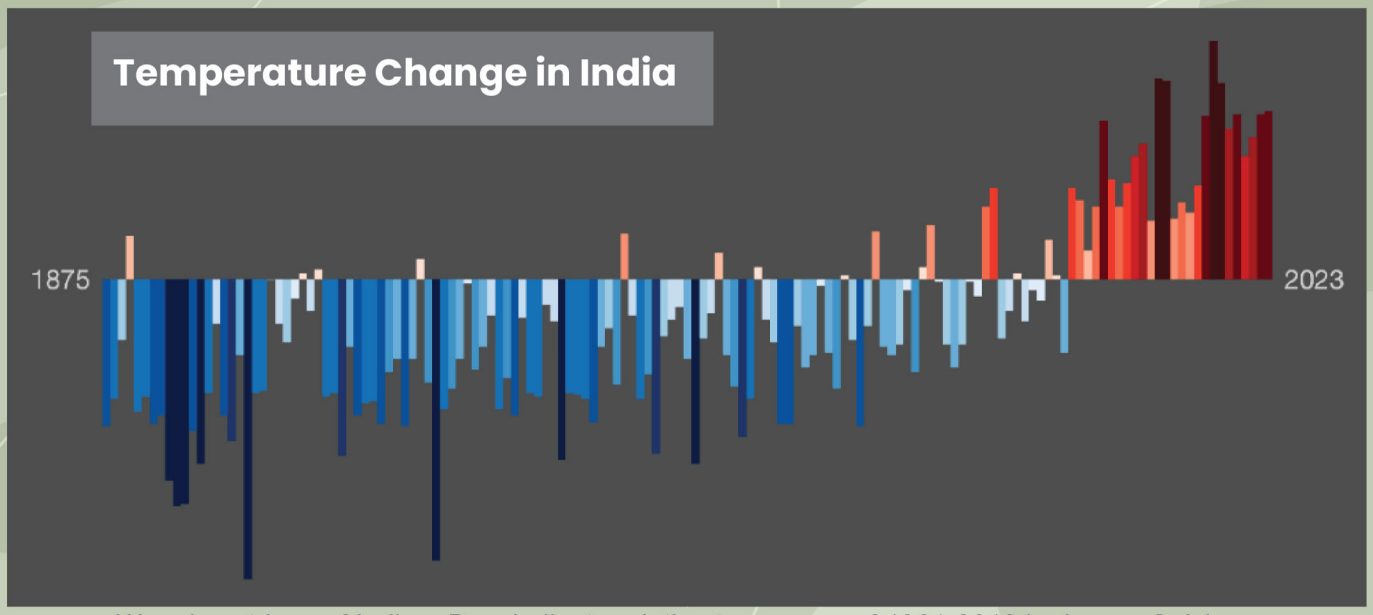
INDO-US CONFERENCE ON

CLIMATE CHANGE IMPACTS ON OCCUPATIONAL AND ENVIRONMENTAL HEALTH



Warming stripes of India – Bars indicate relative to average of 1961-2010 in degree Celsius; Red color indicates hotter temperatures
Data Viz Credits: Ed Hawkins, National Centre for Atmospheric Science, University of Reading, National Centre for Atmospheric Science, UoR.

CliCON OEH2025

VENUE: NARAYANI HEIGHTS HOTEL, GANDHINAGAR

DATES: FEBRUARY 26-28, 2025

HOSTED BY

ICMR INDIAN COUNCIL OF MEDICAL RESEARCH | NIOH NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH

ICMR-NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH, AHMEDABAD, INDIA

PARTNERED WITH

ICMR INDIAN COUNCIL OF MEDICAL RESEARCH | NIREH NATIONAL INSTITUTE FOR RESEARCH IN ENVIRONMENTAL HEALTH

CSIR-INDIA सीएसआईआर CSIR भारत का नवाचार इंजन The Innovation Engine of India | नीरी NEERI

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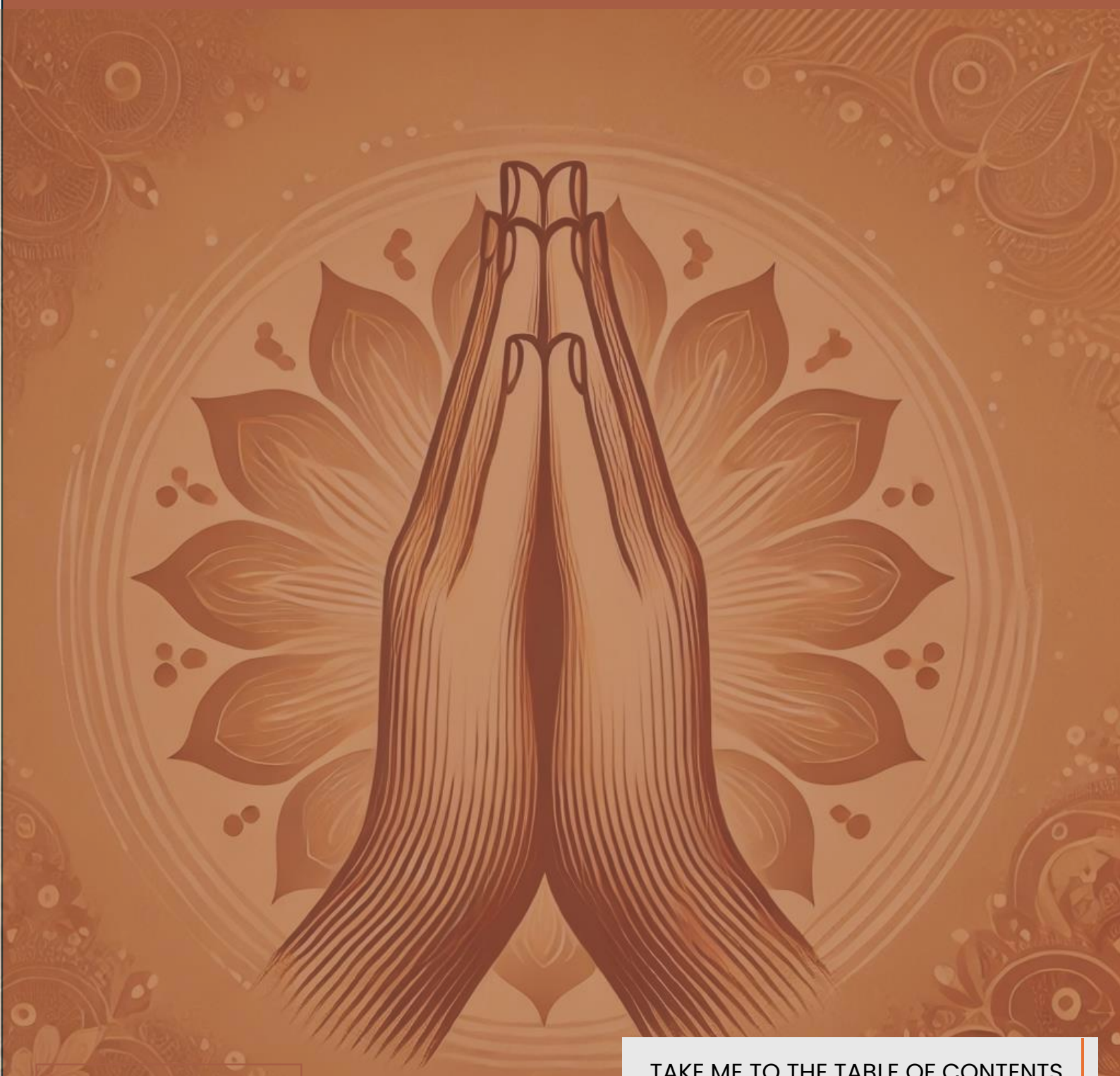

