highly dependent on scientific data supporting and guiding this concerted governmental action.

Content

Considering these premises, a workshop was planned with the patronage of Collegium Ramazzini at the Annual Conference of Global Health for the Americas, held by FIU in Cartagena, Colombia, in September 2023. Experts from FIOCRUZ, Brasil, Universidad de Cartagena, Colombia, Universidade Federal do Para, Belem, Brasil, Centro de Innovación Científica Amazónica, Puerto Maldonado, Perú, Instituto Nacional de Salud, Lima, Perú, Ministério dos Povos Indígenas, Brasil, reported updates on exposure-related health impacts, genetic predispositions, and co-exposures between mercury, microplastics and agrochemicals introduced by deforestation and mining.

Implications for addressing the issue

This presentation illustrates the current experience in the Amazon research and the needs to enhance and strengthen specific partnership focused on the environmental crisis in this key area of Latin America. To avoid fragmentation of scientific efforts, unified cohorts should be created to gain epidemiological (and political) power to address the complexity of exposomic and social stressors affecting human's health in this region.

Potential follow-up/actions

The CR statement of 2021, "Reducing disease and death from artisanal small-scale mining" included recommendations for governments, employers and mineral purchasers that need to be applied locally. These inputs should be conveyed to the new Intergovernmental Science Panel for the Amazon established by the Declaration of Belem.

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Funding source
NIEHS T32ESO33955 'Training in Environmental Neurosciences'

Promising perspectives of international collaborative efforts inUruguay

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Laborde Amalia

Dr. Amalia Laborde is the former Chair Professor of Toxicology, Faculty of Medicine, Republic University of Uruguay. She is currently Freelance Professor, coordinating research and training in occupational and environmental sub-fields. She has worked on the health impact of chemicals in her country and has collaborated in the consolidation of knowledge and public health policies regarding environmental chemicals in Latin America in collaboration with Collegium Ramazzini researchers.

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Background or Purpose

Internationally collaborative scientific events may be essential activities in order to put occupational and environmental threats on the public health agenda.

Content

The International Scientific Conference, "Environmental Health in Political Agenda" was held in Uruguay 12 years ago and was supported by the Collegium Ramazzini. It was a milestone for developing new programs, creating the environmental pediatric units, and generating interest in environmental research.

Implications for addressing the issue

Nowadays, a collaborative effort initiative from the pediatric and obstetric sector is developing a 1,000 mother-child pair cohort to investigate their exposure to environmental toxicants, particularly endocrine disruptors including pesticides, household products and plastics.

Potential follow-up/actions

This project aims to become a good platform for mutual interaction and collaboration between the Collegium Ramazzini and Uruguayan researchers to increase scientific knowledge in environmental and occupational health. Additionally, it will communicate this knowledge to decision-makers and to the global public to protect the most vulnerable populations from the increasing threats from toxic chemicals.

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WORK OF THE FELLOWS I

1. Emerging occupational health risks in industrial and other construction projects: Prevention strategies, Krishna Nirmalya Sen, India

2. Artificial intelligence as an emerging workplace safety and health threat, Joseph "Chip" Hughes, USA

3. Carcinogenic evidence of a humidifier disinfectant, polyhexamethylene guanidines: Toxicological and epidemiological findings of lung cancer induced by humidifier disinfectant exposure, Cheong Hae Kwan, Republic of Korea

4. Investigating asbestos contamination in the framework of information gaps: The Sibaté asbestos-cement facility case study, Juan Pablo Ramos-Bonilla,

Emerging occupational health risks in industrial and other construction projects: Prevention strategies

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Conference Sessions - Session

Policy Discussion Abstract Form

Sen Krishna Nirmalya

Dr Sen is the Head of the Department of Environment, Health and Safety in L&T Construction, M&M Strategic Business Group. On an average, over 25,000 construction workers are deployed by the particular strategic business group.

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Background or Purpose

In India, the construction industry is the second largest sector in terms of employment with around 74 million workers and contributes nearly 9 to 11% of the country's GDP. Construction workers are often exposed to various high level occupational health risks. As per the recent global estimates, 88% of work-related deaths, were attributed to work-related diseases. Moreover, less than 5% workers are employed by large construction organizations. The balance workers are mostly unregulated.

Content

Occupational health related risk factors are often ignored at workplaces, and construction industry in India is no exception. This can be attributed to lack of awareness, and chronic nature of health effects. Construction workers are highly susceptible to various occupational health risks owing to the intrinsic characteristics, constantly evolving workplaces, introduction of new materials/equipment and processes. Occupational risk factors include MSDs, vibration, noise, chemicals, heat-related illnesses and air contaminants like silica dust, asbestos, fumes, and

gases. In addition, introduction of new machinery/equipment and materials with nano technology are presenting novel risks to construction workers.

Implications for addressing the issue

A majority of construction workers are migrant workers. They hail from economically weak areas. Many of them come to construction work as they do not find any alternatives. Since they do not have any permanent employer, obtaining compensation for their adverse health becomes difficult. Hence it is important to focus on prevention and put in place policies to strengthen the existing mechanisms so that adverse occupational health outcomes are avoided or minimized.

Potential follow-up/actions

Limited epidemiological data related to occupational health in the construction industry needs attention. Experience of occupational health challenges faced in global construction industries should be used to develop strategies for prevention while local data and remedial measures are developed.

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Artificial intelligence as an emerging workplace safety and health threat

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Conference Sessions - Session

Policy Discussion Abstract Form

Hughes Joseph

In 1990, Joseph "Chip" Hughes began a 35 year federal career as program administrator with the US government, directing the NIEHS Worker Training Program in the Department of Health and Human Services, designing training programs for vulnerable workers in high risk occupations, and more recently as Deputy Assistant Secretary for U.S. Occupational Safety and Health Administration (OSHA) for Emergency Response in the U.S. Department of Labor.

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Background or Purpose

Artificial Intelligence (AI) has increasingly become an integral part of the modern workplace, revolutionizing industries and transforming how tasks are performed. Its applications range from automating routine processes to enhancing sophisticated data analysis. While the benefits of AI in terms of efficiency, productivity, and innovation are undeniable, its integration into the workplace also raises significant concerns regarding worker protection and the creation of new technology-based safety and health risks.

Content

AI-augmented work poses risks such as reduced worker autonomy, diminished job quality, embedded biases in decision-making, lack of transparency, and potential job displacement. As AI technology advances, a risk that

the OSH benefits will not be equitably distributed exists, which may aggravate existing occupational health inequities for certain segments of the workforce. There are significant barriers to achieving OSH equity through AI deployment. Privacy and confidentiality concerns arise from the increased surveillance that some AI systems bring, potentially disadvantaging workers if safeguards on data use are not implemented.

Implications for addressing the issue

The integration of AI into the workplace presents substantial risks to worker protection, including job displacement, skills gaps, privacy concerns, algorithmic bias, and psychological impacts. Addressing these risks requires a multifaceted approach involving regulatory frameworks, organizational policies, and a commitment to ethical AI practices. These concerns can be mitigated through transparent power structures, algorithmic audits, and multidisciplinary participatory approaches to AI design, implementation, maintenance, and evaluation.

Potential follow-up/actions

By investing in workforce development, implementing ethical AI guidelines, fostering supportive work environments, ensuring data privacy, and promoting fairness and inclusion, organizations can harness the potential of AI while safeguarding the rights and well-being of workers in numerous industrial settings. Through collaborative efforts of the Collegium Ramazzini, a focus on responsible AI integration through a policy statement or an international convening can create safer working conditions that can benefit both employers and workers.

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Funding source
None

Carcinogenic evidence of a humidifier disinfectant, polyhexamethylene guanidines: Toxicological and epidemiological findings of lung cancer induced by humidifier disinfectant exposure

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Research Data Abstract Form

Cheong Hae Kwan

Hae-Kwan Cheong, professor emeritus of Sungkyunkwan University, is an environmental epidemiologist and a fellow of Collegium Ramazzini since 2007. Since the 1990s, he has been involved in many environmental health issues in Korea, including carbon disulfide, oil spills, humidifier disinfectants, and climate change. He had been a chair of the national committee on humidifier disinfectant-related health hazard review and presents recent developments on the carcinogenicity of this multipotent toxin.

All authors and affiliations

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Background

Humidifier disinfectants, designed to remove water scale from humidifiers, have been manufactured and sold in South Korea since 1994 and were used before recall by the government in 2011. It has induced various respiratory illnesses, such as upper and lower respiratory tract inflammation, asthma, pneumonia, interstitial lung disease, bronchiectasis, and chronic obstructive pulmonary disease. Carcinogenesis of polyhexamethylene guanidine phosphate (PHMG-p)-containing products, the main component of the exposure, was evaluated as a long-term health effect, and recent progress was reviewed.

Methods/Approach

A study evaluated the long-term effect of PHMG-p exposure in rat models and human pulmonary alveolar epithelial cells. Epidemiological studies were conducted using the claimants' data compared with national controls.

Results

In rat models, CT scans and lung tissue pathology 54 weeks after respiratory exposure to PHMG-p in rats revealed a significant discovery-lung cancer occurred even in the low-dose group, with a higher incidence in the high-dose group. PHMG was found to promote lung carcinogenesis by enhancing necroptotic and MAPK signaling, inhibiting apoptosis, and interfering with DNA damage repair mechanisms in a human cell model in a time-dependent manner. In ongoing epidemiological studies, claimants for humidifier disinfectant damage had significantly higher standardized incidence ratios of lung cancer compared to the general Korean population. They also showed an increased risk of lung cancer according to exposure duration in a dose-response manner and exhibited a significantly higher risk compared to propensity score-matched controls from the National Health Insurance Service data. The PHMG-p was recommended as a high 5 in the IARC Monographs Advisory Group Meeting 2024 based on the experimental evidence.

Conclusions and next steps

This finding was brought to the attention of the public and environmental health experts, as it necessitates immediate action. It is equally important to stress the need for further research to fully understand this study's implications and develop effective strategies for prevention.

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Funding source
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Investigating asbestos contamination in the framework of information gaps: The Sibaté asbestos-cement facility case study

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Research Data Abstract Form

Ramos-Bonilla Juan Pablo

Dr. Juan Pablo Ramos-Bonilla is an Associate Professor in the Department of Civil and Environmental Engineering at Universidad de los Andes. He has investigated the occupational and environmental health impacts of asbestos in Colombia. Since 2015, he has led an ongoing investigation into the health impacts of asbestos in Sibaté, a municipality where the asbestos industry began operations in Colombia in 1942

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Background

The operation of asbestos manufacturing facilities has been linked to asbestos-related-disease clusters, affecting workers and the general population. Sibaté, home to an asbestos-cement facility since 1942, has Colombia's first reported mesothelioma cluster. Weak legal enforcement and inadequate communication from environmental authorities have resulted in a lack of detailed information about the facility's operations and environmental performance. This study aims to investigate the facility's operations, including its production processes, stages involved, and the potential production and release of residues, as well as assess its environmental impacts on the population.

Methods/Approach

Former workers were interviewed to obtain information on the production process, plant layout, asbestos control measures, and waste management. Asbestos concentrations associated with different production activities of the facility were sourced from the scientific literature. Additionally, regulatory compliance documents from the regional environmental authority (CAR) were reviewed. Thirteen records (ten permissive and three non-compliance) were analyzed to evaluate adherence to regulations on industrial wastewater treatment, hazardous waste management, and air emissions.

Results

Thirteen factory workers that were employed between 1967 and 2010 were interviewed, providing detailed information about the production process. Flow charts were constructed, identifying activities with high asbestos fiber release potential. Environmental authority records, available since 1980, revealed incomplete data on wastewater and hazardous waste management. Untreated discharges into the El Muña reservoir occurred until 1999. Hazardous waste, mainly sludge and asbestos-containing materials (ACM), were frequently disposed of in Sibaté and the region, with the knowledge of the environmental authority. Local testimonies confirmed the frequent disposal of asbestos residues in urban Sibaté.

Conclusions and next steps

The asbestos-cement facility in Sibaté, which remains operational with asbestos substitutes, repeatedly violated environmental regulations, resulting in persistent asbestos contamination and significant health risks for the local population. The methodology employed in Sibaté may serve as a model for assessing similar risks in other low- and middle-income countries.

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NA

PANEL II: Work at the Castle of Bentivoglio

1. Carcinogenic effect in Sprague-Dawley rats exposed long-term from prenatal life to Glyphosate and Glyphosate-based herbicides, Daniele Mandrioli, Italy

2. Toxicity studies of nicotine bitartrate dihydrate administered in drinking water to Sprague Dawley rats and Swiss mice, Simona Panzacchi, Italy

3. Pathological characterization of lung fibrosis in Sprague-Dawley rats treated with fluoro-edenite fibers, Eva Tibaldi, Italy

Carcinogenic effect in Sprague-Dawley Rats Exposed Long-term from Prenatal Life to Glyphosate and Glyphosate-Based Herbicides

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Conference Sessions - Session

Research Data Abstract Form

Mandrioli Daniele

Daniele Mandrioli, MD, PhD is the Director of the Cesare Maltoni Cancer Research Center of the Ramazzini Institute, Bologna, Italy. He conducts research on environmental toxicants and carcinogens and evidence-based methods in toxicology and epidemiology. Dr. Mandrioli's research on environmental toxicants and carcinogens includes the design and development of toxicological, epidemiological studies and mechanistic studies.

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Background

Glyphosate-based herbicides (GBHs) are the world's most widely used weed control agents. There has been intense and increasing public health concern about glyphosate and GBHs since the International Agency for Research on Cancer classified glyphosate as a probable human carcinogen in 2015.

To further study the health effects of glyphosate and GBHs, the Ramazzini Institute, in collaboration with an international network of institutes and universities, has launched the Global Glyphosate Study (GGS), the most comprehensive toxicological study ever performed on these compounds. The GGS is an integrated study designed to test a wide range of toxicological outcomes including carcinogenicity, neurotoxicity, multi-generational effects, organ toxicity, endocrine disruption and prenatal developmental toxicity.

Methods/Approach

Glyphosate and two GBHs, Roundup Bioflow (MON 52276) used in the European Union (EU) and RangerPro (EPA 524-517) used in the U.S., were administered long-term to Sprague-Dawley (SD) rats beginning in prenatal life until 104 weeks of age via drinking water at doses of 0.5, 5, and 50 mg/kg body weight/day. This dose

range encompasses both the EU Acceptable Daily Intake (ADI) and the EU No Observed Adverse Effect Level (NOAEL) for glyphosate.

Results

Glyphosate and GBHs at exposure levels corresponding to the EU ADI and the EU NOAEL caused significant, dose-related increased trends in incidence of leukemia, a very rare malignancy, in SD rats. Notably, about half of the leukemia deaths seen in the glyphosate and GBH groups occurred at less than one year of age, comparable to less than 35-40 years of age in humans. Glyphosate and GBH at exposure level corresponding to EU ADI and EU NOAEL also caused various types of other solid tumors.