Image credits: Dall-E

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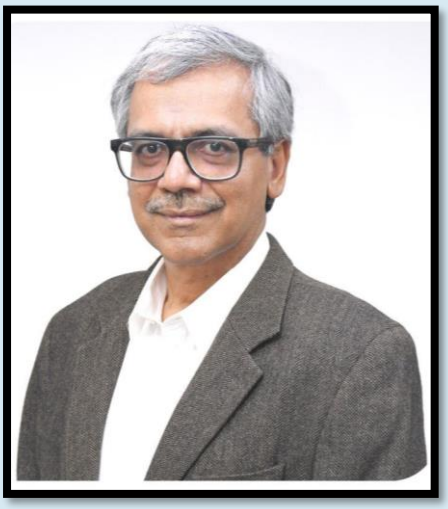
Welcome messages

Dr. Rajiv Bahl, Director-General, ICMR



It is my great pleasure to welcome all distinguished speakers, researchers, and delegates to the **Indo-US Conference on Climate Change Impacts on Occupational and Environmental Health (CliCON-OEH 2025).** This conference takes place at a critical juncture when the global climate crisis is directly impacting public health, occupational safety, and environmental sustainability. As we begin 2025, we are already witnessing record-breaking temperatures worldwide, underscoring the urgency of these discussions.

India, with its diverse geography and vast workforce engaged in climate-sensitive sectors like agriculture, construction, and industry, is particularly vulnerable to climate change. Prolonged heatwaves, unpredictable rainfall, worsening air pollution, and extreme weather events have significantly increased risks to workers' health and productivity. The 2024 heatwave, where temperatures soared beyond 50°C, was a stark reminder of the urgent need for mitigation strategies, particularly for outdoor workers. *As occupational and environmental health experts, we must take the lead in understanding, addressing, and mitigating these impacts.*

CliCON-OEH 2025 serves as a vital platform for *cross-disciplinary dialogue and collaboration between Indian and international experts*. Through these discussions, we aim to develop evidence-based interventions, innovative adaptation strategies, and scientifically driven policies to protect vulnerable populations. I am especially pleased that this conference fosters Indo-US exchanges, allowing us to learn from each other's experiences and jointly advance climate resilience in occupational health.

I commend the efforts of *ICMR-National Institute of Occupational Health (ICMR-NIOH), ICMR-National Institute for Research in Environmental Health (ICMR-NIREH), and CSIR-National Environmental Engineering Research Institute (CSIR-NEERI)* in organizing this prestigious gathering. I encourage all delegates to actively engage, share insights, and forge collaborations that will shape a sustainable and healthier future for all.

Welcome to Ahmedabad, and I wish you a productive and inspiring conference.

Welcome messages

Dr. Sanghamitra Pati, Additional Director General, ICMR

Climate change is driving extreme weather events that are resulting in humanitarian crises worldwide. It is already affecting health in numerous ways, including causing death and illness from extreme weather events like heatwaves, storms, and floods. These events have grown in both frequency and severity in recent years. A recent example is the January 2025 wildfires in Southern California, which many experts link to climate change. Some scientists argue that climate change has caused rapid shifts between dry and wet conditions in California, doubling the risk of wildfires. Such volatility increases the risks of both floods and fires. Climate change also disrupts food systems, increases the spread of zoonotic diseases and illnesses related to food, water, and vectors, and contributes to mental health challenges. These health risks, which are closely tied to climate, disproportionately impact vulnerable and marginalized groups, including women, children, ethnic minorities, low-income communities, migrants, displaced persons, the elderly, and those with pre-existing health conditions.

Recognizing the significant health risks posed by climate change, Indian Council of Medical Research (ICMR) has declared *climate change & its impact on health* as a high priority research area. I extend my heartfelt congratulations to ICMR-NIOH for organizing this landmark conference which brings together leading experts, policymakers, and practitioners to discuss, and address the pressing challenges posed by climate change on occupational and environmental health. I am sincerely hopeful that the deliberations during the three days of this conference will promote interdisciplinary discussions, exchange of innovative research, and developing actionable strategies. This conference will also provide an excellent platform to enhance Indo-U.S. scientific collaborations in pursuit of the shared goal of addressing the health risks associated with climate change. At this juncture, it is important to acknowledge that the threats from climate change can only be mitigated through concerted global efforts.

On behalf of the ICMR fraternity, I am extremely pleased to welcome all participants to this important conference. We are excited to have such a diverse and accomplished group of delegates here, and we look forward to the insightful discussions and collaborative exchanges that lie ahead. I wish you all the best as we work together towards meaningful solutions. May our conversations today lead to impactful outcomes and strengthen our shared commitment to the issues at hand.

Welcome messages

Dr. Santasabuj Das, Director (Additional Charge), ICMR-NIOH

Climate change is no longer a distant threat—it is a present reality with undeniable impacts on occupational and environmental health. From rising temperatures to extreme weather events, its effects on workers' safety, productivity, and well-being are profound. As the landscape of occupational health evolves, it is imperative that we view it through the lens of climate change.

While global policymakers continue efforts to mitigate climate change, we, as occupational and environmental health experts, have a crucial role in understanding and addressing its impact on workers' health and the health of vulnerable and marginalized communities. ICMR-NIOH is proud to lead these efforts, and it is my privilege to welcome distinguished speakers and delegates from India and around the world to this landmark conference in Ahmedabad.

January 2025 has already marked unprecedented global temperatures, with India witnessing extreme summer heat last year that affected countless lives. This stark reality underscores the urgency of our mission.

Recognizing the critical role of researchers and health professionals in climate mitigation, resilience, and adaptation, CliCON OEH2025 aims to address gaps in preparedness, apprise stakeholders, build communities, and foster international collaborations to facilitate and disseminate health research, educate healthcare professionals, raise awareness about health inequities exacerbated by climate change, and promote innovative, climate-responsive solutions and health practices.

Key themes of the conference include critical areas of air pollution and extreme heat vulnerabilities, vector-borne diseases, disasters and public health emergencies, climate risk assessment and adaptation towards building a resilient and climate-ready health sector for the 21st century.

I am particularly pleased that this conference brings together experts from India and the U.S., fostering mutual learning and collaboration towards sustainable solutions. The exchange of knowledge and ideas here will undoubtedly shape a resilient and healthier future for all.

Once again, I extend a heartfelt welcome to all participants and wish you a productive, insightful, and inspiring conference in Ahmedabad.

Welcome messages

Dr. Ankit Sheth, Head (Health Sciences Division), ICMR-NIOH

It is with great pride and immense pleasure that I welcome you to the Indo-US Conference on Climate Change Impacts on Occupational and Environmental Health (CliCON OEH2025), a landmark event dedicated to addressing one of the most pressing challenges of our time. Hosted by ICMR-National Institute of Occupational Health (NIOH) in collaboration with ICMR-NIREH, and CSIR-NEERI, this conference serves as a dynamic platform to deliberate on the profound impacts of climate change on worker and environmental health.

The impacts of climate change are unfolding in real-time, affecting workers across industries such as agriculture, construction, manufacturing, and transportation. Rising temperatures, air pollution, extreme weather events, and vector-borne diseases are increasingly posing occupational health risks, necessitating urgent scientific inquiry, policy innovation, and cross-sectoral collaboration. CliCON OEH2025 is designed to foster meaningful discussions, share ground-breaking research, and develop actionable strategies to mitigate these risks.