Conclusions and next steps

Glyphosate and GBHs at exposure levels corresponding to the EU ADI and the EU NOAEL caused a statistically significant dose-related increased trend in leukemia and other solid tumors incidences.

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Toxicity studies of nicotine bitartrate dihydrate administered in drinking water to Sprague Dawley rats and Swiss mice

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Conference Sessions - Session

Research Data Abstract Form

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Dr. Panzacchi is head of the Biostatistics Unit at the Cesare Maltoni Cancer Research Center of the Ramazzini Institute (CMCR/RI). She obtained a degree in Biological Sciences and a Master of Philosophy in Biostatics from the University of Bologna.

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Background

Nicotine is a naturally occurring alkaloid in the solanaceous (nightshade) family of plants including tobacco in which it contributes nearly all the alkaloid content. Human exposures to nicotine are associated with smoking, chewing, or sniffing various forms of tobacco, and abundant literature details the adverse effects of chronic exposures to tobacco products. Nicotine is now delivered in electronic cigarettes and in over-the-counter products designed to reduce or stop smoking, including gum and dermal patches.

Methods/Approach

Sprague Dawley rat dams were exposed to nicotine (as nicotine bitartrate dihydrate) in drinking water ad libitum starting from gestation and, upon weaning, their pups were exposed to the same drinking water concentrations as their respective dams for 4 weeks or 3 months. Young adult male and female Swiss mice also were exposed to nicotine in drinking water ad libitum for 4 weeks or 3 months.

Results

Reductions in feed and water consumption and resulting lower body weight gains at the higher nicotine exposure concentrations were observed in all studies (4-week and 3-month, rats and mice) with rats being more consistently affected. A high rate of mortality of rat pups exposed to nicotine at concentrations ≥3.12 mg/L during the late-lactation phase of the perinatal 4-week study was observed, whereas no mortality was observed in the control group and in the lowest dosage group (1.56 mg/L) during the same period. In male rats following 3-months of post-weaning exposure, a statistically significant increased trend of the total number of degenerative lesions of the testes and animals bearing lesions were observed in males, together with increased mild inflammation of the kidney.

Conclusions and next steps

The unexpected mortality of exposed rat pups in the 4-week study may have been related to inhibition of normal cholinergic neural development by prenatal nicotine exposure as demonstrated by other researchers.

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Pathological characterization of lung fibrosis in Sprague-Dawley rats treated with Fluoro-Edenite fibres

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Conference Sessions - Session

Research Data Abstract Form

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Dr Tibaldi is the Head of the Pathology Unit at the Cesare Maltoni Cancer Research Center, Ramazzini Institute. Her work is focused on conducting histopathological evaluation and peer review for all in vivo studies.

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Background

An increased incidence of pleural mesotheliomas in Biancavilla, Italy, was attributed to the environmental exposure to fluoro-edenite (FE). Results from the Ramazzini Institute (RI) in vivo long-term study confirmed the evidence that exposure to FE fibres is correlated with an increase of malignant pleural mesotheliomas in Sprague-Dawley rats. Recently asbestosis-like features were substantiated in tissue of Biancavilla residents without known occupational exposures. The aim of this work was to establish whether FE-induce lung fibrosis with a pathogenetic mechanism like other asbestiform fibres.

Methods/Approach

Original slides from the RI study were systematically re-examined to characterize the FE-induced lesions. Quantitative analysis of lung fibrosis was assessed following the Ashcroft method on sections stained with Masson's Trichrome Goldner kit. The mean scores obtained from Ashcroft analysis were statistically analyzed using Mann-Whitney test. An immunohistochemistry panel was used for the evaluation of lung fibrosis: alpha-smooth muscle actin, collagen type I, vimentin. The presence of iron deposits in lungs was evidenced using the Perls' staining and ferritin antibody expression.

Results

Like asbestos, FE-caused fibrotic lesions, pleural plaques or nodules and mesotheliomas. From the quantitative analysis carried out with the Ashcroft method, a significant increase of lung fibrosis (p).

Conclusions and next steps

This study confirmed that FE exposure promotes the onset of fibrotic lesions at pleural level, as fibrous plaques or nodules and fibrosis, through a mechanism like other form of asbestos. These results combined with epidemiological study reported in Biancavilla residents, corroborate the need to promote health and epidemiological surveillance plans of respiratory diseases in population living in FE-contaminated sites.

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PANEL III:

The public health and environmental damage caused by war: a case study of Gaza now and in the future

1. The environmental impacts of war, Daniel Hryhorczuk, USA

2. Impact of the colonization on the environment: Case study in Palestine with emphasis on Gaza, Mazin Qumsiyeh, Palestine

3. Rebuilding public health and health infrastructure in Gaza: a public health approach, Iman Nuwayhid, Lebanon

The environmental impacts of war

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Conference Sessions - Session

Policy Discussion Abstract Form

Hryhorczuk Daniel

Daniel Hryhorczuk is a Professor Emeritus at the University of Illinois School of Public Health in Chicago.

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Background or Purpose

War and the preparation for war create profound and extensive adverse impacts on the environment and on environmental health.

Content

Armed conflicts, including the wars in Ukraine and Gaza, can cause severe, widespread, and/or long-lasting damage to the environment, which can meet the definition of ecocide. This environmental damage can increase the risk of related acute and chronic adverse health effects. Systematic comprehensive assessment of the environmental damage and related health impacts, likely difficult until conflict ends, is necessary to document damage and plan remedial measures. It is also necessary to provide further support for local responses and global preventive measures, including development of an international convention declaring ecocide as a crime against humanity.

Implications for addressing the issue

International law proscribing military crimes against the environment has evolved over the past five decades, but enforcement is often complicated by issues of attribution, non-signatories to international treaties, and other factors. In addition to possible treaty obligations, attacks on the environment fall under the protection and authority of customary international law, including principles of humanity. There is a strong movement to more explicitly define environmental protections under international law and to build on existing law that governs the way in which warfare is conducted. There are needs for investigating the environmental consequences of all armed conflicts and for implementing more effective measures to protect the environment during war, including holding accountable those responsible for damaging the environment during war and those who instigate war. However, the only way to prevent the environmental impacts of war is to prevent war itself, by preventing conflicts from becoming violent, by addressing the underlying causes of war, and by strengthening the infrastructure for peace.

Potential follow-up/actions

The Collegium should consider drafting a statement supporting current efforts to include ecocide as the fifth crime against humanity in times of both war and peace.

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Impact of the colonization on the environment: Case study in Palestine with emphasis on Gaza

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Conference Sessions - Session

Policy Discussion Abstract Form

Qumsiyeh Mazin

Prof. Mazin Qumsiyeh is founder and volunteer director of the Palestine Institute for Biodiversity and Sustainability, Bethlehem University (PIBS see palestinenature.org). Professor Mazin Qumsiyeh previously served at US universities including Tennessee, Duke and Yale. Qumsiyeh published over 180 scientific papers, over 30 book chapters, hundreds of articles, and several books including "Sharing the Land of Canaan" and "Popular Resistance in Palestine" (more at qumsiyeh.org)

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Background or Purpose

Many conflicts in Western Asia over the past 75 years left devastation and refugees and the last war on the Gaza Strip is a good example. Our interests as environmentalists are the effects of conflict (including active conflict, pre-conflict activities, and post conflict impact). In this work, I review impacts on the Palestinian environment of activities since 1948 (establishment of the state of Israel) with special attention paid to the Gaza Strip: pre-conflict (such as training sites, military bases, military installation), during conflicts (use of different munitions, pollution, altering habitats), and post-conflicts (unexploded munitions, ground-water pollution, devastated landscape). The data show significant environmental damage that operates short-term and long-term. In addition to the ongoing genocide, there is an ongoing ecocide. While more studies are needed and encouraged, the data does suggest that environmental and human health impacts need to be highlighted in public discourse and remedial actions must be taken in protracted situations such as the colonization of Palestine.

Content

Description of conflict on environmental damage and its implication to sustainability is given.

Implications for addressing the issue

Data shows way forward to sustain human and natural communities.

Potential follow-up/actions

Formation of networks of concerned people globally is needed to bring peace and environmental justice.

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Rebuilding public health and health infrastructure in Gaza: a public health approach

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Conference Sessions - Session

Policy Discussion Abstract Form

Nuwayhid Iman

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Background or Purpose

Israel has targeted hospitals and primary health centers in the on-going war in Gaza (starting on October 7, 2023), rendering two thirds of those dysfunctional, and killed more than 500 health professionals. In addition, schools and universities have been destroyed, WASH facilities have been damaged, and the environment has been heavily polluted from detonated explosives, fire combustion products, and rubble. To address this catastrophic health crisis, we argue for a public health approach for the rebuilding of Gaza's health.

Content

A public health approach transcends the focus on hospitals, medical care, and physical injuries to encompass a broader spectrum of mental and social health, including social inequalities. Driven by its core values of equity and social justice, and in collaboration with other sectors, this approach prioritizes community health workers, equipped with knowledge of the local context, to address the social (e.g., lack of schools and education, food insecurity, malnutrition, loss of loved ones, broken social networks), environmental (e.g., limited access to water, poor water quality, poor sanitation and hygiene, overcrowding), economic (e.g., destroyed economic sectors, limited

jobs, child labor), and political (e.g., security, neighborhood safety) conditions that will impact people's health and wellbeing for many generations.

Implications for addressing the issue

It is a moral imperative to strive towards a future where the people of Gaza can live in peace, dignity, and self-determination. The international public health community must provide urgent and unequivocal support to the people of Gaza, guided by locally-identified community-based needs and solutions. However, justice, freedom, end of occupation, and the dismantling of structural racism are pre-requisites for the sustainability of the health and wellbeing of people in Gaza.

Potential follow-up/actions

Public health professionals, including fellows of the Collegium Ramazzini, can actively engage in the training of public and environmental health human resources in Gaza and the health and environmental rehabilitation of Gaza.

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WORK OF THE FELLOWS II

1. Efficient prevention or adaptation to oxidative stress in nanomaterials workers? Daniela Pelclova, Czech Republic
2. Policy development leading to a ban on artificial stone in Australia in July 2024 in response to the accelerated silicosis epidemic among stonemasons, Malcolm Sim, Australia
3. The ethical imperative for deradicalization: A unified field theory, Elihu Richter, Israel
4. Effective engineering control for infectious respiratory particles: Germicidal UV, Kathleen McPhaul, USA
5. Feasibility, acceptability, and implementation of per- and polyfluoroalkyl substances (PFAS) at-home testing among United States firefighters, Alberto Caban-Martinez, USA

Efficient prevention or adaptation to oxidative stress in nanomaterials workers?

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Conference Sessions - Session

Research Data Abstract Form

Pelclova Daniela

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Background

Researchers exposed to nanocomposites were examined and their exposures monitored to study the trends in oxidative stress (OS) from a 5 year perspective. Biomarkers of OS and/or antioxidant capacity were analyzed in exhaled breath condensate (EBC), plasma, and urine.

Methods/Approach

Researchers' exposure to nanoparticles was measured using online and off-line instruments during machining of geopolymer samples and epoxide resin with nanoSiO2 filler, and metal surfaces welding. Additionally, in the last 2 years, personal nanoparticles samplers (PENS) were used. Markers of oxidation of lipids, nucleic acids

and proteins were analyzed both pre-exposure and post-exposure using HPLC/MS/MS in researchers and controls in 2016-2018 (malondialdehyde, aldehydes C6-C13, 8-isoProstaglandinF2α, 8-hydroxy-2-deoxyguanosine, 8-hydroxyguanosine, 5-hydroxymethyl uracil; o-tyrosine, and 3-nitrotyrosine). In 2019 and 2020, thiobarbituric acid reactive substances (TBARS) were measured and antioxidant status was assessed by glutathione (GSH) and ferric-reducing antioxidant power (FRAP), all using spectrophotometry.

Results

On average 20 researchers were examined yearly (aged 40±5 years, exposure 14±3 years). Median particle number concentrations dropped from 4.8x104/cm3-5.4x105/cm3 in 2016-2018 to 4.6 x103/cm3-15.0x103/cm3 in 2019-2020. In contrast to 2016-2018, all markers of OS were elevated in researchers' EBC and plasma, TBARS, corresponding to malondialdehyde, were increased in 2019-2020 in pre-exposure EBC only (p).

Conclusions and next steps

Positive effect of reducing nanoparticles exposure by more than one order of magnitude, but also adaptation of long-term exposed researchers may give plausible explanations. Therefore, verification of OS biomarkers using highly sensitive HPLC/MS/MS in stored samples is needed.

Acknowledgements: Cooperatio 207041-3 Charles University and GACR 22-08358S

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Funding source
Cooperatio 207041-3 Charles University in Prague; and GACR 22-08358S

Policy development leading to a ban on artificial stone in Australia in July 2024 in response to the accelerated silicosis epidemic among stonemasons

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Conference Sessions - Session

Policy Discussion Abstract Form

Sim Malcolm

Prof. Sim is an Emeritus Professor in the School of Public Health and Preventive Medicine at Monash University. He was previously Head of the Centre for Occupational and Environmental Health before retiring in 2021. He has been very actively involved in research into the accelerated silicosis epidemic in Australia and providing policy and practice advice to the Australian Government to reduce the burden of this disease.

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Background or Purpose

Artificial stone can contain up to 96% crystalline silica and a variety of resins, pigments and other additives. Its use has rapidly increased in Australia and many other countries over the past two decades. Cases of accelerated silicosis among stonemasons working with artificial stone in Australia continued to rise dramatically since the first case report in 2015.

Content

Due to concern about this dramatic increase of silicosis cases, a national dust disease taskforce was established in 2019. The taskforce made several recommendations in June 2021 to improve working conditions and reduce respirable crystalline silica (RCS) dust exposures among stonemasons. It recommended that a ban on artificial stone be introduced if control measures did not result in a measurable improvement. There was considerable media

coverage of this issue leading to increased public awareness. The main construction trade unions also began a campaign to ban work with this material.

Implications for addressing the issue

In 2023 the Australian Workplace OHS Ministers met and asked Safe Work Australia (SWA), the national OHS policy body, to review the effectiveness of control measures and to evaluate future options, including a ban on artificial stone. In 2022 the published number of cases had risen to 579. The SWA report in August 2023 concluded that the existing regulatory framework was ineffective in protecting workers from silicosis and recommended a total ban. The OHS Ministers subsequently decided to ban artificial stone from 1 July 2024. An important implication of this was the need to identify alternative safer materials.

Potential follow-up/actions

This has important implications for policies in other countries where artificial stone is being used in the construction industry. An important contributor to policy development is establishing high quality screening programs, including sensitive tools such as low dose CT scans, to detect silicosis at an early stage.

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Nil

The ethical imperative for deradicalization: A unified field theory

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Conference Sessions - Session

Policy Discussion Abstract Form

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Background or Purpose

The demands to provide humanitarian aid to a population that until now has been incited and indoctrinated to carry out mass murder and atrocities pose ethical questions. How do you go about doing this?

Content

Humanitarian aid must be delivered. It should be accompanied by strong indoctrination and education programs, as well as legislation and political changes. These measures aim to shape embedded mindsets, beliefs, attitudes, and modes of behaviors that cause hatred, dehumanization, and demonization. The role model for such changes comes from the denazification programs of the US, British, and French imposed on Nazi Germany after WW2. These programs aimed to eliminate deeply embedded mindsets in heavily indoctrinated populations. These programs were accompanied by public health measures such as supplying water, food, shelter, basic security, sanitation, vaccination, and health care.

Implications for addressing the issue

It is suggested that these models apply to the deradicalization of any extremist population or movement intent on terrorism, including combatants and non-combatants. All these groups and their followers are indoctrinated top-down using motifs of dehumanization, demonizing, and glorification of violence. This indoctrination is population-wide, from cradle to grave, and can be intergenerational. Child soldiers are a special risk group.

Potential follow-up/actions

There is a need for a unified field theory and model to apply to all the above scenarios. As with denazification, deradicalization requires command and control approaches top-down as well as community-based approaches reaching far and deep into community life. There is a parallel need for strong public health programs, especially where infrastructure has been greatly destroyed. Deradicalization must be local, regional, and global. The core value is to choose life.

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Effective engineering control for infectious respiratory particles: Germicidal UV

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Conference Sessions - Session

Policy Discussion Abstract Form

McPhaul Kathleen

Dr. McPhaul is an Associate Research Professor in the Department of Global, Environmental, and Occupational Health (GEOH) and Principal Investigator of the study "Indoor Air, Human Health and Germicidal UV". She studies the policy and communication dynamics surrounding germicidal ultraviolet (GUV) for air disinfection, energy efficiency and pandemic preparedness.

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Background or Purpose

Ultraviolet-C, or UVC, inactivates infectious pathogens in water, on surfaces, and in air. Pandemic preparedness and occupational health practice demand improved technology to protect essential workers from novel infectious respiratory particles (IRP's); we must also protect all workers from endemic respiratory infections. Businesses experience absenteeism due to seasonal infections and also become unwitting spaces for transmission of IRP's to the public. Engineering controls are available but underutilized for IRP's. We analyze the policy barriers to using UVC as an engineering control for IRP's in the workplace.

Content

UVC has a long history of safe use in schools and tuberculosis wards to prevent transmission of IRP's. It is increasingly installed in restaurants, airports and hospitals. Yet the science for human safety does not meet the threshold for IARC and ICNIRP; the ACGIH, however, has recently updated its TLV's for UVC in the workplace and NIOSH has specific, detailed guidance for safe installation of 254-UVC. Yet, there is no effort to integrate

public-facing informational websites across US federal agencies and the World Health Organization (WHO) to guide occupational health practitioners and employers for the safe use of UVC in the workplace.

Implications for addressing the issue

The occupational risks to workers from UVC can be controlled which means that employers and workers can enjoy the benefits of reducing illness and absenteeism due to IRP's. Yet, the lack of credible, integrated information is a barrier and, we argue, that this barrier creates a vacuum which allows for the proliferation of misinformation.

Potential follow-up/actions

Occupational medicine must advocate for plain language guidance for workers and employers while providing expertise and recommendations to policy makers on the need for strategic use of GUV in workplaces. We must also consider the need for medical surveillance protocols, work accommodations when reasonable, and preventive health education in workplaces.

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The Balvi Foundation

Feasibility, acceptability and implementation of per- and polyfluoroalkyl substances (PFAS) at-home testing among United States firefighters

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Conference Sessions - Session

Research Data Abstract Form

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Background

Firefighters are exposed to per- and polyfluoroalkyl substances (PFAS) through aqueous film forming foam and protective turnout gear. PFAS bioaccumulates in nature and resists environmental degradation leading to long-term contamination of fire training sites and adjacent ecosystems. Serum PFAS levels are linked to adverse health effects, including carcinogenicity, immune dysfunction, endocrine disruption, and dyslipidemia. Despite the known health effects, biomonitoring of serum PFAS levels among firefighters is limited. In the present study, we evaluated the feasibility, acceptability and implementation of an at-home PFAS test kit and describe serum PFAS levels in a national sample of firefighter workforce.

Methods/Approach

Health survey, employment, occupational exposure and blood PFAS data were collected as part of an at-home firefighter PFAS feasibility testing study launched in June 2023. A volumetric absorptive microsampler was mailed to each firefighter to measure 45 different PFAS types and concentrations in capillary whole blood. Total blood PFAS levels were calculated and classified using National Academies of Sciences PFAS guidance on PFAS testing and health outcomes. Feasibility, acceptability and implementation metrics were derived from the operational processes of administering the PFAS kits to firefighters and evaluating their perspectives on use.

Results

Among 268 firefighter participants 86.4% were male, 95.5% white, and 90.2% non-Hispanic with a group mean age of 47.44 years. Geometric mean serum levels of key PFAS congeners in μg/L for all firefighters were: total PFOS (5.03), total PFOA (0.76), PFHxS (1.71), PFNA (0.21), PFHpS (0.09), PFUnA (0.04), PFBS (0.03), PFDA (0.02), PFDS (0.006), NMeFOSAA (0.005), PFOSA (0.002), PFDoA (0.001), and PFTrDA (0.0005). The at-home PFAS test protocol met study criteria on feasibility, implementation, and acceptability among study participants.

Conclusions and next steps

At-home PFAS testing kits provide an accepted approach to PFAS biomonitoring among fire service personnel. Legacy and emerging PFAS congeners were detected in serum samples in a national sample of firefighters.

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Funding source
Research reported in this publication was supported by the National Cancer Institute (P30CA2401) at the State of Florida (2317B)

PANEL IV

Contribution of occupational medicine to occupational health in the ASEAN countries

1. Managing occupational health and safety for health personnel through the Hospital and Healthcare Standard, Naesinee Chaiear, Thailand
2. The importance of effective regulatory framework to keep the workplaces healthy and safe in ASEAN countries, Abu Hasan Samad, Malaysa
3. The importance of occupational medicine harmonization in ASEAN, Muchtaruddin Mansyur, Indonesia

Managing occupational health and safety for health personnel through the Hospital and Healthcare standard

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Conference Sessions - Session

Policy Discussion Abstract Form

Chaiear Naesinee

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Background or Purpose

In Thailand occupational physicians contribute not only clinical practice but also lead the development of occupational safety and health management system (OH&SMS) in healthcare setting.

Content

In 2003, the Srinagarind Hospital set up the Safety, Health, and Environment (SHE) Committee and in 2006 established the governing bodies of OH&SMS, including the office of OH&S and other committees. The office comprises a safety officer and an occupational physician as chief. Six years later, two registered nurses were added. The OH&S committee are responsible for OH&S policy preparation, the regular monthly meeting, strategic planning, budgeting plan development, goal achievement, management evaluation and review, and continual improvement. The recently launched patient and personnel safety goals (2P Safety Goals) uses the Srinagarind OH&SMS as a model for the development of the Goals guideline and more details of OH&S added in the Hospital and Healthcare Standard where this standard is enforced at all hospital levels in Thailand.

Implications for addressing the issue

Thailand hospitals follow the hospital and healthcare standard and 2P Safety Goals, OH&MS and occupational health service activities have gradually been adopted and implemented by many hospital. In fact, Occupational Safety, Health and Environment Act B.E. 2554 (A.D.2011) has been integrated to 2P Safety Goals Guide. 1,007 out of 1,471 (68.5%) voluntary hospitals in Thailand participated (2018-2024) and the number of incident reports increased suggesting a building reporting culture; the most reported incidents are effects of unsafe physical structures. Health workers revealed the lower incidents of airborne and droplet exposure from between 2022 to 2024. These finding showed the evidence of increasing awareness of occupational health and safety management for health workers in Thailand.

Potential follow-up/actions

In Thailand, all hospitals are required to achieve the hospital accreditation (HA) and are required to reaccredit every three years. The 2P Safety Goals implementation are enforced and followed up through the process of reaccreditation.

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Funding source
none

The importance of effective regulatory framework to keep the workplaces healthy and safe in ASEAN countries

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Conference Sessions - Session

Policy Discussion Abstract Form

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Background or Purpose

There is need for ASEAN countries to keep workplaces healthy, safe and protect workers. This requires proper management of occupational safety and health (OSH) risks by controlling the hazards and preventing work-related injury and illnesses. One effective approach is an effective regulatory framework relevant to the changes and the need of workplaces, which translates into better OSH and overall performances of the organizations and the country.

Content

The OSH regulatory framework in Malaysia started with piecemeal legislation and regulations. The Factories and Machinery Act (FMA 1967) applicable to a few industrial sectors and prescriptive approach required significant effort to implement. The Occupational Safety and Health Act (OSHA 1994) with its self-regulatory approach and wider coverage complements FMA 1967. New regulations on workplace safety, hazardous chemicals and competent person introduced and amendments made to address specific issues on noise and hazardous

chemicals. However, there were "overlaps" for a few regulations under the two Acts which caused difficulties in the implementation. This led to the introduction of OSH (Amendment) Act (OSHA 2022); FMA 1967 repealed, a few specific regulations introduced, and amendments made to a few others.

Implications for addressing the issue

ASEAN countries like Malaysia need an effective OSH regulatory framework. The authority needs to periodically review the existing regulations and develop the new ones as the country progresses. Coming up with pertinent and effective regulations, however, takes time and effort, with many challenges and pushbacks by the employers. OSHA 2022 is expected to improve compliance resulting in improved notification and lowered workplace incident of injuries, poisoning and diseases. Certain economic sectors, however, may need assistance in achieving this.

Potential follow-up/actions

Stakeholders' engagement is a norm before any amendment, or new regulation is introduced. OSH practitioners, workers, and employers can collectively contribute.. ASEAN countries can learn from each other and the sharing of experience facilitates effective implementation.

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The importance of occupational medicine harmonization in ASEAN

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Conference Sessions - Session

Policy Discussion Abstract Form

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Background or Purpose

Several South East Asian (SEA) countries are facing changes in the proportion of their population, leading to a large proportion of working age and some countries becoming an ageing society with high prevalence of communicable and non-communicable diseases and occupational diseases and accidents. The practice of occupational medicine in occupational health and workers' health services is important to increase access to and quality of health services for achieving a high level of national productivity.

Content

SEA countries have made significant progress in occupational health and safety by integrating technology into training programmes. The COVID-19 pandemic accelerated the process. These technologies not only make education more accessible but also enhance the learning experience and allow trainees to practice real-life scenarios in a controlled environment. Collaboration and knowledge exchange among SEA countries play an important role in advancing occupational medical education (OME). Student exchanges, faculty exchanges, and

international partnerships in research will be ways to harmonize through sharing experiences, research findings, and best practices.

Implications for addressing the issue

Such collaboration fosters a global perspective on both challenges and solutions. Through collaboration, it is possible to develop harmonization of OME and training and create equity and equal distribution of quality occupational health services. Therefore, building collaboration and harmonization of OME and training in SEA is needed. Strong occupational medicine professionals will strengthen the occupational health services and workers' health and productivity. The arrangement of ASEAN Diagnostic Criteria for Occupational Diseases after five meetings in Thailand and once in Malaysia is an initial milestone in the harmonization of occupational health and medicine in SEA countries.

Potential follow-up/actions

Seminars and workshops are needed to build this collaboration and harmonize OME at institutions in SEA. Benchmarking to the other countries which have more advanced occupational health service training and programs will enhance the better standardized OME and training in SEA.

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POSTER SESSION and COFFEE BREAK

1. Indirect effects of PM2.5 exposure on COVID-19 mortality in the greater Jakarta, Indonesia area: an ecological study, Budi Haryanto, Indonesia
2. Interstitial lung disease and progressive pulmonary fibrosis: A World Trade Center 20-year longitudinal cohort study, David Prezant, USA
3. The use of bioindicators to evaluate air quality: One health study inItaly, in the "Land of Fires", Maria Iris Forte, Italy
4. Lung function changes with negative radiology following exposure to asbestos, Xaver Baur, Germany
5. Exposure of Syrian refugee agricultural workers to pesticides in greenhouses in Lebanon: Findings from a pilot study, Iman Nuwayhid, Lebanon
6. Challenges of occupational health research in Lebanon's agricultural sector: A case study in a humanitarian setting, Rima R. Habib, Lebanon
7. The under-recognition of occupational risk related to solar ultraviolet radiation exposure and skin cancers, Alberto Modenese, Italy
8. Effects of climate change, physical stress and personal protective equipment on the thermal strain of healthcare workers, Stefan Rakete, Germany
9. Cadmium exposure and risk of hypertension: a systematic review and dose-response meta-analysis, Tommaso Filippini, Italy
10. Outdoor artificial light at night exposure and risk of conversion from mild cognitive impairment to dementia: an Italian prospective cohort study. Tommaso Filippini, Italy
11. The Impact of Sudden Temperature Changes and Global Warming Projections on Stroke Incidence in Taiwan, Wen-Yi Lee & Pau-Chung Chen, Taiwan
12. Children's blood lead level is associated with their working fathers' blood lead level, Muchtaruddin Mansyur, Indonesia
13. Glyphosate formulations increase anxiety-like behaviors, and produce alterations in motor coordination and neuromuscular tone in a rat model of transgenerational glyphosate exposure, Don Smith, USA
14. Surveillance of reproductive health and occupational exposures among women firefighters in the United States, Natasha Solle, USA
15. New findings from the EU-SPRINT Project, Daria Sgargi, Italy

Indirect effects of PM2.5 exposure on COVID-19 mortality in the greater Jakarta, Indonesia area: an ecological study

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Conference Sessions - Session

Research Data Abstract Form

Haryanto Budi

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Background

Air pollution, including PM2.5, has been suggested as one of the primary contributors to COVID-19 fatalities worldwide. Jakarta, the capital city of Indonesia, recognized as one of the ten most polluted cities globally. Additionally, the incidence of COVID-19 in Jakarta surpasses that of all other provinces in Indonesia. However, no study has investigated the correlation between PM2.5 concentration and COVID-19 fatalities in Jakarta. The study aims to investigate the correlation between short-term and long-term exposure to PM2.5 and COVID-19 mortality in the greater Jakarta area.

Methods/Approach

An ecological time-trend study was implemented. The data of PM2.5 ambient concentration was obtained from Nafas Indonesia and the National Institute for Aeronautics and Space (LAPAN)/National Research and Innovation Agency (BRIN). The daily COVID-19 death data was obtained from the City's Health Office.