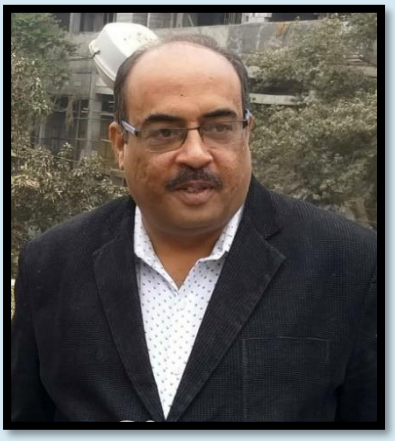
This conference brings together renowned experts, policymakers, researchers, industry leaders, and government representatives to engage in a series of plenary talks, panel discussions, and scientific presentations. With over 300 delegates, 20 plenary talks and 110 scientific presentations, the event will serve as a melting pot of ideas aimed at developing evidence-based solutions and fostering global partnerships. Topics of discussion range from climate-driven health risks, adaptation and resilience strategies, human health risk assessments, and interdisciplinary collaborations to drive impactful policy recommendations.

As the Organizing Secretary, I am confident that the discussions and outcomes of this conference will pave the way for innovative research, stronger institutional partnerships, and concrete policy recommendations to build climate-resilient workplaces.

Wishing you all a productive and enriching experience at CliCON OEH2025!

Welcome messages

Dr. Rajnarayan Tiwari, Director, ICMR-NIREH



It is my privilege to welcome the delegates, faculty and other participants of the Indo-US Conference on Climate Change Impacts on Occupational and Environmental Health jointly organized by ICMR-National Institute of Occupational Health, Ahmedabad; ICMR-National Institute for Research in Environmental Health, Bhopal; CSIR-National Environmental Engineering Research Institute, Nagpur and National Institute of Environmental Health Sciences, USA.

This conference is aligned with the current concern across the globe regarding degradation of environment, deteriorating air and water quality, changing climate with its consequences and resorting to a climate resilient and sustainable development. In the recent time the effect of climate change is evident with more frequent occurrence of extreme weather events resulting into loss of property and lives. Not only this the consistent global warming is also resulting into less productivity at workplaces, migration of population from one place to other to survival and livelihood and increased burden on the existing health system due to increased health effects of raised ambient temperature.

When it comes to fighting the challenges posed by environmental degradation, every citizen is a stakeholder, and each one can contribute in his/her own way to conserve environment and play a crucial role in averting the impending disaster due to global warming and climate change. It is to be understood that the time for action is now, and we must come together as a global community to address the threats posed by rising temperatures, extreme weather events, and ecological disruption.

This conference provides that forum where stakeholders can share knowledge, collaborate on innovative solutions, and collectively commit to building a sustainable future for generations to come. In this conference the global experts and national experts, students, activist and citizens from various parts of the country will delve upon the health impacts posed by the climate change at workplace and in general environmental setup and brainstorm to find out the ways to go ahead for sustainable development and achieving the SDGs by 2030.

I am certain that this conference will succeed in developing a framework for addressing the occupational and environmental health impacts of changing climate.

Welcome messages

Dr. Vikas Kapil, Emory University, USA

Since the beginning of recorded history, human health has been affected by changes in climate worldwide. The modern industrial age has further accelerated these changes and are associated with a myriad of direct and indirect health effects, including for work and the environment. These impacts are often disproportionately experienced by people among vulnerable groups such as those with chronic medical conditions, the elderly and the poor.

The range of concerns including exacerbation of respiratory conditions and other chronic diseases, natural disasters and extreme weather, increasing risk of certain cancers, food insecurity, deteriorating water and air quality and mental health are often further exacerbated by deteriorating health system functioning and access.

Public health prevention strategies and response to these must acknowledge the broad and global nature of these threats to health and must leverage opportunities for collaboration and effective action within countries and between governments, academic and health institutions, the private sector and broader civil society.

CLICON OEH2025 presents just such an opportunity to bring together leading experts and practitioners from India and the United States to discuss the pressing challenges on occupational and environmental health; I would like to take this opportunity to join the organizers in welcoming all attendees to this important conference.

Welcome messages

Dr. S. Venkata Mohan, Director, CSIR-NEERI

It gives me immense pleasure that **ICMR-National Institute of Occupational Health (NIOH)** Ahmedabad in partnership with **Centers for Disease Control (CDC)** and **National Institute for Environmental Health Sciences** is jointly hosting an Indo-US conference on **"Climate change impacts on Occupational and Environmental Health"** during *February 26-28, 2025.*

With the objectives of providing a crucial forum for interdisciplinary cooperation, encouraging communication between the researchers, medical practitioners, and policymakers in the area of Climate change impacts on Occupational and Environmental health, I hope that this conference will provide an appropriate platform for the interaction amongst researchers and scholars of various fields and I am sure that this Conference will be meaningful, relevant, purposive, interactive and credible.

On behalf of CSIR-NEERI, I congratulate the dedicated and committed team for organizing such conferences and express my best wishes for the grand success of the conference.

Welcome messages

Dr. K. Krishnamurthi, Chief Scientist & Head, HTC, CSIR-NEERI

Welcome to Ahmedabad!

I am thrilled to co-organize the upcoming **Indo-US Conference on Climate Change Impacts on Occupational and Environmental Health (CliCON-OEH 2025)** proposed to be held during *February 26-28, 2025, at ICMR-NIOH, Ahmedabad, India*. The effects of global warming and climate change on the environment and public health are critical issues that demand collaborative efforts and knowledge exchange.

This initiative to bring together experts from the **USA and India** would highlight our commitment to fostering international cooperation in addressing climate change and health challenges.

I believe this conference will serve as an excellent platform for interaction among scientists, policymakers, health and safety professionals. The exchange of valuable experience and insights are essential for raising public awareness and strengthening environmental protection initiatives.

The success of such events is crucial in advancing our collective efforts to tackle the environmental burden of diseases and health hazards. I extend my heartfelt best wishes for the conference's success. May it lead to fruitful discussions, meaningful collaborations, and significant contributions to the advancement of environmental public health initiatives.

About CliCON OEH 2025

Image credits: Dall-E

Indo-US Conference: Climate Change Impacts on Occupational and Environmental Health

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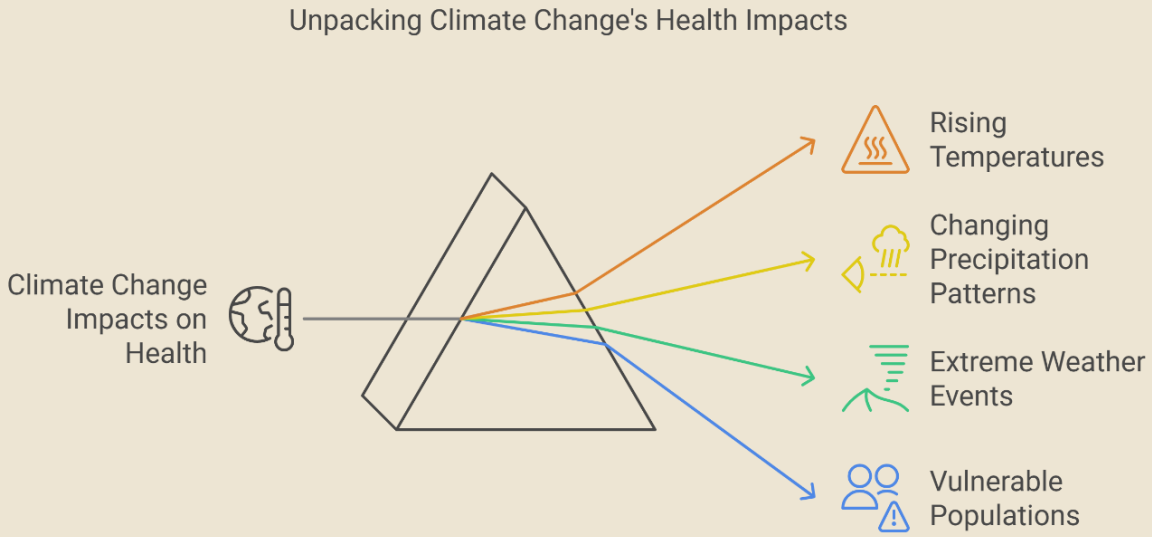
About the Conference

CliCON OEH 2025: Addressing Climate Change & Health Challenges

Recognizing the urgent need for action**, CliCON OEH 2025** is a pioneering **Indo-US conference** dedicated to addressing the intersection of **climate change, occupational health, and environmental health**. The conference aims to bring together a distinguished group of **scientists, policymakers, industry experts, and public health professionals** to discuss cutting-edge research, policy frameworks, and innovative solutions for mitigating the impact of climate change on workers and the environment.