Results

Our study unveiled an intriguing pattern: while short-term exposure to PM2.5 showed a negative correlation with COVID-19 mortality, suggesting it might not be the sole factor in causing fatalities, long-term exposure demonstrated a positive correlation. This suggests that COVID-19 mortality is more strongly influenced by prolonged PM2.5 exposure rather than short-term exposure alone. Specifically, our regression analysis estimate that a 50 μg/m3 increase in long-term average PM2.5 could lead to an 11.9% rise in the COVID-19 mortality rate.

Conclusions and next steps

Our research, conducted in one of the most polluted areas worldwide, offers compelling evidence regarding the influence of PM2.5 exposure on COVID-19 mortality rates. It emphasizes the importance of recognizing air pollution as a critical risk factor for the severity of viral respiratory infections.

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Funding source
No funding source

Interstitial lung disease and progressive pulmonary fibrosis: A World Trade Center 20-year longitudinal cohort study

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Conference Sessions - Session

Research Data Abstract Form

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Background

World Trade Center (WTC) exposure is associated with obstructive airway diseases and sarcoidosis. There is limited research regarding the incidence and progression of non-sarcoidosis interstitial lung diseases (ILD) after WTC-exposure. ILD encompasses parenchymal diseases which may lead to progressive pulmonary fibrosis (PPF). We used the Fire Department of the City of New York's (FDNY's) WTC Health Program cohort to estimate ILD incidence and progression.

Methods/Approach

This longitudinal study included 14,525 responders without ILD prior to 9/11/2001. ILD incidence and prevalence were estimated and standardized to the US 2014 population. Poisson regression modeling of risk factors associated with ILD included WTC-exposure and forced vital capacity (FVC). Follow-up time ended at the earliest of end of study period, transplant, or death.

Results

Non-sarcoid ILD developed in 80/14,525 FDNY WTC responders. Age, smoking, and gastroesophageal reflux disease (GERD) prior to diagnosis were associated with incident ILD, though FVC was not. PPF developed in 40/80 ILD cases. Including sarcoidosis cases increased ILD cases by 5 and PPF cases by 3 persons. Among the 80 cases, the average follow-up time after ILD diagnosis was 8.5 years, with the majority of deaths occurring among those with PPF (PPF: N=13; ILD without PPF: N=6).

Conclusions and next steps

The prevalence of post-9/11 ILD was more than two-fold greater than in the general population, despite excluding sarcoid-related ILD from our primary analyses. An exposure-response gradient could not be demonstrated. Half the ILD cases developed PPF, higher than previously reported. Age, smoking, and GERD were risk factors for ILD and PPF, while lung function was not. This may indicate that lung function measured after respirable exposures would not identify those at risk for ILD or PPF.

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Funding source
The National Institute for Occupational Safety and Health. Contracts: 200-2017-93326, 200-2017-93426, 75D301-22-R-72142, 75D30

The use of bioindicators to evaluate air quality: One health study in Italy, in the "Land of Fires"

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Conference Sessions - Session

Research Data Abstract Form

Forte Iris Maria

Dr Iris Maria Forte has a well-established experience in both molecular and translational cancer research. She published over 30 articles focused on understanding the molecular basis of human cancer. Her research aims at identifying new possible diagnostic, prognostic and predictive markers for cancer development and identifying new therapeutic targets that could be more rapidly translated to the clinic. She has trained several young scientists and has been working in editorial teams.

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Background

This study investigates the use of bioindicators as a means to assess air quality to provide a comprehensive overview of ecosystem health. In particular, we focused on a region of Italy (Campania), which represent a dramatic example of a polluted area (Land of Fires). We evaluated the air levels of toxic heavy metals by using two different bioindicators: moss, S.circinatum and the honeybee, Apismellifera. The use of both indicators improve the quality of the measurements because the first is a fixed element while the latter is mobile. We tested the efficacy

of these bioindicators to monitor the presence and the biological effects of potentially toxic elements (PTEs) in the Land of Fires.

Methods/Approach

The moss was placed near apiaries in two locations:1) a natural place (Carditello), and 2) high industrial and anthropogenic pollution location (outskirts of Giugliano). We also selected two places as control sites. We first evaluated the bioaccumulation of PTEs, and then, the ultrastructural and biochemical effects in both organisms.

Results

As expected, the control sites showed the absence of heavy metal pollution. Surprisingly, comparable pollution levels were observed in the two sites characterized by different environmental conditions. Our data indicated that both bioindicators had a greater bioaccumulation capacity. Ultrastructural observations confirmed the data on bioaccumulation.

Conclusions and next steps

Our preliminary data suggest that toxic fumes mainly give the contribution to the presence of heavy metals in the air while that due to the degree of anthropization is negligible. In addition, although our results must be improved, they open the "view" on a disturbing panorama relating to the fact that environments which present a situation of low anthropization and high care of the territory, can present an extremely worrying degree of environmental pollution from metals, if there are "toxic fumes" or other sources of pollutants released into the air.

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Lung function changes with negative radiology following exposure to asbestos

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Conference Sessions - Session

Research Data Abstract Form

Baur Xaver

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Background

Numerous papers document that pulmonary function impairment after exposure to asbestos can precede radiographic changes, either by chest X-ray or CT scan. This has significant implications for compensation, with some workers in the past being denied compensation with such findings.

Methods/Approach

Literature search and review

Results

A review of the scientific literature reveals many papers documenting that pulmonary function can be altered after exposure to asbestos, e.g. from traditional workplace exposures such as at shipyards or from exposure to contaminated vermiculite from Libby, MT (Ohlson, Rydman et al. 1984; Wang, Wang et al.2010; Clark, Flynn et al. 2017). These changes can occur in the absence of smoking, although smoking increases the amount of change in such individuals.

When considering persons with asbestos exposure but no radiographic changes, our literature search has shown that pulmonary function changes can still be ascribed to the asbestos exposure. These effects are less than in those with asbestos-related pleural abnormalities or asbestosis or with both (Kilburn and Warshaw 1991; Dujic, Tocilj et al. 1992; Kilburn and Warshaw 1994; Wilken, Velasco Garrido et al. 2011). (Fig.).

Conclusions and next steps

Our findings indicate that even sensitive chest CT scanning cannot provide exact lung function data and replace specific pulmonary tests. Although the issue of compensation being denied individuals whose only clinical abnormality following asbestos exposure is impaired pulmonary function has been discussed in the published literature, increasing numbers of studies addressing the issue document that such alterations in pulmonary function can occur and that there is therefore an inappropriate denial of benefits to some. Proper assessment of the literature would support fairer results in such cases and provide a more accurate framework for evaluation of asbestos-exposed individuals going forward.

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Funding source
none

Exposure of Syrian refugee agricultural workers to pesticides in greenhouses in Lebanon: Findings from a pilot study

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Conference Sessions - Session

Research Data Abstract Form

Nuwayhid Iman

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Background

Syrian refugee agricultural workers are the labor backbone of agriculture in Lebanon. They are exposed to multiple work hazards in settings where occupational health and safety measures and pesticide control regulations are almost non-existent. This project aims to assess the exposure of this vulnerable population to pesticides in greenhouses in the Beqaa region of Lebanon.

Methods/Approach

A pilot study, conducted in summer 2023, recruited 21 Syrian agricultural workers (11 males/10 females) from greenhouse farms where tomatoes and cucumbers are planted. Following IRB clearance, consent was secured from each participant. One or two pesticide mixers/sprayers were recruited at the time of pesticide spraying. Within 12-48 hours, two workers harvesting the crops from the same greenhouses were recruited. The names and active ingredients of the applied pesticides were listed. Multiple methods were adopted to measure the workers' pesticide exposure during the 1–3-hour work shift: 1) field observation to document work practices; 2) wearing a FreshAir wristband to collect ambient air exposures; 3) collecting pre- and post-shift urine samples to measure pesticide urinary metabolites. An end-of-shift questionnaire was also introduced.

Results

Observations showed that mixing several types of pesticide is a common practice: using a 'cocktail' of pesticides for preventive purposes every 10-14 days. The frequency of spraying with targeted curative pesticides is increased when harmful insects are spotted. Personal protective equipment are hardly used. Agricultural work is gendered with men mixing/spraying pesticides and women harvesting the crops. Laboratory results for FreshAir wristbands and urinary metabolites to assess pesticide types and concentrations are underway.

Conclusions and next steps

Exposure of workers to pesticides in low-resourced settings is influenced by irregular and dynamic practices that are often economically driven. Field observations revealed high exposure to pesticides among workers Next step is to correlate field observations with measured environmental exposures (air, urine).

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National Institute Of Environmental Health Sciences (NIEHS) and Fogarty International Center (FIC)

Challenges of occupational health research in Lebanon's agricultural sector: A case study in a humanitarian setting

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Conference Sessions - Session

Policy Discussion Abstract Form

Habib Rima R.

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Background or Purpose

Syrian agricultural workers, displaced to Lebanon following the Syrian conflict in 2011, live under precarious conditions in informal settlements, face hazardous exposures in agricultural work, and suffer from legal and social discrimination. The GEOHealth-MENA research project, funded by NIH, aims to link pesticide exposure, heat stress, and social stressors with wellbeing, mental health, and neurobehavioral performance among 300 Syrian refugee workers (150 agricultural and 150 non-agricultural for comparison). The challenges faced in recruiting workers into the pilot study undertaken in summer 2023 are discussed.

Content

Forty-one Syrian refugee workers [21 agricultural; and 20 non-agricultural] were recruited. A stakeholder's coalition was formed to secure the approval of employers and recruit consented workers. Following IRB approval, recruitment in the pilot study took several months.

We faced multiple challenges in recruiting Syrian refugee workers. Employers in non-agricultural workplaces questioned the research relevance and the focus on Syrian workers, while excluding national workers. Employers in agricultural workplaces, where almost all workers are Syrian, were concerned about documenting exposures,

which may encourage workers to demand improvements of working conditions. Female workers were reluctant to participate without the permission of their male next of kin (husband/father/brother). They were accompanied by a male figure during data collection. As agricultural work in greenhouses is gendered, with almost only males applying pesticides and only females harvesting crops early or late during the day, recruitment of male and female workers required multiple visits to greenhouses at odd times, as early as 5:00AM or late at 6:00PM.

Implications for addressing the issue

Occupational health research of agricultural workers in humanitarian settings is complex and has to account for multiple work- and non-work-related hazards and stressors.

Potential follow-up/actions

The pilot study provided valuable tips. Support from a wider circle of stakeholders and a well-planned study protocol were adopted to ensure high response rates in the larger study in summer 2024.

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National Institute of Environmental Health Sciences (NIEHS) and Fogerty International Centre (FIC)

The under-recognition of occupational risk related to solar ultraviolet radiation exposure and skin cancers

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Conference Sessions - Session

Policy Discussion Abstract Form

Modenese Alberto

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Background or Purpose

Occupational exposure to solar ultraviolet radiation (UVR) involves 1.6 billion workers worldwide, with a burden of ~19,000 deaths and 0.5 million disability-adjusted life years (DALY) for non-melanoma skin cancers (NMSC). Nevertheless, UVR-inflicted occupational skin cancers are extremely under-reported to worker compensation authorities.

Content

It is time to globally improve the prevention of occupational risks related to solar UVR exposure of outdoor workers, considering that:

1. The risk is preventable: SunSafety campaigns e.g. in Australia showed positive effects, with a reducing trend in melanoma incidence for subjects

2. There are collective technical and organizational protective measures (e.g., covering/shielding structures, avoiding open-field work with high UV-index) to be applied at the workplaces, even if current risk evaluation and specific workers' trainings are lacking.
3. Personal Protective Equipment (UV-filtering glasses and clothing, UV-protecting hats/helmets) are available, even if not rigorously worn by the workers. Moreover, sunscreens are fundamental individual protections, but it is difficult to have them directly provided by the employers.
4. Occupational health surveillance is fundamental for the prevention of UV-related effects, and can require collaboration with specialists such as dermatologists. In case of diagnoses of NMSC, the diseases need to be reported to the workers' compensation authorities.

Implications for addressing the issue

Improvement of the prevention of solar UVR risk at workplaces on a global scale will result in a reduction of extremely frequent, but under-recognized, occupational diseases, such as NMSC. It should be noted that recent data indicate that specific subtypes of melanoma are associated with cumulative solar UVR at work.

Potential follow-up/actions

Actions urgently recommended on a global scale in outdoor workplaces are:

1) Rigorous adoption of UVR-prevention programs, including occupational health surveillance.
2) Improvement of the notification of work compensation claims for UVR-inflicted diseases.
3) Definition of a reliable occupational exposure limit, to support risk evaluation and specific norms.

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Effects of climate change, physical stress and personal protective equipment on the thermal strain of healthcare workers

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Conference Sessions - Session

Research Data Abstract Form

Rakete Stefan

Dr. Stefan Rakete heads the group for Analysis and Monitoring. His main research interest is the assessment of hazardous exposures to humans in occupational and environmental settings. His special interests are the analysis of hazardous substances in biological and environmental samples as well as the impact of climate change on workers.

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Background

Due to climate change, hot days and heat waves will occur more frequently. As a consequence, indoor air temperatures may also rise, especially in non-air-conditioned rooms. A survey has shown that this particularly affects nursing staff in Germany. The aim of the presented study is the investigation of the influence of increased indoor temperatures and the use of personal protective equipment (PPE) on the thermal stress of health care workers.

Methods/Approach

The study was divided into two parts. In the first part, 18 test subjects were exposed to standardized test conditions in a climate chamber: 1) 22 °C without PPE, 2) 27 °C without PPE, 3) 22 °C with PPE and 4) 27 °C with PPE. The second part of the study took place in a hospital ward at temperatures below 22 °C or above 27 °C.

In both studies, physiological parameters were monitored with wearable sensors and subjective well-being was assessed using a questionnaire.

Results

For the climate chamber experiment, both heat and PPE showed significant effects on physiological parameters and the subjective well-being. The combination of heat and PPE showed the strongest effects. While PPE had no effect on core body temperature, skin temperature was increased by wearing PPE. Perceived physical strain increased with heat and PPE, as did exertion and water consumption. For the hospital ward experiment, increased temperatures had a significant effect on physiological parameters and lead to a decline of subjective well-being.

Conclusions and next steps

Although this study does not indicate any acute health risk from elevated temperatures or the use of PPE, we observed a negative influence on the well-being and performance of healthcare workers. The experimental design and the resulting data can be used be used to investigate mitigation strategies, e.g., using cooling vests.

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Funding source
Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW)

Cadmium exposure and risk of hypertension: a systematic review and dose-response meta-analysis

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Conference Sessions - Session

Research Data Abstract Form

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Background

Exposure to environmental toxic metals represents a significant global public health concern. Many studies have found that exposure to cadmium (Cd) increases the risk of developing hypertension. Since the shape of the relation between Cd exposure and hypertension has not been well characterized, we assessed it by performing systematic review and dose-response meta-analysis of human studies.