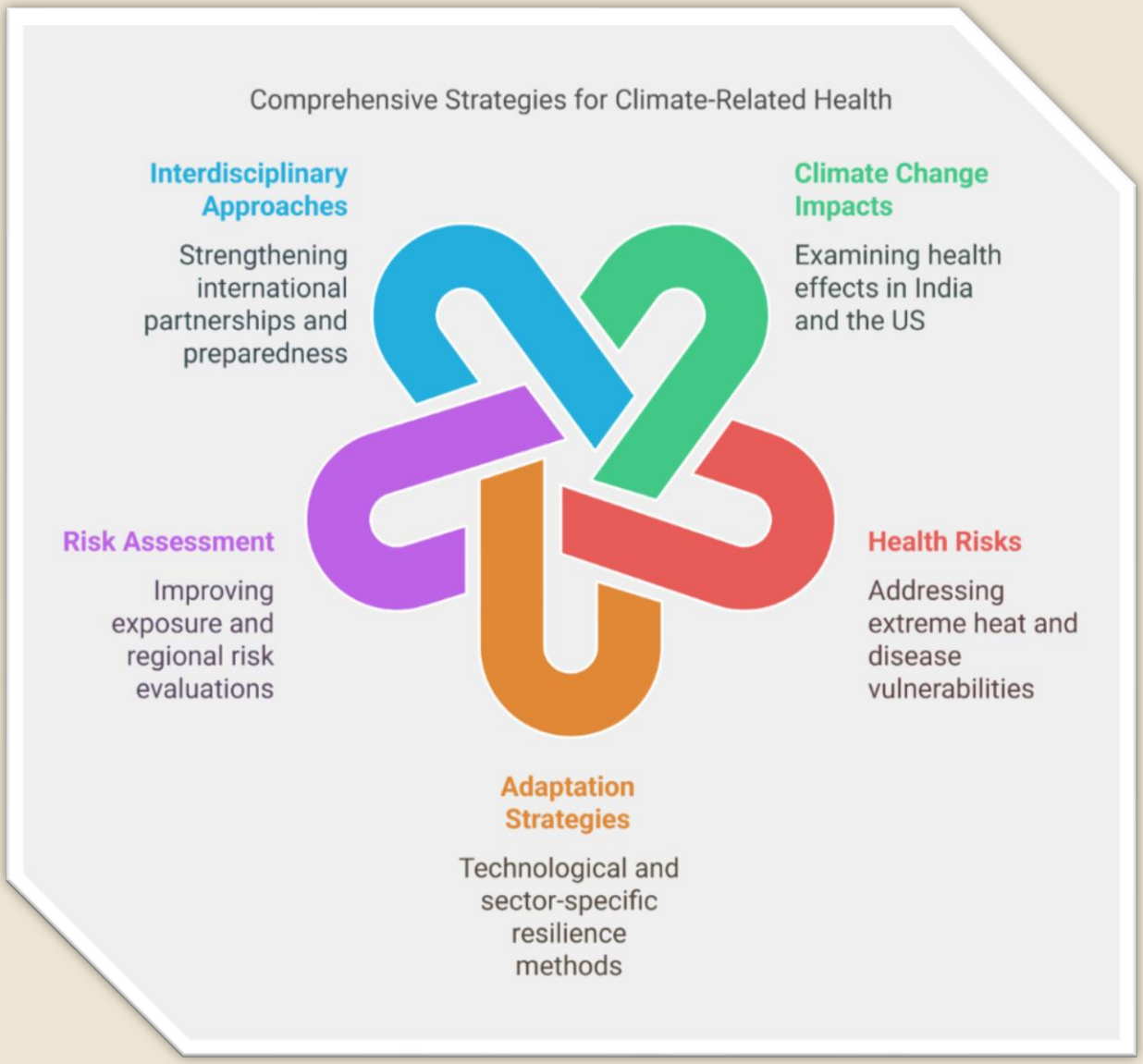


The conference will provide a **dynamic platform for discussions, networking, and collaboration**, fostering **new research initiatives and**

policy-driven solutions to safeguard worker health and improve environmental resilience.

By facilitating interdisciplinary dialogue, **CliCON OEH 2025** is poised to drive meaningful change in how we address the health impacts of climate change.

Key focus areas include:



Join us in Ahmedabad as we work together toward a sustainable and health-secure future.

About ICMR-NIOH

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About ICMR-NIOH

NIOH: Advancing Occupational & Environmental Health

The **National Institute of Occupational Health (NIOH),** under the **Indian Council of Medical Research (ICMR)**, is India's premier institution dedicated to safeguarding worker health through research, training, and policy development. Established in 1966 as the Occupational Health Research Institute (OHRI) in Ahmedabad, it was renamed NIOH in 1970 and has since expanded with Regional Occupational Health Centres (ROHC) in Bangalore (1977).

Image credits: Dr. Lokesh Sharma

ICMR-NIOH shining bright in Ahmedabad

Key Research Areas

- Occupational diseases: Silicosis, asbestosis, pneumoconiosis, and byssinosis.
- Exposure studies: Heavy metals, welding fumes, pesticides, and bioaerosols.
- Workplace ergonomics: Reducing musculoskeletal disorders and fatigue.

- Women in labour-intensive work: Health risks in small enterprises and agriculture.
- Air pollution: Assessing indoor and outdoor exposure risks.
- Toxicovigilance: Monitoring pesticide residues in food and environment.
- Occupational mental health: Investigating work-related stress, psychological well-being, and interventions to enhance mental health in the workplace.

Impact & Innovation

NIOH plays a crucial role in environmental monitoring, occupational disease prevention, and policy recommendations. The ENVIS Centre at NIOH, sponsored by the Ministry of Environment & Forests, serves as a hub for research data and dissemination on occupational and environmental health. Through scientific advancements, technological innovation, and policy collaboration, NIOH continues to improve occupational safety and public health across India.