Methods/Approach

We searched the literature for eligible articles using keywords related to Cd, hypertension, and blood pressure (BP). Eligible criteria for the studies were: observational design, adult population, assessment of exposure using Cd biomarkers, and availability of exposure category-specific risk estimates for hypertension. We performed a dose-response meta-analysis of the findings yielded by the eligible studies.

Results

We included 18 articles in both qualitative and quantitative analyses published between 2006-2024, with most (n=14) having a cross-sectional design. Cd was measured in whole blood and/or urine in almost all studies, whereas only two assessed the concentration in serum. Dose-response meta-analysis showed an almost linear relation between urinary Cd concentrations and hypertension risk with RR=1.18, 95%CI 1.02-1.37 at 2.0 μg/g creatinine compared with null exposure. Conversely, the association between blood Cd and hypertension risk was non-linear, with a more steep risk increase at Cd concentrations above 2 μg/L, and a RR of 1.48 (95%CI 1.17-1.86) at 2.0 μg/L compared with null exposure. We found similar trends in studies limited to Asian populations, while when considering studies from North America hypertension risk seemed to increase above 1.0 μg/g creatinine.

Conclusions and next steps

The positive association between Cd exposure and risk of hypertension, based on a validated biomarker as blood Cd, was non-linear while the association was almost linear for urinary Cd, possibly related to the different timing of exposure assessed by blood (short-term) and urine (long-term) concentrations. Further lowering Cd exposure is confirmed as a public health priority for chronic disease prevention.

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Outdoor artificial light at night exposure and risk of conversion from mild cognitive impairment to dementia: an Italian prospective cohort study

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Conference Sessions - Session

Research Data Abstract Form

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Background

A few studies have suggested that exposure to lighting during night hours, i.e. light at night (LAN), may increase the risk of dementia. In this study, we aimed to evaluate the association between exposure to outdoor artificial LAN and risk of conversion to dementia in an Italian cohort of subjects with mild cognitive impairment (MCI).

Methods/Approach

We recruited subjects with a diagnosis of MCI at the Cognitive Neurology Clinic of Modena Hospital in the period 2008-2014, and we followed these subjects up to 2021 for conversion to dementia. We collected their residential history and we assessed LAN exposure at subjects' residences using satellite imagery data available from the Visible Infrared Imaging Radiometer Suite (VIIRS) for the period 2014-2022. Using a Cox-proportional hazards model adjusted for relevant confounders, we computed the hazard ratio (HR) of dementia with 95% confidence interval (CI) according to increasing LAN exposure through linear, categorical, and non-linear restricted-cubic spline models.

Results

Out of 53 recruited subjects, 34 converted to dementia of any type including 26 Alzheimer's dementia. In linear regression analysis, LAN exposure was positively associated with dementia conversion (HR 1.03, 95% CI 1.00-1.06 for 1-unit increase). Using as reference the lowest tertile, subjects at both intermediate and highest tertiles of LAN exposure showed increased risk of dementia conversion (HRs 2.26, 95% CI 0.88-5.85, and 2.89, 95% CI 1.10-7.58). In spline regression analysis, the risk linearly increased up to a LAN exposure of 30 nW/cm2/sr, above which a plateau seemed to be reached. Results were almost confirmed when limited to conversion to Alzheimer's dementia, except for an almost linear relation.

Conclusions and next steps

Our findings suggest that exposure to outdoor artificial LAN may increase conversion from MCI to any type of dementia, especially above 30 nW/cm2/sr, while such relation appears to be almost linear for Alzheimer's dementia.

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Children's blood lead level is associated with their working fathers' blood lead level

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Conference Sessions - Session

Research Data Abstract Form

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Background

Children are a vulnerable population group to the effects of lead exposure. Lead exposure can occur directly from the child's daily environment and indirectly due to contact with their lead-exposed working fathers. This study explores factors related to blood lead levels (BLL) in children, the results of which can be used as a basis for prevention and control strategies for lead exposure and its health effects.

Methods/Approach

This study used a cross-sectional design involving 324 children from exposed sites and 240 from control sites, aged 12 to 59 months in five areas of Java Island, Indonesia. 137 fathers were randomly selected based on their children's BLL exceeding 10 micrograms. Children's BLL from fingertips blood were measured using LeadCare II Analyzer. This study used ICP-MS to measure fathers' BLL from venous blood.

Results

The proportion of BLL of ≥3.5 μg/dL showed a similar proportion (>95%) based on gender and socioeconomic level. Besides that, the percentage of children's BLL of ≥3.5 μg/dL in controlled areas showed a proportion of 93.3% which was slightly lower than children's BLL in exposed areas (97.8%).

The BLLs in fathers/guardians (N = 137) displayed a median (Q1 – Q3) of 6.63 (4.71–12.23 g/dL). Intriguingly, among fathers with BLL ≥20 μg/dL, 90% of their children also manifested BLL ≥20 μg/dL. Children whose father's/guardian's BLL was ≥20 μg/dL exhibited a sixfold higher risk of having elevated BLL, compared to children with parents whose BLL was lower than 20 μg/dL (OR=6.0; 1.3–27.3, $p < 0.01$).

Conclusions and next steps

Children with high BLL should promptly receive access to appropriate medical intervention, coupled with vigilant health monitoring, particularly if they exhibit symptoms and are experiencing delays in their growth and developmental milestones. The personal hygiene of working fathers should be improved to minimize the children's lead exposure from their fathers.

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Glyphosate formulations increase anxiety-like behaviors, and produce alterations in motor coordination and neuromuscular tone in a rat model of trans-generational glyphosate exposure

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Conference Sessions - Session

Research Data Abstract Form

Smith Don

Don Smith is a Distinguished Professor of Microbiology and Environmental Toxicology with over 30 years of experience in environmental health research in rodent animal models and human studies, with an emphasis on exposures and neurotoxicology of environmental agents, including the introduction, transport and fate of metals and natural toxins in the environment, exposure pathways to susceptible human populations such as children, the metabolic disposition and elimination of toxicants.

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Background

Environmental and occupational glyphosate exposure is associated with a variety of adverse health and neurobehavioral effects in children and adults, though the causal nature of these relationships remains uncertain.

Methods/Approach

We used a rodent model of transgenerational environmental glyphosate exposure via formulations of glyphosate, RoundUp, or RangerPro at doses or 0, 0.5, 5, or 50 mg/kg/d starting on gestational day 6 in F0 pregnant dams and continuing in F1 generation postnatally through pregnancy and postnatally in the F2 generation through 1 year of age until behavioral testing in an open field test of behavioral reactivity, balance beam test of gross motor coordination, grip strength test of fore- and hindlimb neuromuscular tone, and passive avoidance test of short term memory.

Results

Findings show that all three formulations altered behavioral reactivity and open field exploration consistent with increased anxiety in a dose-response fashion, though the RoundUp and/or RangerPro formulations caused greater anxiety-like behaviors than glyphosate alone, and when sex-based differences were present, males were more affected than females. There was evidence that RoundUp and/or RangerPro, but not glyphosate alone altered gross motor coordination and neuromuscular tone, but there were no effects of any formulation on short term memory to avoid an aversive stimulus in the passive avoidance test.

Conclusions and next steps

These results demonstrate that trans-generational glyphosate exposure, particularly in the commercially available formulations of RoundUp and RangerPro produces significant neurobehavioral impairments and increased anxiety-like behaviors, substantiating concerns for the adverse health effects of environmental applications of this commonly used herbicide.

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Funding source
Funding from the Ramazzini Institute

Surveillance of reproductive health and occupational exposures among women firefighters in the United States

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Conference Sessions - Session

Research Data Abstract Form

Solle Natasha

Dr. Natasha Schaefer Solle is an Associate Research Professor in the Department of Medicine at University of Miami Miller School of Medicine and Sylvester Comprehensive Cancer Center, with research focus on occupational cancer risks and improving cancer screening in underserved communities. She has played a critical role in the conception of the Firefighter Cancer Initiative, a multi-faceted project aimed to study firefighters' exposure to carcinogens, decrease cancer risk, and develop methods of education about prevention.

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Background

Women in the United States fire service workforce represent a critical and increasing demographic within an historically male-dominated profession. They are routinely exposed to a myriad of hazardous substances, including carcinogens, endocrine disruptors, and other toxic chemicals released during fires and from fire suppression activities. Despite these exposures, little research has been done to evaluate reproductive health risk from exposures encountered during fire and emergency medical response. In the present study, we examine the association of miscarriages and fertility markers (anti-mullerian hormone (AMH)) in a sample of women firefighters.

Methods/Approach

Women firefighters participating in a statewide cohort study, Health Exposure Reproduction (HER) of Florida Women Firefighters, completed a baseline health survey and provided a whole blood sample to examine

fertility and hormone markers. A binary logistic regression model with the outcome of yes/no for miscarriage was used in data analysis.

Results

Among 95 women firefighter participants, 32.3% reported miscarriage. Of these, most were 40-49 years old (48.4%), Caucasian (83.9%), non-Hispanic (87.7%), married (64.5%), and college graduate (51.6%). Forty percent were healthy weight and 67.7% had children. Self-reported miscarriage was significantly higher among company officers (36.7% vs 19.4%), women with firefighting tenure 11-20 years (41.9%), and those having given birth (67.7% vs 29.7%) compared to firefighters who did not miscarry. Low serum levels of AMH were observed more commonly in 60.7% of firefighters who miscarried compared to 34.4% those who did not (p-value=0.013).

Conclusions and next steps

Our findings highlight the reproductive health challenges faced by women firefighters, particularly those in leadership roles, those with longer firefighting tenures, and those who have given birth. The significant association between low AMH levels and miscarriage underscores the importance of regular reproductive health monitoring and fertility support for women in the fire service. Future research should focus on identifying causal relationships between firefighting exposures and reproductive health outcomes.

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State of Florida

New findings from the EU-SPRINT Project

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Conference Sessions - Session

Research Data Abstract Form

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Dr. Sgargi is Researcher at the Biostatistics Unit at the Cesare Maltoni Cancer Research Centre of the Ramazzini Institute. She obtained a PhD in Statics at the University of Bologna. She works at the analysis of results of bioassays, and at systematic reviews of the literature

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Background

The SPRINT project, financed by the European Union's Horizon 2020 Program, is being carried out by a consortium of 28 partners with interdisciplinary experience. The project aims at developing and testing an Integrated Global Health Approach to assess the risk associated with Plant Protection Products (PPPs) on ecosystems, plants, animals and human health, and at identifying transition paths towards a use of these substances that is sustainable in an economic, social and environmental way.

Methods/Approach

The Project adopts a comprehensive approach based on 4 actions:
- Case studies to assess the actual exposure scenario to PPPs and the main components of mixtures
- Laboratory tests to assess the effects of these exposure
- Development of a Global Health Risk Assessment Toolbox for the investigation of health effects and impacts
- Development of transition paths towards more sustainable farming.

Results

Several peer-reviewed articles are being published, both on methods and on the results of the sampling campaign. Our research has found that pesticides are recurrent across the case study sites, in all farming systems, although organic samples were less contaminated than those from conventionally farmed fields. Of the 625 environmental samples, 86% contained at least 1 pesticide residue above its detection limit. Indoor dust was the type of sample which contained the highest number of pesticide residues and concentrations. Most residues detected in soil, water, crops, and air are hazardous to non-target organisms, including humans.

Conclusions and next steps

The health impacts of pesticide mixtures are not well understood, remarking the relevance of this study. Baseline data on pesticides and their mixtures distribution and hazards should guide decision-making and risk reduction strategies. A monitoring hazard-based prioritization tool could improve decisions on pesticides approval in the EU and support the EU in meeting its targets, while also helping develop tailored transition plans and protecting humans and the environment.

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Students and Trainers – poster and video

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2. Use of personal protective equipment by resident physicians from a north-Italian university during the Covid19 pandemic, Matteo Silvestri, Italy
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Preliminary findings from the California Artificial Stone and Silicosis Enhanced Medical Monitoring Study

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Conference Sessions - Session

Research Data Abstract Form

Fazio Jane

Dr Fazio is a Clinical Instructor of Pulmonary and Critical Care Medicine and the University of Los Angeles, California School Of Medicine, and PhD Candidate in Health Policy and Management, where she has worked with public health officials to better understand the emergence of silicosis among stone countertop workers

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Background

Silicosis is a preventable, progressive, fibrotic lung disease caused by exposure to respirable crystalline silica, reported among engineered stone countertop fabricators in several countries. We aim to describe work practices and silica dust mitigation strategies of countertop workers in Los Angeles County (LAC).

Methods/Approach

We recruited countertop fabrication workers November 2023-June 2024 through targeted public health outreach and included current workers with ≥2 years tenure, residing in LAC, and ≥18 years old. Participants completed a 30-minute telephone survey on demographics, occupational characteristics, medical history, and symptoms.

Results

Twenty-eight individuals completed the questionnaire. All were male, median age of 44 years (Interquartile range [IQR] 40-51), and work tenure of 18 years (IQR 13-23). Twenty-five (89%) were employees and three were independent contractors. Twenty-seven (96%) were Spanish-speaking. All fabricated engineered and natural stone, but 22 (79%) used engineered stone >50% of the time. The most common job tasks were: cutting with hand-held tools (86%), polishing (86%), and shaping/grinding/finishing (89%). Seventeen (61%) participants reported frequently or always dry cutting, however, all worked near someone dry cutting. Twenty-five (89%) reported frequently using respiratory protection: half-face respirators (n=13, 46%); disposable N95s (n=8, 29%); and surgical masks (n=4, 14%); 2 denied respirator use altogether. Eighteen (64%) had never received respirator training and only 5 (18%)had been fit tested. Twenty-four (86%) had used compressed air for cleaning. Seventeen (56%) reported having at least one respiratory symptom, but only 1 had a previously diagnosed respiratory condition.

Conclusions and next steps

Countertop fabrication workers in LAC commonly engage in high-risk dust-generating activities without controls such as wet methods and adequate respiratory protection. Therefore, employers need to make changes to comply with California's recent prohibition of dry cutting and full-face powered air-purifying respirator requirement. These results highlight the need for promotion of improved practices in this industry.

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Use of personal protective equipment by resident physicians from a north-Italian university during the Covid19 pandemic

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Conference Sessions - Session

Research Data Abstract Form

Silvestri Matteo

Matteo Silvestri is residency doctor from the residency School of Occupational Medicine from University of Modena & Reggio Emilia (UniMoRe), which analyzed the first results of a survey regarding the use of personal protective devices by reidency doctors during the SARS CoV-2 pandemic between July and September 2022;

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Background

The international multi-centric study "Connecting European Cohorts to Increase Common and Effective Response to SARS-CoV-2 Pandemic" (ORCHESTRA) was funded by the EU Horizon2020 program to identify better preventive strategies to reduce the COVID-19 risk.