NIOH shining in the night of Republic Day (26th January 2025)

Meet The Organizing Team

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Organizing Committee - CliCON OEH 2025

Chief Patron

Dr. Rajiv Bahl,
Director General, ICMR, India

Organizing Chairperson

Dr. Santasabuj Das
Director (Addl. Charge), ICMR-NIOH, India

Organizing Committee - CliCON OEH 2025

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Dr. Vikas Kapil
Emory University,
USA

Dr. Rajnarayan Tiwari
Director,
ICMR-NIREH

Dr. K. Krishnamurthi
Chief Scientist & Head,
HTC, CSIR-NEERI

Organizing Committee - CliCON OEH 2025

Organizing Secretary

Dr. Ankit Sheth
Scientist 'E' and Head (HSD),
ICMR-NIOH

Joint Organizing Secretaries

Dr. Ravichandran B
Officer-in-charge,
NIOH-ROHC(S)

Dr. Sivaperumal P
Scientist 'E',
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Dr. Ravibabu
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Mr. Ramshankar Barai
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Mrs. Sunita Kerketta
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Dr. Shubhangi Pingle
Sci -E,
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Dr. Mahendra Thakor
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ICMR-NIOH

Dr. Soundarya
Sci -C,
ICMR-NIOH

Dr. Rakshit Shah
Sci -C,
ICMR-NIOH

Mrs. Shilpa Ingole
Technical Officer-B,
ICMR-NIOH

And all the ICMR-NIOH staff

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Plenary Talks

Abstracts & Speakers

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Dr. Dorairaj Prabhakaran
Executive Director - Centre for Chronic Disease Control,
India

A 360-degree view of air pollution and cardiovascular disorders (CVD)

Air Pollution is emerging as major contributor to mortality, morbidity and health disparities in India and several other LMICs. However, the evidence for the link of air pollution and cardiovascular diseases has largely come from high income countries. The difficulty has been both in robust exposure assessment and outcome assessment using longitudinal studies. This talk will provide data on the linkage of PM2.5 and several cardiovascular risk factors and explore the role of other exposomes such as NO_2, ozone and temperature.

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Dr. Courtney Murdock
Associate Professor,
College of Agriculture and Life Sciences,
Entomology Department,
Cornell University, USA

Landscapes of infection: Predicting mosquito-borne disease transmission in a rapidly changing world

This presentation would explore the ecological factors influencing mosquito-borne disease distribution and transmission dynamics, emphasizing how climate and land use changes are reshaping these relationships. The discussion would include key environmental variables studied in relation to vector-borne disease patterns, particularly in the context of current and future climate change. Critical knowledge gaps that hinder the ability to predict these changes mechanistically would be highlighted, along with strategies to anticipate and respond proactively. Key findings from ongoing research, including NIH-funded studies in Ahmedabad and Surat, would be presented to address these gaps, with a focus on urban mosquito-borne diseases such as dengue (*Aedes aegypti*) and urban malaria (*Anopheles stephensi*). The implications of this research for predicting transmission dynamics and planning interventions in a rapidly warming world would be discussed, concluding with recommendations for future research in this vital area.

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Dr. Vidhya Venugopal
Professor & Country Director (NIHR GHRC NCD-EC),
Department of Environmental Health Engineering,
Faculty of Public Health,
Sri Ramachandra Institute of Higher Education and Research, (DU),
Porur, Chennai-600116

Heat Vulnerability and Workers' Health—India Findings and way forward

Rising heat stress in India, driven by climate change, poses significant risks to occupational health, highlighting the urgent need to address heat vulnerability among workers. Empirical evidence from 13 epidemiological studies underscores the physiological strain, dehydration, and productivity loss experienced across industries such as agriculture, construction, manufacturing, and the informal sector. Vulnerable worker populations, including migrant laborers with limited adaptive capacity, pregnant women in workplaces as highlighted by a WELLCOME-funded study, and outdoor workers facing kidney disease risks as reported by CENCAM, require targeted interventions. Lessons from heat mitigation strategies include engineering controls like workplace cooling and improved ventilation, administrative measures such as work-rest cycles and hydration programs, and personal protective strategies like clothing adaptations and hydration protocols, with over 350 enterprises adopting the "Heat Stress Prevention Guide." Integrating heat risk management into occupational safety policies, fostering multi-sectoral collaboration between government, industry, and researchers, and advancing scalable heat adaptation models are critical policy imperatives. This presentation calls for bridging research, industry best practices, and policy implementation to strengthen the resilience of India's workforce against rising temperatures, offering data-driven insights and practical interventions aligned with the conference theme on heat vulnerability and worker health.

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Dr. Arul Veerappan

Assistant Professor of Medicine,
Division of Environmental Medicine, Department of Medicine,
NYU Grossman School of Medicine,
NYU Langone Health, New York, NY, USA

Adverse Health Effects of Climate Change: Occupational Exposures and Impacts

Wildfires are significant sources of air pollution, exposing both firefighters and the general public to hazardous particulate matter (PM). Wildland fires originate from unplanned ignitions, such as lightning, volcanic activity, human-caused accidents, or prescribed fires that escalate into wildfires. Climate change is increasing wildfire risks by creating hotter, drier conditions that extend fire seasons and intensify fire behavior. These climate-driven wildfires pose serious health risks, particularly to individuals with occupational exposure to wildfire smoke. Wildfire smoke contains a complex mixture of hazardous air pollutants that threaten human health. Research indicates that while wildfire risks have increased for all, individuals with high social vulnerability face disproportionately greater exposure. Wildfire PM is also of concern to the public, especially from PM aerodynamic diameter less than 2.5 (≤2.5) micrometers (PM2.5) in size, which has the strong potential for adsorbing toxic metals, which may then enter the human body through inhalation and have adverse physiological effects. In general, west coast states of the United States such as California is often affected by wildfire. Since the 1980s, the size and intensity of wildfires in California have notably increased. Fifteen of the 20 largest wildfires in California history have occurred since 2000, and ten of the most costly and destructive fires to life and property in the state have occurred since 2015. In the US, smoke produced from the Wildfire/Camp Fire exposed Californians to dangerous levels of PM and contained concerning levels of toxic metal contaminants, including lead, which spiked for about 24 hours. Camp Fire, which burned for a 2.5-week period, elevated levels of lead and zinc were detected, as well as calcium, iron, and manganese. Smoke containing these metals traveled more than 150 miles and was detected in the air as far away as San Jose. Firefighters, agricultural workers, and construction workers are among the most affected occupational groups due to their frequent outdoor work. Studies assessing wildland firefighter exposure to smoke primarily measure carbon monoxide (CO) and PM, tracking lung function, airway responsiveness, and respiratory symptoms. Biomarkers indicate systemic inflammation and oxidative stress responses in firefighters. While acute health effects have been well studied, research on long-term health risks remains limited, underscoring the need for future studies on chronic exposures to long term firefighters and first responders.

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Dr. Daniel Croft
Pulmonary and Critical Care Medicine,
University of Rochester Medical Center,
USA

Climate Change and Respiratory Infections: Dual Threats

My primary area of research is my K23 funded epidemiology work on the effect of air pollution on the transcriptomics of the immune response to respiratory viral infection in adults. In this broad study, we are applying multiple exposure methods including land use regression and source specific estimation to a population of patients hospitalized with viral, bacterial or combined infection. I am complementing this K23 study with several studies including a study of air pollution in historically redlined areas in Rochester, NY, a study of the effect of air pollution on the response to a COVID-19 vaccine and finally, a statewide NYSERDA funded study on the association between air pollution and respiratory infection. To help address inequities in the health effects of air pollution and climate change, I am currently serving as a coordinating chair for the American Thoracic Society workshop 'Climate Change and Respiratory Health: Opportunities for Environmental Justice'. In addition to air pollution research, I am involved in translational research on indoor air pollution and on other inhaled toxins including electronic nicotine delivery systems. Clinically, I have developed expertise in the diagnosis and management of disorders caused by inhaled toxins that injure people both at home and in the workplace. This includes my efforts to help patients quit both smoking and other inhaled toxins.

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Dr. Rishikesh Naik* and Dr. Sunil Patel**
*Group Head – Integrated Health at Aditya Birla Group
**Lead – Occupational Health at Aditya Birla Group

Health Adaptation Amidst Climate Change – Elements of Heat Stress Management

As climate change accelerates, populations worldwide face significant health challenges that demand rapid adaptation. Rising temperatures, extreme weather events, and shifting ecosystems contribute to the spread of infectious diseases, heat-related illnesses, injuries, mental health issues, and threats to water and food security. For example, India recorded 554 cumulative heatwave days in 2024, up from 230 in 2023. Occupational exposure to extreme heat undermines productivity, increases work-related accidents, and can result in fatalities, particularly in the manufacturing, service, and construction sectors; nevertheless, these industries cannot cease operations due to economic and social imperatives. A structured approach is essential for health adaptation to climate change. At Aditya Birla Group, a comprehensive framework has been developed to address the health impacts of climate change within the boundaries of our control. For example, documents managing HIV, tuberculosis (TB), and malaria in the workplace address vector-borne diseases. Similarly, documents on occupational stress management, first aid and emergency medical care, general hygiene and sanitation, and heat stress management at the workplace contribute to mitigating mental health impacts, injuries, fatalities, and challenges related to food and water, as well as heat stress in the workplace respectively. Specifically, workplace heat stress assessment accounts for temperature, humidity, radiant heat, air velocity, clothing, physical activity, and worker fitness. This involves three steps: qualitative risk assessment, quantitative risk assessment, and physiological monitoring. Beyond engineering controls, ensuring water availability, shelter, proper ventilation, acclimatization, and suitable work-rest schedules, along with workforce awareness and education, is critical for effective heat stress management.

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Dr. Rima Habre
Associate Professor of Environmental Health and Spatial Sciences,
University of Southern California

Risk, Adaptation, and Resilience for Health and Well-being in Response to Climate Change

The impacts of climate change (CC) due to global warming have never been more apparent, nor has climate action been more urgent. The health burden of CC is immense, encompassing temperature-related illnesses and deaths, air pollution, wildfire risks, and other threats affecting populations worldwide. Recognized as the most significant public health challenge of the 21st century, CC is driving hazards such as heat waves, droughts, and wildfires, which increasingly occur as compound events— from a combination of spatially and temporally dependent physical processes—challenges the adaptive capacity of systems and human resilience. These interdependent exposures demand novel, transdisciplinary approaches to assess their cascading health risks effectively. Certain populations—outdoor workers, pregnant women, children, individuals with preexisting conditions, energy-insecure households, and residents of climate-vulnerable neighborhoods—face heightened vulnerablilty from a combination of extrinsic and intrinsic factors, such as social factors, environmental exposures, climate risks and adaptive capacity, or biological susceptibility and resilience. Geospatial tools help quantify and rank extrinsic stressors, yet interactions between these and personal/intrinsic factors remain poorly understood. Climate vulnerability, which includes elements of adaptive capacity and resilience, varies geographically, contributing to widespread health disparities from local to global scales. Dr. Habre's plenary talk will explore these critical themes, emphasizing vulnerable populations, advancements in methodological approaches, and the need for transdisciplinary research and education. She will present work from the CLIMAte-Related Exposures, Adaptation, and Health Equity (CLIMA) Center at the University of Southern California, funded by the NIH Climate and Health Initiative. CLIMA researchers are developing novel methods to characterize climate-related exposures such as urban heat islands, wildfire smoke and compound climate events, their impact on cardiovascular health and resilience across the life course, and the role of adaptation strategies (air conditioning, greening interventions for shade), and system and human vulnerability (power outages, social vulnerability). Dr. Habre will also discuss how emerging fields like exposomics and planetary health can provide a unified framework for advancing transdisciplinary research and solutions for climate change and health. The ultimate goal is to equip policymakers with solution-oriented guidance and train the next generation of scientists to assess and enhance climate adaptation efforts for CC resilience globally.

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Dr. Sandul Yasobant
Assistant Professor & Co-Lead (One Health),
Indian Institute of Public Health Gandhinagar (IIPHG),
India

Transforming Healthcare Facilities for Green & Climate Resilience: Experiences from Gujarat, India

Climate change has impacted human health in various ways, including healthcare facilities' infrastructure, resulting in making healthcare systems less accessible during climatic hazards or extreme weather events due to a lack of facility-level preparedness. This poses an urgent need to make healthcare facilities (HCFs) climate-resilient, so that healthcare systems can deliver services without any disruption in times of adversity. This study aimed to identify existing gaps at the HCFs regarding preparedness for climatic hazards and handholding healthcare facilities in developing an understanding and implementing interventions for building climate resilience in line with various global and national guidelines. An assessment was conducted in 31 HCFs of eight districts of Gujarat (during 2023-24) from varied climatic risk zones by geographic location. Facility-level action plans were developed to address the identified gaps in the assessment process with on-field technical support in implementing Green & Climate Resilient (GCR) interventions such as capacity building, facilitating solar electrification in the facilities, adopting energy efficient equipment and conservation measures, adoption of water conservation measures with development of rainwater harvesting structures, strengthening safe management of hospital waste, development of green initiatives and fostering infrastructural upgradation like accessibility for disabled, fire resistance mechanism, digital health systems in healthcare facilities. This is a first-of-its-kind study to document the GCR implementation in Gujarat, India, and proposes ways to reduce carbon emissions by transforming HCFs for GCR compliance.

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Dr. Deepak Davda
Executive Director & CEO, CETP Vatva;
Joint CEO,
Ahmedabad Mega Clean Association
Full-time Director & CEO, Novel Spent Acid Vatva

Innovative Strategies for Compliance: CETP Vatva Methodology and Circular Economy in Waste Management

The Green Environment Services Co-Op. Society Ltd. (GESCSL) was established in 1995, leading to the commissioning of the Common Effluent Treatment Plant (CETP) at Vatva in 1998. This initiative centralized industrial effluent treatment, ensuring stringent environmental compliance. Over the years, CETP Vatva has implemented significant innovations to enhance efficiency. Electro-oxidation technology was introduced in 2008 for treating complex industrial effluents, followed by a Treatment, Storage, and Disposal Facility (TSDF) in 2013 for hazardous waste management. By 2014, real-time monitoring was achieved through Supervisory Control and Data Acquisition (SCADA) systems and auto samplers. The adoption of Spray Dryer Technology in 2015 addressed high total dissolved solids (TDS) effluents, while NABL accreditation in 2018 ensured superior environmental testing standards. Further advancements included the establishment of an IT Cell and CCTV Monitoring Cell in 2020 to enhance surveillance and efficiency. In 2021, the Fenton Catalytic Reactor, an advanced oxidation process (AOP), was introduced for improved treatment of complex industrial effluents. The Color Reduction Pilot Plant, launched in 2025, aims to further refine effluent treatment. Additionally, a 5-megawatt solar power project, that will be operational by July 2025, will cut thermal electricity dependency by 80%. A sludge dryer with a 50 MT/day capacity, also to be functional by July 2025, will eliminate landfill disposal by converting dried sludge into fuel. A key circular economy initiative at CETP Vatva is the NOVEL Common Sulfuric Spent Acid Management facility, established in 2009. This system processes spent sulfuric acid, converting waste into gypsum for the cement industry, aligning with sustainable industrial practices. Authorized by the Gujarat Pollution Control Board, NOVEL ensures effective acid segregation, neutralization, and treatment before effluent discharge to CETP Vatva. These initiatives have significantly reduced pollution, cut industry operational costs by 30-50%, and set CETP Vatva as a benchmark for environmental sustainability and compliance. Due to all the aforementioned common environmental infrastructures, GESCSL & NOVEL Vatva are regarded as model industrial estates for pollution control in the country.