Methods/Approach

We used the ORCHESTRA self-reported questionnaire to assess the utilization rate of different types of personal protective equipment (PPE) in cases of SARS-CoV-2 infections reported by resident physicians from the UniMoRe medical residency schools. Questionnaires were collected between July and September 2022.

Results

271 residents (40% male, average age 30 years) responded: 24% worked, at least for a period between March 2020 and September 2022, in "COVID departments". Of the subjects who reported at least 1 SARS-CoV-2 infection episode, 65% worked in "COVID departments" while 55% worked in "non-COVID departments". The PPE availability during March-May 2020 was judged as inadequate by 5% of respondents from the first group and 4% from the second. In the first group >74% of respondents reported often/always wearing PPEs (surgical masks, filtering face piece (FFP) 2 respirators, eye protections, aprons, gloves). In the second group, only the 35% reported often/always using all the available PPEs, including FFP2 respirators, as there was no indication for their continuous use in "non-COVID departments". Considering PPEs and SARS-CoV-2 infections, among those who never tested positive 80% reported often/always using gloves; 43%, eye protections; 54%, disposable gowns; 85%, surgical masks; 79% FFP2, and 7% FFP3, respirators. Among those who reported ≥1 infections, the PPEs utilization rates were similar, except for gloves, utilized in 77% of the cases.

Conclusions and next steps

This study highlights differences in the frequency of PPEs utilization between medical residents in COVID vs non-COVID departments, with the former showing higher utilization rates. No relevant difference was observed for the type of PPEs utilized in relation to SARS-CoV-2 infections.

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Graveyard workers: An occupational group with high levels of solar ultraviolet radiation exposure you would never think about

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Conference Sessions - Session

Research Data Abstract Form

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Background

The Project "Measuring solar ultraviolet radiation (UVR) in outdoor workers in Lisbon: From measuring to assessing risks and developing a digital health platform for workers' guidance" (MEAOW@SolarUV), launched in 2023, is aimed to evaluate solar UVR exposure in outdoor workers (OW) in Portugal using prolonged personal monitoring. OW from Lisbon municipality engaged in different activities are involved.

Methods/Approach

Six different groups of OW were included: gardeners, graveyard workers, pavers, sanitation workers, street construction workers and sailors. GENESIS-UV dosimeters, worn on the upper left arm for about one month, were used to monitor UVR exposure.

Results

The preliminary results obtained in 4 graveyard workers of a Lisbon cemetery, monitored from mid April/beginning of May to mid-August 2023 are presented here. The average daily solar UVR exposure, resulting from an average number of 64,5 working days (minimum 57, maximum 74) ranged from 1,8 to 3,7 SED (1 SED = 100 J/m² erythemal weighted irradiance): these values are among the highest recorded in these groups.

Conclusions and next steps

Our data unexpectedly show an high individual solar UVR exposure in graveyard workers, a group not frequently considered in the OW lists, as the one recently provided by the Irish Health Safety Executive. During the four-months observation period, graveyard workers received an individual average daily dose largely sufficient to cause sunburn, a main acute adverse health effect of UVR. Furthermore, sunburns are potentially mutagenic and are recognized risk factors for UV-related skin cancers. Studies like the one presented here are fundamental for a proper recognition of the group of workers at a higher risk, such as graveyard workers, in order to properly implement preventive interventions, including adequate health surveillance programs, and for a proper occupational disease recognition.

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Funding source
Project ID 2022.01888.PTDC, funded by FCT (Fundação para a Ciência e a Tecnologia), Call for R&D Projects in All Scientific Domains - 2022

The reconstruction of occupational exposure in patients with Parkinson's disease and Parkinsonism

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Conference Sessions - Session

Research Data Abstract Form

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Background

It is known that occupational and environmental exposure to various chemicals is associated with an increased risk of Parkinson's Disease (PD) and Parkinsonism (P). The aim of this study is to identify methods for a Retrospective Exposure Assessment (REA), based on reliable assessments of chemical exposure, and therefore suitable to provide accurate information on occupational exposure to neurotoxic agents/substances.

Methods/Approach

A previous study applying the Job Exposure Matrix (JEM) ALOHA by Renzetti et al.2022, observed an association between cumulative occupational exposure to metals and pesticides and a significant increased risk of P and PD in the province of Brescia, Italy. This JEM was based on self-reported job history and experts classification but did not provide information on the specific type of chemical responsible for the association with the neurological impacts. Therefore, we considered a recent systematic review of Borghi et al.2020 to identify a more appropriate method for occupational REA when assessing long-term neurological effects.

Results

Among the methods considered in the review, we found of particular interest the study by Vermeulen et al.2010, who developed a REA for the assessment of miners exposed to diesel fumes. The study by Bello et al. 2017 identified a REA for various chemicals in ex-military personnel. Finally, Mester et al. 2011 developed a JEM for the exposure to endocrine disrupting chemicals in the automotive sector.

Conclusions and next steps

Based on the methods identified, we are planning a review of the work history collected among 430 P and PD cases and 446 age- and sex-matched controls of our first study by Lucchini et al., 2020. We will apply the identified REA methods and compare them to assess the variations in exposure-disease associations. We believe that using different methods to reconstruct job exposure to neurotoxic chemicals is key to identify more accurately the occupational determinants of chronic neurodegenerative diseases.

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Occurrence of active implanted and wearable devices among workers exposed to electromagnetic fields

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Conference Sessions - Session

Research Data Abstract Form

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Background

The risk of interference with Active Implanted Medical Devices (AIMD) and Active Wearable Medical Devices (AWMD) shall be assessed at any level of exposure to electromagnetic fields (EMF). For instance, EMF can interfere with cardiac pacemaker (PM) or implantable cardioverter-defibrillator (ICD), causing an inappropriate stimulation or affecting the sensing function or the setting of the devices.

Methods/Approach

The diffusion of AIMD/AWMD among EMF-exposed workers was explored through a survey conducted among Occupational Physicians (OPs) in charge of the workers' health surveillance in several Italian hospitals and companies. A 15-item online survey was collected, focusing on nine types of devices, including AIMD (PMs, ICDs, loop-recorders, cochlear implants and auditory brainstem implants, central nervous system/peripheral nerve stimulators) and AWMD (active prosthesis, wearable pumps for drugs/hormones, hearing aids). The study is funded by the Italian Workers' Compensation Institute (i.e. INAIL) within the project BRiC22 ID36.

Results

A total of 131 OPs, in charge of the health surveillance for an overall population of ~170,000, responded. Preliminary results of the survey indicate that the most common devices were: i) hearing aids (79% reported at least 1 worker with the device in the last year), ii) drug/hormone infusion pumps (76%), iii) ICDs (64%) and iv) PMs (61%).

Conclusions and next steps

Considering the overall population of workers followed by the OPs and the reported proportions of subjects with AIMD/AWMD, we estimated that >700 individuals, i.e., 0.5% of the total workers followed, utilize AIMDs (mainly PMs and ICDs), while >900 have AWMD (mainly hormone/drug pumps and hearing aids). Therefore, based on our estimates, approximately the 1-1.5% of the working population can be at risk for interference to medical devices from EMF exposure at the workplace. Adequate health surveillance and fitness-for-work evaluation of these workers must be carefully implemented to reduce this risk. Device manufacturers should be consulted in specific situations.

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INAIL, project BRiC22 ID36

Occupational solar ultraviolet radiation exposure in a group of Italian fishermen: re-analysis of data within an international study aimed at building a job exposure matrix

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Conference Sessions - Session

Research Data Abstract Form

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Background

A novel job exposure matrix (JEM) combining personal solar ultraviolet radiation (UVR) measurements and expert ratings is under development by an international research group (Wurtz et al. Saf Health Work 2022).

Methods/Approach

A UniMoRe expert participated with other nine experts in the assessment of probability and duration of outdoor work for all ISCO-88 (International Standard Classification of Occupations) codes. To integrate objective measures in the JEM, we re-analyzed solar UVR data collected with personal dosimeters in 7 fishermen of the North-Adriatic Sea (Modenese et al. 2019). We grouped them according to the ISCO88 fishermen codes 6152 'Inland and coastal waters fishery workers,' and 6153 'Deep-sea fishery workers.'

Results

Based on the experts' estimates, fishermen were the highest exposed group for both probability and duration. Our measurements showed that the 6152 group, formed by two workers conducting sea snail and cuttlefish fishing on small boats with no possibility of shielding from sunlight, received a daily UVR dose ranging from 0,8 to 5,4 Standard Erythema Doses (SED). Group 6153 included five fishermen who were mussels fishing and trawling on medium-sized boats, partially shielded from sunlight, and received a daily UVR dose between 0,3 and 2,1 SED.

Conclusions and next steps

Fishermen with the ISCO88 codes 6152 and 6153 were classified by experts in the highest level group of UVR exposure. In our re-analysis, coastal fishermen received, at least in one of the two days, >1 Standard Erythema Dose (SED) (maximum= 5,4 SED). Deep sea fishermen received lower UVR doses; nevertheless, 3 out of 10 measurements resulted >1 SED, (maximum= 2,1), i.e., twice the energy needed for sunburns. Notably, measurements were collected during cloudy mornings in spring. Our data, matched with the expert assessment, is a significant contribution to the development of an innovative solar UVR JEM.

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Environmental, climatic, socio-economic factors and non-pharmacological interventions: a comprehensive four-domain risk assessment of COVID-19 hospitalization and death in Northern Italy

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Conference Sessions - Session

Research Data Abstract Form

Palandri Lucia

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Background

Up to now, studies on environmental, climatic, socio-economic factors, and non-pharmacological interventions (NPI) show diverse often-contrasting associations with COVID-19 spread or severity. Most studies used large-scale, aggregated data focused more on viral spread than severe outcomes, with limited adjustment for

individual factors. Evidence simultaneously evaluating variables belonging to different exposure domains is scarce, and none analyse their collective impact on an individual level.

Methods/Approach

Our population-based retrospective cohort study aimed to assess the comprehensive role in individual COVID-19-related risk of hospitalization and death played by exposure variables belonging to four different domains: Environmental, climatic, socio-economic, and non-pharmacological interventions (NPI). We analysed data from all patients (n=68472) who tested positive to a SARS-CoV-2 swab in Modena Province (Northern Italy) between February 2020 and August 2021.

Using adjusted Cox proportional hazard models, we estimated the risk of severe COVID-19 outcomes, investigating dose-response relationships through restricted cubic spline modelling for hazard ratios.

Results

Several significant associations emerged: long-term exposure to air pollutants (NO2, PM10, PM2.5) was linked to hospitalization risk in a complex way and showed an increased risk for death; while humidity was inversely associated; temperature showed a U-shaped risk; wind speed showed a linear association with both outcomes. Precipitation increased hospitalization risk but decreased mortality. Socio-economic and NPI indices showed clear linear associations, respectively negative and positive, with both outcomes.

Conclusions and next steps

Our findings offer insights for evidence-based policy decisions, improving precision healthcare practices, and safeguarding public health in future pandemics. Refinement of pandemic response plans by healthcare authorities, taking into account our findings, could result in significant benefit to potentially affected populations.

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Progetto FAR Mission Oriented 2020 – Progetto “Filiera”, Linea FOMO

Investigating the association between perfluorinated compounds exposure and neurodevelopment in children using mixture models.

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Conference Sessions - Session

Research Data Abstract Form

Tung Chia-Jung

Chia-Jung Tung is a doctoral student at the Institute of Environmental and Occupational Health Sciences at the National Taiwan University, under the supervision of Professor Pau-Chung Chen. Chia-Jung Tung's research focuses on the impact of environmental exposures, particularly endocrine disruptors, on children's neurobehavioral development.

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Background

Per- and polyfluoroalkyl substances (PFAS) are persistent environmental contaminants with potential adverse health effects. This study investigates the relationships between 11 types of PFAS and children's behavioral performance

Methods/Approach

This study recruited participants from the Taiwan Birth Panel Study II (TBPS II), encompassing a cohort of 448 children aged 6-8 years. Behavioral performance was evaluated using the Conners' Kiddie Continuous

Performance Test, 2nd Edition (K-CPT 2). Both linear regression and quantile g-computation (QGC) analyses were employed to assess the results.

Results

The study included 448 children with an average age of 7.0 years; 58.8% had a normal BMI. PFBS (6.538 ng/mL), PFOS (5.493 ng/mL), and PFOA (3.047 ng/mL) had the highest concentrations, while PFDoDA had the lowest. PFBS and PFHxA showed negative scores for boys and positive for girls across five K-CPT 2 indicators. PFBA showed positive scores for boys and negative for girls. PFOA consistently showed positive results for girls. Significant gender differences indicated that PFBS and PFBA affected males more, while PFHxA impacted females.

Conclusions and next steps

The study found significant gender differences in the impact of short-chain PFAS on children's neurobehavioral development and attention. Future research can further identify more accurate risk factors and targeted interventions based on gender differences, better protecting children's health and development from the adverse effects of exposure to short-chain PFAS substitutes.

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NSTC 112-2621-M-002-024-MY3

A systematic review and dose-response meta-analysis on fluoride exposure and bone health

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Conference Sessions - Session

Research Data Abstract Form

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Background

Exposure to Fluoride (F), a common natural element, occurs primarily through drinking water. F can have adverse effects on human health, including dental and skeletal fluorosis, altered thyroid function and neurodevelopment. To understand its effects on bone health, particularly bone density and fracture risk, we carried out a systematic review and meta-analysis, using a novel statistical approach to characterize the shape of the relationship between exposure and effects.

Methods/Approach

Three authors reviewed titles, abstracts and full-text files, retrieved via an online literature search of PubMed, Embase and Web of Science databases, for original human studies reporting risk estimates (relative risk, hazard ratio, odds ratio or mean difference) on the relationship between fluoride exposure and bone density or fracture risk. Next, we performed a meta-analysis of the selected studies, using both a restricted maximum likelihood

random effects model, which compares the highest versus lowest fluoride exposure categories, and a one-stage dose-response model, which assesses the shape of the association.

Results

We included 28 articles on bone fracture risk and 12 on bone density in the quantitative analyses, from those initially found in the literature search (1052 and 1201, respectively). Most focused on adults in Western countries, and assessed fluoride exposure through its concentrations in drinking water, urine, serum, toenail or dietary intake. Our initial dose-response analyses showed positive associations between fluoride exposure in drinking water and fracture frequency and bone mineral density (BMD), from 1.5 mg/L and

Conclusions and next steps

Further stratified analyses are currently underway, focusing on gender, bone site and risk of bias influence. Overall, the risk of bone fractures appears to increase with exposure to F in drinking water. Greater attention should therefore be paid to F levels in water regarding potential adverse effects on bone health.