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Dr. Kalpana Balakrishnan
Dean (Research) and Director,
WHO Collaborating Center for Occupational and Environmental Health,
ICMR Center for Advanced Research on Air Quality, Climate and Health.
Sri Ramachandra Institute of Higher Education and Research (SRIHER), Chennai, India

Reimagining Exposure Assessment Paradigms for Climate Change and Health in India

Exposure assessment capacities for major environmental risk factors continue to be a challenge in India, despite the availability of multiple environmental regulations that require routine exposure surveillance. Climate change is anticipated to increase the magnitude of this challenge with major implications for public health on account of dynamic changes in the exposures to a combination of chemical, physical, biological and psychosocial stressors, leading to increased uncertainty in exposure and human health risk predictions. There is thus a need for redefining exposure assessment approaches in an evolving environment, for the outputs to be relevant for climate actions and building greater climate resilience. The talk will provide an overview of considerations for designing a "Climate Exposome" framework that can holistically integrate technological advancements in exposome tracking with climate monitoring and disease surveillance to address community vulnerabilities. A network of "Climate and Health Observatories" and multi-disciplinary stakeholder engagement will be critical for successful implementation of such a framework.

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Dr. Sagnik Dey
Professor at the Centre for Atmospheric Sciences, IIT Delhi, India
Adjunct Professor at the Department of Health, Policy and Management, Korea University, South Korea
Coordinator of Centre of Excellence for Research on Clean Air (CERCA)
Associate Faculty of School of Public Policy and Transportation Research and Injury Prevention Centre (TRIPC) at IIT Delhi.

Health Risks of Climate Change in India: Current Evidence, Knowledge Gaps and Future Directions

Climate change is the greatest environmental threat to humanity. Understanding the full extent of climate change impacts in human health, requires an interdisciplinary and innovative approach and synergistic efforts by climate and health scientists. In this presentation, I will first discuss how extreme events, heat and air pollution exposure changed in the current climate conditions. Utilizing satellite data and machine learning techniques, we have developed novel exposure assessment methods at a population scale, overcoming limitations of India's sparse ground monitoring network. Using ambient PM2.5, NO2, HCHO, and PM2.5 species tagged to emission sources, we conducted epidemiological studies with secondary health data from national surveys. Our findings indicate that PM2.5 species, when considered individually rather than as a total mass metric, have a more significant cumulative health impact. We should conduct cohorts to understand the biological pathways for the differential impacts of individual species, so that PM2.5 composition be considered in defining air quality standards. I will also present projections of air pollution under different future emission scenarios in India. By 2031-2040, mortality attributable to ambient PM2.5 will be 2.4-4% higher under the high-emission RCP8.5 scenario compared to RCP4.5, increasing to 28.5-38.8% by 2091-2100. Reducing greenhouse gas emissions to limit warming below 2°C by 2050 could prevent 0.77±0.18 million annual deaths, saving 18.9 billion Euros. Furthermore, using a chemical transport model, we examined the climate consequences of air pollution reduction. We found that reducing secondary precursor gases to lower PM2.5 levels could unexpectedly increase temperatures by 0.3-0.5°C, highlighting the need for a trade-off analysis. To better quantify heat stress, we developed the India Heat Index, integrating temperature, humidity, wind, and radiation based on 40 years of meteorological data from ERA-5 re-analysis. Time-series analyses in Delhi (semi-arid), Varanasi (humid subtropical), and Chennai (tropical wet/dry) showed an 8.1% (6-10.3), 5.9% (4.6-7.2) and 8% (1.7-14.2) increase in all-cause non-accidental mortality risk on 'sweltering' days, respectively. Finally, I will discuss key research priorities to advance environmental health in India, including addressing scale gaps in climate and health data, isolating the effect of climate change effects from climate variability, and developing future policy scenarios.

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Dr. Gufran Beig
Ph.D. in Atmospheric Physics at Physical Research Laboratory, Ahmedabad
Post-Doctoral Fellow in Atmospheric Sciences at NCAR, Boulder Colorado, USA
Former Scientist-G and Founder Director, SAFAR, IITM, Pune (Ministry of Earth Sciences, Govt. of India).
Sir Ashutosh Mukherjee Chair Professor, National Institute of Advanced Studies (NIAS),
Indian Institute of Science (IISc) Campus, Bengaluru

Navigating the Nexus: Air Pollution, Climate Change, and Health Risks

Air pollution and climate change are two most pressing environmental challenges that inevitably interact, affecting ecosystem health and human well-being. While climate change undermines long-term sustainability, severe air pollution—particularly surface ozone (O_3) and fine particulate matter ($PM_{2.5}$)—directly impairs human health and agriculture, impacting the country's economy. Recent increasing extreme air pollution events, resulting from extreme meteorological conditions driven by unusual large-scale circulation, are impacting cities. These pollutants significantly worsen respiratory health, with risks rising worldwide, including in India. Studies show climate change can exacerbate O_3 and $PM_{2.5}$, intensifying impacts on health. Addressing these issues requires comprehensive solutions examining root causes—main sources and their relative contributions—by developing an integrated air quality resource framework with prioritizing of health-centric measures. In India, the National Institute of Advanced Studies (NIAS) in association with the Office of the Principal Scientific Adviser have proposed the National Air Quality Resource Framework of India (NARFI), adopting an airshed management approach to tackle this complex problem.

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Dr. Poornima Prabhakar
Director, Centre for Health Analytics Research and Trends (CHART), Trivedi School of Biosciences, Ashoka University.
Senior Research Scientist, Head-Environmental Health &Deputy Director, Centre for Chronic Disease Control

Exploring Interdisciplinary and Collaborative Approaches for Climate Change and Health Research: An Overview

This talk will explore the contours of an inter-disciplinary approach to climate change and health research. Given the cross-cutting sectoral actions that define a changing climate, research and interventions to address the climate crisis necessitate a collaborative and cogent strategy that account for this transdisciplinary nature of the problem. Leveraging existing examples of collaborative research, the talk will aim to define a roadmap for India's future agenda for climate and health research.

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Dr. Rajesh Vedanthan
Director, Section for Global Health, Institute for Excellence in Health Equity
Associate Professor, Department of Population Health,
Division of Cardiology/Department of Medicine,
NYU Grossman School of Medicine
USA

Exploring Interdisciplinary and Collaborative Approaches for Climate Change and Health Research

The study of climate change and health is a transdisciplinary exercise. Climate science itself involves multiple academic disciplines and scientific approaches. Climate change-related extreme weather events are a global problem that manifest locally in the form of climate-related hazards such as drought, heatwaves, and rainwater flooding. These climate-driven hazards intersect with social and structural determinants of health, such as poor housing, environmental pollution, poverty, social stressors, cultivable land, and water supply, leading to food insecurity, water insecurity, interruptions to electricity and fuel supply, and transportation challenges. These factors may limit options available for health-related behaviors (e.g. diet and physical activity), and can cause and exacerbate unhealthy behaviors and adverse health outcomes. Climate change and climate-related hazards have been documented to be associated with multiple health behaviors and health outcomes in populations and communities worldwide. These populations, communities, and individuals reflect multiple and potentially spatially specific socio-economic conditions, cultural traditions, and environmental exposures. In order to robustly assess the complex ways in which climate change intersects with health in different communities worldwide, a transdisciplinary approach is required that brings together natural sciences, social sciences, and humanities. This lecture will present examples of transdisciplinary approaches to the study of climate change and health, and will prompt discussion for future areas of collaboration, research, and implementation.