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War-related heavy metal exposure and the risk of congenital anomalies in neonates in Iraq: A case control study in Fallujah

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Conference Sessions - Session

Research Data Abstract Form

Quarsie Jeffrie

Jeffrie Quarsie is a medical doctor specialised in clinical public health with a focus on environmental health. He currently is a PhD candidate in Environmental Health at Institute of Risk Assessment Sciences, Utrecht University under professor Dick Heederik. In his research Quarsie examines the impact of heavy metal pollution during the Iraq war on birth outcomes for which he spent 5 months in Iraq and held over 100 interviews with families in Kalar and Fallujah.

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Background

An observed rise in congenital malformations in children born in the most heavily bombarded regions in Iraq during the 2003 US-UK invasion led to local concerns about possible associations between war related heavy metal exposure, including depleted uranium, and health concerns like congenital anomalies. Therefore, the association between parental and antenatal exposure to trace heavy metals and the occurrence of visible congenital malformations among neonates in Fallujah was evaluated.

Methods/Approach

A hospital-based case-control study was performed between 1st September 2021 and 27th June 2022, in Fallujah and Kalar, Iraq. Newborns with hospital diagnosed visible congenital malformations (cases) were included and compared with neonates from the general population (control) all born in Fallujah. An additional control

group from Kalar was included as well. Both mother and father were asked to complete a questionnaire with items on potentially relevant environmental exposures. Trace metal levels were measured by ICP-MS of parental hairs. Multivariable logistic regression analysis was performed to calculate adjusted odds ratios and their 95% confidence intervals. Potential confounders considered were consanguinity and parent's age but were similarly distributed between cases and controls. Mother's age was included in the multivariate model.

Results

Our study included parents of 33 neonates with visible congenital malformations (hydrocephaly, anencephaly, cleft palate), and parents of 80 control neonates. Ever lifetime exposure to low military exposure of mother (OR=2.93, 95% CI 2.2 – 44.6) and of father (2.93, 0.1 - 0.7) were significantly associated with giving birth to birth defects. Uranium concentrations in hair were also significantly higher in cases than in controls (OR=15.8, 95% CI 4.04 - 34.05).

Conclusions and next steps

Long-term low maternal and paternal military exposure were the war-related variables most strongly associated with birth defects in Fallujah. Higher uranium hair concentrations were found in parents with birth defects. The mechanism of the associations is not clear.

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Funding source
Right To Learn Fund

Well-being and work ability of professionals in the emergency departments of the University Hospital of Modena

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Conference Sessions - Session

Research Data Abstract Form

Poma Erica

Erica Poma hold a master's degree in Economics and Public Policy from the University of Modena and Reggio Emilia (Unimore) and is currently a PhD student in Work, Development and Innovation (Unimore). Her main research interests are in gender and diversity policies, work ability, good governance, and social policies that promote equality and individual well-being.

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Background

Recruitment and retention strategies for healthcare personnel represent a priority for European political agendas, which are examining how to counteract the high turnover rate in healthcare facilities, particularly among emergency professionals. To combat the increase in resignations among healthcare professionals, empirical evidence shows that the level of work capacity and well-being are significant determinants of absenteeism, the intention to leave one's job, or early retirement, and thus factors that can promote the extension of productive working life. Alongside work ability, studies on hospital turnover recognize the central role of organizational conditions, work environment (physical and social environment, structural characteristics), job satisfaction, and emotional exhaustion in influencing turnover and the intention to leave one's job. The family and territorial system that supports a better work-life balance is also particularly crucial, as it is an important determinant of the well-being of workers.

Methods/Approach

This study, through the administration of a questionnaire in two different waves (August-September 2022; May-June 2024), will focus on the well-being, work ability, and working conditions of professionals in the Emergency Departments of the Azienda Ospedaliero-Universitaria di Modena.

Results

Medical, psychological and organizational expertise will be integrated in an interdisciplinary framework to develop a theoretical model, supported by empirical evidence, that can help design multilevel interventions to promote organizational well-being in these areas, which are characterized by significant levels of psychosocial risk (work-related stress, aggression and violence against workers, etc.).

Conclusions and next steps

Future steps in this research include further administration of a questionnaire in the emergency departments of the Azienda Ospedaliero-Universitaria di Modena, indicatively in May-June 2025, which will allow us to assess the effects of the variables and policies under consideration over a medium-term time frame.

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Identifying unmet needs in cancer survivorship by linking patient-reported outcome measures to the International Classification of Functioning, Disability and Health

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Conference Sessions - Session

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Schiavi Margherita

Margherita Schiavi, an occupational therapist and health researcher is a Ph.D. Candidate. A dedicated researcher with extensive experience in clinical projects and education, her primary research focuses on occupational rehabilitation, assessing occupational needs, and improving the quality of life for complex patients. She has presented her work at numerous conferences and has published in different journals.

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Background

Advances in cancer detection and treatment have extended cancer survivor (CSs) life expectancy, but their evolving health needs remain unmet. This study analyzes 14 patient-reported outcome measures (PROMs) for CSs with non-cutaneous cancers, using the International Classification of Functioning, Disability and Health (ICF) framework.

Methods/Approach

Each PROM was examined for correspondence to ICF health and functioning dimensions. Two independent reviewers extracted meaningful concepts from each PROM item, linking them to ICF categories. Discrepancies were resolved through discussion with a third expert reviewer.

Results

PROMs varied in ICF component correspondence, with "Activities and Participation" and "Environmental Factors" most frequently represented, highlighting their significance. "Body Structures" received minimal attention, suggesting its limited relevance to CSs' needs.

Conclusions and next steps

This evaluation of PROMs enhances understanding and addresses the diverse needs of CSs, crucial for improving their quality of life. The study underscores the importance of addressing "Activities and Participation" and "Environmental Factors" in PROMs for CSs. These insights support developing comprehensive PROMs and help healthcare providers prioritize critical areas of survivorship care, ultimately enhancing CSs' well-being.

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Asbestos in drinking water and related disease risks: An epidemiological and environmental study

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Conference Sessions - Session

Research Data Abstract Form

Lettucci Elia

Elia Lettucci is a fifth-year medical student at the University of Modena and Reggio Emilia. He is an active member of ONA (National Asbestos Observatory), and currently Vice-President of Rotaract Club in Carpi, that shares and promotes, at local and international level, ideals and objectives of environmental protection, fight against diseases such as Polio, the provision of water and sanitation services and promotion of peace.

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Background

Asbestos and related diseases are a major public health concern. Historically used for construction, asbestos is classified as a Group 1 carcinogen by the IARC. Asbestos-cement (AC) pipes remain widely used for tap-water distribution. In the Emilia-Romagna region, Northern Italy, it is estimated that 5,120,750 meters of AC pipes still in use, accounting on average for 26.84% of the total, with some municipalities having up to 48.45% of their pipes made of AC. In particular, measurements conducted in the city of Carpi in 2015 revealed concentrations exceeding 20,000 fibers per liter (f/L), with a maximum of 105,780 f/L. Some studies have suggested a link between asbestos ingestion and cancer, including airborne asbestiform fibers when contaminated water is used in humidifiers and showers. This study aims to explore the association between asbestos levels in tap-water and asbestos-related diseases in Emilia-Romagna region.

Methods/Approach

We will integrate the map of AC pipes in Emilia-Romagna with the analysis of fiber types and concentrations, and of water properties, including hardness, pH, and seasonal temperature variations. We will integrate data from the regional mesothelioma and cancer registry to assess risk of cancer using a dose-response approach to assess the safe level of asbestos fibers in potable water, considering the reference standards of US-EPA (7 million fibers per liter, MF/L) and WHO (0.1 MF/L).

Results

We will evaluate any potential link between increasing asbestos concentrations in contaminated water over time and gastrointestinal, urothelial, renal and mesothelioma cancers. We also plan to pool our results with those from similar international studies that showed weak but positive associations.

Conclusions and next steps

From a public health perspective, the identification of any association between asbestos levels in tap water and cancer will urge the enforcing of mitigating interventions, including replacement of AC pipes and implementation of water treatments to prevent further deterioration of the pipes.

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Air pollution from motorized traffic and risk of early onset dementia in the Modena province, Northern Italy

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Conference Sessions - Session

Research Data Abstract Form

Soncini Camilla

Dr. Camilla Soncini, MD, graduated in Medicine and Surgery in July 2024 at the University of Modena and Reggio Emilia. She worked on thesis project aimed at assessing the role of environmental factors and risk of dementia. She is now a research fellow studying the relation between environmental factors and biomarkers of oxidative stress dietary risk factors and risk of neurodegenerative diseases at the same University.

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Background

Dementia is defined as a group of disorders characterized by the development of multiple cognitive deficits. When the condition affects individuals under the age of 65, it is referred to as early-onset dementia. The average incidence of the condition between the ages of 30 and 64 is about 120/100,000, with an incidence that increases with age. The etiological causes of the condition are varied and while the study of risk factors for late-onset dementia has yielded important results, there are still many gaps regarding early-onset dementia.

Methods/Approach

The aim of this study is to investigate environmental pollutants, such as benzene and PM10 (Particulate Matter with diameter

Results

We analyzed the data using multivariate conditional and unconditional logistic regression, adjusting for confounding factors (sex and age), and proceeding with nonlinear analyses based on restricted cubic splines. Overall, the results show that exposure to high levels of benzene and PM10 is correlated with an increased risk of early-onset dementia and exposure to extremely low levels seems to be correlated with a slight increase in disease risk.

Conclusions and next steps

We conclude that it is essential to further research the effects of atmospheric pollutants on cognitive health, particularly in young adults.

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Interstitial lung disease

PANEL V

Evolving trends in adopting cleaner fuels in India kitchens during past decade: Its impacts on the health of women and the household

1. The evolution of women's health in India kitchens vis-à-vis household environment, TK Joshi, India

2. Household air quality before and after the introduction of liquefied petroleum gas (LPG) in kitchens in India under project mode, Mukesh Khare, India

3. Health impacts and lessons learned from the kitchens liquefied petroleum gas (LPG) project in India, GC Khilnani, India

The evolution of women's health in India kitchens vis-à-vis household environment

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Conference Sessions - Session

Policy Discussion Abstract Form

Joshi Tushar Kant

Dr. Joshi, was former Director of the Center for Occupational and Environmental Health in New Delhi and was a visiting research fellow at London School of Hygiene at TUC Centenary Institute of Occupational Health.

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Background or Purpose

Household air pollution (HAP) caused by solid fuels (such as wood, animal dung, crop residues, charcoal and coal) for cooking and heating is a significant cause of respiratory morbidity and mortality, especially in women.

Content

Interventions and Initiatives

Ever since the magnitude of the problem was realized, attempts has focused on primary prevention by substituting the biomass fuel with cleaner fuels and introducing improved cooking stoves. The Government of India promoted liquefied petroleum gas (LPG) use since 2015 with a positive effect on women's welfare due to: (a) reduced fuel collection/preparation time, (b) reduced cooking time and (c) convenient cooking arrangement. These benefits of LPG adoption have received little attention in the literature.

The Ministry of Petroleum and Natural Gas (MOPNG) launched the 'Pradhan Mantri Ujjwala Yojana' (PMUY) as a flagship scheme on 1st May 2016. The objective was to make clean cooking fuel such as LPG available to the rural and deprived households, in order to move them away from traditional cooking fuels such

as firewood, coal, cow dung, etc. The target under the scheme was to provide 80 million LPG connections to the deprived households by March 2020. The scheme was extended further and by 1st March 2024 there were 102.7 million PMUY beneficiaries.

Implications for addressing the issue

The Government of India is addressing the public health concerns of women's and children's health by providing clean cooking fuel, i.e., LPG to poor and rural households. This initiative has saved 7.2 million tons of fuel wood with decreased pressure on forests and a small gain for climate change. There have been many benefits to women for switching to using LPG such as women's time-saving for fuel collection/preparation and cooking and a convenient cooking experience.

Potential follow-up/actions

A robust outcome assessment, along with barriers and challenges would help improve such schemes elsewhere.

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Household air quality before and after the introduction of liquefied petroleum gas in kitchens in India under project mode

Conference Sessions - Session

Policy Discussion Abstract Form

Gupta Naresh

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Background or Purpose

Indoor air pollution poses a significant and growing health risk in India. Primary pollutants of concern in biomass fuel generated household air pollution are particulate matters (PM10, PM2.5, PM1.0), NOx, SOx, and CO.

Content

The Pradhan Mantri Ujjwala Yojana (PMUY), launched in 2016, has significantly impacted indoor air quality in India. Before the scheme, many rural and underprivileged households relied on solid fuels like firewood, cow dung, and crop residues for cooking. These traditional fuels produced high levels of indoor air pollution, leading to severe health issues such as respiratory diseases and low birth weights, especially affecting women and children.

After the implementation of PMUY, which provided free liquefied petroleum gas (LPG) connections to economically disadvantaged households, there has been a notable improvement in indoor air quality. The availability of cleaner cooking fuel through PMUY has also empowered women by reducing the time and effort required to collect traditional fuels and improving overall household health.

Implications for addressing the issue

Studies show that indoor PM2.5 concentrations in households using LPG were nearly two times lower during cooking hours compared to those using traditional chulhas. By 2019, the PMUY helped prevent 1.8 million tonnes of PM2.5 emissions and reduced indoor air pollution deaths by 13%. This equated to the prevention of approximately 150,000 pollution-related premature deaths in that year alone.

Potential follow-up/actions

Despite these improvements, challenges remain in ensuring consistent LPG use among beneficiaries and extending the benefits to all eligible households. The target coverage under the Pradhan Mantri Ujjwala Yojana (PMUY) has been expanding ever since its launch. However, in 2021-2022, 9.6% of beneficiaries took no refills, 11.3% took only one refill, and 56.5% took four or fewer refills of LPG.

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Health impacts and lessons learned from the kitchens LPG (Liquefied Petroleum Gas) project mission in India

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Conference Sessions - Session

Policy Discussion Abstract Form

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G C Khilnani is Professor and Head of the Department of Pulmonary Medicine and Sleep Disorders, AIl India Institute of Medical Sciences, New Delhi, teaching and training in pulmonary medicine. He has pioneering research on occupational lung diseases.

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Background or Purpose

Cooking activities release millions of particles (~106 particles/cm3) by burning wood, oil and other similar sources, many of which are ultra-fine particles. Residents' health may be negatively impacted by these particles spreading not just to the kitchen but also to other parts of the building. Almost 40% of Indian households still use solid fuels including wood, charcoal, leaves, cow dung cake, among others.

Content

The Kitchens LPG Project, under the Pradhan Mantri Ujjwala Yojana (PMUY) launched in 2016 by the Government of India, aims to mitigate these health hazards. The target was to release 8 crore (80 million) Liquefied Petroleum Gas (LPG) connections to the deprived households by March 2020. Under the union budget for financial years 2021-22, provision for release of an additional 1 crore (10 million) LPG connections under the PMUY scheme was made. There is also extension of PMUY for release of 75 lakh (7.5 million) LPG connections over three years from financial year 2023-24 to 2025-26. As of 1st March 2024 there are 10.27 crore (102.7 million) PMUY beneficiaries.

Implications for addressing the issue

The benefits of the program are:

1. Reduction in health risks: Switching to LPG significantly reduces the emission of harmful pollutants, leading to lower respiratory and cardiovascular diseases.
2. Improved quality of life: Access to LPG saves time spent on gathering biomass fuels, allowing women to engage in other productive activities and improving their overall quality of life.
3. Environmental benefits: Reduced reliance on biomass fuels decreases deforestation and environmental degradation, contributing to forest conservation and climate change mitigation.
4. Economic benefits: Healthier individuals contribute more effectively to the economy. The LPG industry also creates job opportunities, stimulating economic growth.

General benefits expected are health improvements, reduction in mortality rates and environmental and social Impacts.

Potential follow-up/actions

The potential follow-up issues involve addressing accessibility and affordability, supply chain, behavioral change, and monitoring and evaluation.

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WORK OF THE FELLOWS III

1. Social and environmental injustice of plastic pollution: Report of the Minderoo-Monaco Commission on Plastics and Human Health, Adetoun Mustaphan, Nigeria

2. Consumer exposure to pesticide residues from food: An exploratory study of duplicate food portions intake and urinary metabolite excretion, Paul Scheepers, Netherlands

3. The age of fire: Ticking time toxic exposures from historical buildings, Oladele Ogunseitanl USA

4. How has environmental health research affected artisanal and small-scale gold mining?, Stephan Böse-O'Reilly, Germany

5. Climate crisis and health, from research to policy: Opportunities for the Collegium Ramazzini, Kurt Straif, USA

6. Pros and cons of exposomic approach for risk assessment: Challenges with essential elements like manganese, Roberto Lucchini, Italy

Social and environmental injustice of plastic pollution: Report of the Minderoo-Monaco Commission on Plastics and Human Health

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Conference Sessions - Session

Policy Discussion Abstract Form

Mustapha Adetoun

Dr. Mustapha is a leader in environmental epidemiology in Africa and researcher in air pollution, social determinants of health. plastic pollution and climate change.

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Background or Purpose

Plastic use occurs in every aspect of modern life and results in widespread human exposure to the chemicals contained in plastics. To manufacture plastics, thousands of chemicals are incorporated into carbon-based polymers to convey specific properties. The chemicals include carcinogens, neurotoxicants and endocrine disruptors such as phthalates, bisphenols, poly-fluoroalkyl substances, brominated and organophosphate flame retardants. The Minderoo-Monaco Commission on Plastics and Human Health has produced an extensive review of the plastics impacts on human health and well-being; the global environment, especially the ocean; the economy; and vulnerable populations.

Content

This talk is based on Section 6 of the report, which examines the intersection between plastic, social inequity, and environmental injustice. Plastic disposal is highly inefficient, with recovery and recycling rates below 10% globally. Vast quantities of plastic waste are exported from high-income to low-income countries, where it accumulates in landfills, pollutes air and water, degrades vital ecosystems, befouls beaches and estuaries, and harms human health—environmental injustice on a global scale. The adverse effects of plastics and plastic pollution on human health, the economy and the environment are not evenly distributed. They disproportionately affect poor, disempowered, and marginalized populations such as workers, racial and ethnic minorities, "fence-line" communities, Indigenous groups, women, and children, all of whom had little to do with creating the current plastics crisis and lack the political influence or the resources to address it. Plastics' harmful impacts across its life cycle are most keenly felt in the Global South, in small island states, and in disenfranchised areas in the Global North.

Implications for addressing the issue

Social and environmental justice principles require reversal of these inequitable burdens to ensure that no group bears a disproportionate share of plastics' negative impacts and that those who benefit economically from plastic bear their fair share of its currently externalized costs.

Potential follow-up/actions

Continued discussion of recommendations.

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Funding source
The Minderoo Foundation, the Centre Scientifique de Monaco, and the Prince Albert II of Monaco Foundation

Consumer exposure to pesticide residues from food: An exploratory study of duplicate food portions intake and urinary metabolite excretion

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Conference Sessions - Session

Research Data Abstract Form

Scheepers Paul

Paul T.J. Scheepers obtained his MSc in environmental sciences at Wageningen University and his PhD in toxicology at Radboud University where he was appointed assistant professor in toxicology. At the Radboud University Medical Center in Nijmegen, he founded the research group Risk Assessment and Molecular Epidemiology and the Research Lab Molecular Epidemiology. In 2007 he obtained his associate professorship in risk assessment and molecular epidemiology.

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Background

Food residue data collected for compliance purposes by the European Food Safety Agency (EFSA) can be used to estimate dietary pesticide uptake. In these estimates the contribution of food preparation and processing is covered by a processing factor.

Methods/Approach

We studied the dietary uptake of pesticides in 21 female and 22 male consumers from seven EU countries. A duplicate portion of food and beverages (DFP) was collected from one day (24h). Urine was collected on the same and the next day until noon. DFP and urine was analysed for 183 active ingredients using LC-MS/MS and GC-MS/MS. Glyphosate and AMPA were analysed in a separate dedicated method.

Results

We detected residues of 86 pesticides in the DFPs. The highest detection frequencies (%) were observed for metalaxyl (100%), the synergist piperonyl-butoxide (90%), pirimiphos-methyl (77%) and tebuconazole (70%). The highest median concentrations were observed for dimethomorph (3.68 µg/kg), boscalid (2.33 µg/kg) and piperonyl butoxide (1.92 µg/kg). The most abundant urinary metabolites were 3-PBA (81%), DCCA (63%), TCPy (84%), and DEAMPY (74%), followed by glyphosate (42%) and AMPA (30%). The highest urinary levels were 136 µg/L for the pyrimethanil metabolite M605F002, 18 µg/L for hydroxy-tebuconazole, and 14 µg/L for DEAMPY. For 55.8% of the participants, tebuconazole in DFP matched with urinary tebuconazole-OH excretion. For other pesticides co-occurrence was limited to less than 20%.

Conclusions and next steps

DFP collection combined with urinary metabolite measurements provide a proof of concept to assess dietary intake in volunteers. This approach gives insight into dietary intake of pesticides in consumers.

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Funding source
European Commission

The age of fire: Ticking time toxic exposures from historical buildings

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Conference Sessions - Session

Research Data Abstract Form

Ogunseitan Oladele

Oladele (Dele) Ogunseitan holds the title of Distinguished Professor at the University of California, Irvine, where he led the establishment of the Program in Public Health, and served as founding chair of the Department of Population Health and Disease Prevention. He is also appointed to the Department of Environmental and Occupational Health, and Co-Directs the World Institute for Sustainable Development of Materials (WISDOM).

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Background

Around midnight on 7 November 2023, one of two blimp hangars located on a former military facility in Tustin, California caught on fire. The facility was established in 1942 by the United States Navy to support lighter-than-air craft. At 323m long, 91m wide, and 54m tall, the hangar was among the world's largest wood constructions. The hangar was constructed to be fire-proof with asbestos components. Since its construction and military decommissioning, a vibrant neighborhood emerged in the immediate vicinity. The hangar fire led to emissions of toxic pollutants including asbestos-laden debris, lead (Pb), and volatile organic substances. Panic ensued in the neighborhoods, and several community-engagement events were held to evaluate the risks of exposure and potential disease outcomes.

Methods/Approach

Qualitative appraisal of community perspectives of risks of toxic exposures were conducted through town hall meetings and compared with quantitative assessment of concentrations of toxic emissions conducted by the

U.S. Environmental Protection Agency and data interpretations provided by the California Department of Toxic Substances Control, the City of Tustin, the School District, and the County Health Care Agency.

Results

Despite assurances by the government agencies responsible for emergency response, remediation, and communication, and by an expert panel about the toxic aftermath of the hangar fire, the level of public anxiety remained high, particularly regarding exposure to asbestos fibers. There was notable discrepancy between the data collected by private testing agencies commissioned to sample within domiciles and the ambient measurements provided by the laboratories commissioned by government agencies, which fueled uncertainty and public distrust.

Conclusions and next steps

Climate change is fueling wildfires in many parts of California. So is the development of neighborhoods around old buildings that were constructed with toxic materials, including asbestos, and leaded compounds. It is necessary in this and similar cases to develop comprehensive response procedures for exposure prevention and community engagement.

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Funding source
University of California Presidential Chair Endowment

How has environmental health research affected artisanal and small-scale gold mining?

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Conference Sessions - Session

Policy Discussion Abstract Form

Böse-O'Reilly Stephan

Prof. Dr. Med. Stephan Böse-O´Reilly is a professor of environmental and public health at the University Hospital, LMU in Munich, Germany. He is a pediatrician and his main interest is to prevent children from disease by helping to reduce their exposure to toxic substances, such as lead and mercury.

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Background or Purpose

Artisanal and small-scale gold mining (ASGM) is widespread in low and middle income countries (LMICs). The widespread use of mercury is highly neurotoxic. Over the past two decades, by measuring mercury levels in the urine, blood, hair, and breast milk, we have conducted a comprehensive assessment of the health impacts on miners. Our research has identified significant health needs, the deficiencies in workplace health and safety standards, and the substantial burden of disease associated with these mining practices. What tangible impact had this research on the situation of ASGM miners?

Content

After years of pandemic restrictions, ASGM continues with considerable activity. Extracting ore from small tunnels, processing it with rudimentary ball mills and using mercury to create amalgams containing both gold and mercury, involves many young miners, including a significant number of women and children. The amalgams are then heated to release toxic mercury vapors, leaving behind gold that provides minimal financial return per miner.

Young and female miners and their children are subjected to unhealthy living conditions in makeshift camps, exposed to constant noise, dust and mercury fumes. The driving force behind these conditions is deepening poverty. It appears that our research has not led to the reduction and replacement of mercury in many ASGM sites.

Implications for addressing the issue

The combined effects of poverty, exacerbated by the pandemic, the lack of alternative employment opportunities and the urgent need for income have driven individuals to engage in small-scale mining. It's likely that some decision-makers in more affluent areas of a country have benefited from this crisis. Widespread mercury exposure, combined with arid and unhealthy living conditions, affects children in particular. This scenario is a contemporary manifestation of Dante's Inferno - an existence marked by unrelenting suffering, hopelessness and no apparent escape.

Potential follow-up/actions

It's time to rethink strategies to improve environmental and health conditions in ASGM areas.

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Funding source
No funding was obtained for this presentation, apart from a travel grant of LMU

Climate crisis and health, from research to policy: Opportunities for the Collegium Ramazzini

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Conference Sessions - Session

Policy Discussion Abstract Form

Straif Kurt

Kurt Straif is a Research Professor at Boston College and Research Associate at ISGlobal, where he focuses his work on research and policy on topics including global cancer prevention and climate change and health.

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Background or Purpose

This presentation presents a short history, recent achievements and future needs and opportunities on the global nexus on climate change and health.

Content

At COP26 in Glasgow in 2021 health topics were only discussed at the Health Pavilion or some off-side events. Last year, COP28 in Dubai hosted the first ever official Health Day at COP negotiations with 140+ health ministers and senior representatives of health ministries signing a Declaration on Climate Change and Health. This milestone achievement was enabled by many activities of the health community (such as The Lancet Countdown, The Lancet Pathfinder; various statements including from editors-in-chief of major journals, and observer organisations, like the Global Climate Health Alliance; and scientific societies). This momentum has been taken forward to the WHO-ATACH committee and the WHO World Health Assembly resolution on Climate Change

and Health, and will be implemented through WHO's GPW14. Most recently, the annual mid-year preparatory Subsidiary Body (SB60) meetings in Bonn, Germany provided an opportunity to further support health topics at the forthcoming COP discussions in Baku, Azerbaijan.

Implications for addressing the issue

Important opportunities for engagement include the preparation of the IPCC 7th Assessment Report (specifically the inclusion of health topics), and the support of countries in developing the next round of Nationally Determined Contributions (NDC 3.0), with strong pledges on health-related actions, and the development of a consensus on health indicators to be adopted by the COP.

Potential follow-up/actions

The presentation wants to stimulate discussion and sustained action by the Collegium, such as an active committee on climate change and health, the development of a Collegium Statement and an efficient strategy to bring health to the COP negotiations, embedded in the overall idea that the trusted voices of the health community may support more ambitious COP negotiations and offer better public health as co-benefits of successful climate mitigation.

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n/a

Pros and cons of exposomic approach for risk assessment: Challenges with essential elements like manganese

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Conference Sessions - Session

Policy Discussion Abstract Form

Lucchini Roberto

Roberto Lucchini, is a professor of Occupational and Environmental Health with research interest in metal neurotoxicity. He conducted human cohort studies on workers, children, Parkinsonian patients, and controls, focusing on neurodevelopmental and neurodegenerative impacts from metal exposure. His work has provided scientific evidence for risk assessment and identification of protective standards for manganese, lead, and mercury exposure. He documented dose-response relationships that yielded more accurate estimates of population health risks for manganese exposure.

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Background or Purpose

Exposome research is rapidly evolving by encompassing biomolecular omics-based techniques. This constantly refining approach provides increasing opportunity to assess causation and to inform precision medicine and population health. Mixed exposure sciences are key in the exposome quantification, as shown by the growing number of new exposure mixture models. This expanding complexity also creates challenges for risk assessment of the individual mixture components.

Content

Essential elements like copper, iron, manganese, selenium, zinc are part of the exposure mixtures examined in human and experimental research. Exposure to mixtures is mostly based on biomarkers, which can accurately reflect exposure to non-essential purely toxic elements but not to essential elements. This is due to highly efficient physiologic mechanisms devoted to maintaining the homeostatic range. Therefore, mixtures cannot effectively include the role, or 'weight' in statistical terms, of essential individual components. As a result, the health effect of mixtures may be underestimated, and the role of each mixture component identified by models like Benchmark Kernel Machine Regression can be misinterpreted. Manganese is a good example of this, where blood manganese is not a reliable exposure proxy, especially at environmental non-occupational levels; when utilized in mixed exposure models, blood manganese levels misrepresent the real toxic effects, which can be evident when using environmental exposure metrics of airborne particulate, deposited dust or soil.

Implications for addressing the issue

Mixed exposure approaches in exposomic research can negatively impact risk assessment by underestimating the toxicity of individual essential elements. This may yield unrealistic revision of protective standards, or simply to non-compliance with existing ones. The growing demand of individual elements for EV batteries and other uses must be strictly controlled to avoid health consequences on exposed workers and communities.

Potential follow-up/actions

We propose to combine biomarkers with multimedia environmental measurements in mixed exposure sciences, especially for essential elements that may not be adequately represented by biomarkers.

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Funding source
NIEHS R01ES019222, R01ES028369, T32ESO33955