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Dr. Aakash Srivastava
Additional Director,
National Centre for Disease Control, India

Role of Environmental Health Surveillance in Planning and Implementing Adaptation Strategies in Response to Climate Change

Environmental health surveillance systematically collects and integrates data on hazards, exposures, and health outcomes to assess the impact of environmental agents on the host. By continuously monitoring environmental and health indicators, it provides evidence-based insights that guide interventions to reduce disease burden. Since many disease-causing agents stem from environmental factors, the primary goal of integrated surveillance should be to inform towards "treating" the environment. This requires cross-sectoral collaboration beyond healthcare, involving sectors such as housing, water, transport, and energy. Climate change exacerbates environmental hazards, increasing population exposure and negatively impacting health outcomes. Health adaptation strategies aim to protect human health and strengthen healthcare systems against these threats. Effective environmental health surveillance plays a crucial role in identifying evidence-based adaptation measures. Monitoring climate-sensitive diseases helps detect shifts in disease patterns over time, enabling improved preparedness. For example, the Heat-Related Illness and Death Surveillance under the NPCCHH supports early identification and management of heat-related illnesses. Over time, disease distribution data help identify vulnerable populations and guide long-term adaptation strategies. Climate-health vulnerability assessments depend on high-quality, long term surveillance data to generate reliable insights, informing targeted adaptation investments at national, state, and local levels. However, the absence of robust health data often results in assessments that focus on environmental hazards rather than actual health outcomes. Integrated surveillance can enhance outbreak early warning systems, such as the climate-health model for Dengue in Pune, which successfully forecasted outbreaks two months in advance. Transforming existing national disease surveillance systems by integrating geospatial and environmental data enables rapid disease burden assessments and projections. A multisectoral approach—incorporating public health, environmental science, meteorology, urban planning, water management and energy—enhances understanding of environmental risks. For example, tracking of air pollution and emergency admissions under our National Outdoor Air and Disease Surveillance is now linking air pollution data with emergency hospital admissions, quantifying health impacts and reinforcing the need for locally relevant actions. Moving forward, we envision our heat and air pollution-related illness surveillance systems as critical yardsticks for climate adaptation and mitigation efforts—capable of reflecting changes in population health as adaptation strategies evolve and also evaluating their cost-effectiveness. Strengthening national-level surveillance frameworks will ensure a climate-resilient health system that can respond effectively to emerging environmental challenges.

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Scientific Programme

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Day 1 - Wednesday, 26th February, 2025			
09.00 AM - 10.00 AM	**Registration of Delegates and Members**		
10.00 AM - 11.45 AM	**INAUGURAL CEREMONY**		
	INAUGURAL TALK		**SPEAKER**
11.45 AM - 12.15 PM	Climate Change Impact on OEH - Indian Perspective		Santasabuj Das (ICMR-NIOH)
12.15 PM - 12.45 PM	Climate Change Impact on OEH - US Perspective		Vikas Kapil (Emory University, USA)
01.00 PM - 02.00 PM	**NETWORKING LUNCH**		
02.00 PM - 04.00 PM	**PLENARY SESSION: HEALTH IMPACTS OF CLIMATE CHANGE** *Chairpersons: Prof Y K Gupta, Prof N K Ganguly*		
02.00 PM - 02.30 PM	A 360-degree view of air pollution and CVD		Prabhakaran D (CCDC)
02.30 PM - 03.00 PM	Climate Change and Vector-Borne Diseases: Landscapes of infection: Predicting mosquito-borne disease transmission in a rapidly changing world		Courtney Murdock (Cornell University, USA)
03.00 PM - 03.30 PM	Heat Vulnerability and Workers' Health—India Findings and way forward		Vidhya Venugopal (Sri Ramachandra Institute for Higher Education & Research)
03.30 PM - 04.00 PM	Adverse Health Effects of Wildfire due to Climate Change: Occupational Exposures and Health Impacts		Arul Veerappan (NYU Grossman School of Medicine, USA)
04.00 PM - 04.15 PM	**TEA-BREAK DIALOGUES**		
04.15 PM - 06.15 PM	**Scientific ORAL presentations – I** (Hall no. 4, 2nd Floor, Narayani Heights)	**Scientific ORAL presentations – II** (Meeting Room 1, 2nd Floor, Narayani Heights)	**Scientific POSTER presentations – I and II** (Poster Presentation Area I, II, Narayani Heights)
04.30 PM - 05.00 PM	**SPECIAL VIRTUAL PLENARY TALK**		
	Climate Change and Respiratory Infections: Dual Threats		Daniel Croft (University of Rochester Medical Center)

Day 2 - Thursday, 27th February, 2025		
09.30 AM - 11.30 AM	**PLENARY SESSION: ADAPTATION, RESILIENCE, AND REHABILITATION FOR WORKERS' WELL-BEING IN RESPONSE TO CLIMATE CHANGE** *Chairpersons: Dr. Arun Sharma, Dr. Girish Rao*	
09.30 AM - 10.00 AM	Heat Stress Management and Mitigation	Rishikesh Naik & Sunil Patel (Aditya Birla Group)

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10.00 AM - 10.30 AM	Risk, Adaptation, and Resilience for Health and Well-being in Response to Climate Change	Rima Habre (University of Southern California, USA)
10.30 AM - 11.00 AM	Public Health Emergencies, Disasters And Climate Change	Vikas Kapil (Emory University)
11.00 AM - 11.30 AM	Transforming Healthcare Facilities for Green & Climate Resilient: Experiences from intervention in Gujarat, India	Sandul Yasobant (IIPHG)
11:30 AM - 12.00 PM	**SPECIAL TALK**	
	Innovative Strategies for Compliance: CETP Vatva's Methodology Circular Economy In Waste Management: Case Study	Deepak Davda (CEO, GESCSL)
11.00 AM - 12.00 PM	**WORKING TEA**	
11.30 AM - 01.15 PM	**Scientific ORAL presentations – III** (Hall no. 4, 2nd Floor)	**Scientific ORAL presentations – IV** (Meeting Room 1, 2nd Floor)
01.15 PM - 02.00 PM	**NETWORKING LUNCH**	
02.00 PM - 04.00 PM	**PLENARY TALK: CLIMATE CHANGE AND HUMAN HEALTH RISK ASSESSMENT STRATEGIES: OVERVIEW** *Chairpersons: Dr. T K Joshi, Dr. R Tiwari*	
02.00 PM - 02.30 PM	Reimagining Exposure Assessment Paradigms for Climate Change and Health in India	Kalpana B (Sri Ramachandra Institute for Higher Education and Research)
02.30 PM - 03.00 PM	Health Risks of Climate Change in India: Current Evidence, Knowledge Gaps and Future Directions	Sagnik Dey (IIT-Delhi)
03.00 PM - 03.30 PM	Navigating the Nexus: Air Pollution, Climate Change, and Health Risks	Gufran Beig (Indian Institute of Tropical Meteorology)
03.30 PM - 04.00 PM	Climate change and CVD	Prabhakaran D (CCDC)
04.00 PM – 05.00 PM	**WORKING TEA**	
04.15 PM - 06.15 PM	**Scientific ORAL presentations – V** (Hall no. 4, 2nd Floor)	**Scientific ORAL presentations – VI** (Meeting Room 1, 2nd Floor)	**Scientific POSTER presentations – III and IV** (Poster Presentation Area I, II)
06.15 PM – 07:15 PM	**CONNECT, ENGAGE & NETWORK WITH SPEAKERS** *An informal networking session for delegates to engage with speakers, explore current research trends, and discuss future collaboration opportunities in climate change*	
07.15 PM onwards	**NETWORKING DINNER**	

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Day 3 - Friday, 28th February, 2025: Collaboration and Way Forward		
09.00 AM – 10.30 AM	**PLENARY TALK: EXPLORING INTERDISCIPLINARY AND COLLABORATIVE APPROACHES FOR CLIMATE CHANGE AND HEALTH RESEARCH** *Chairpersons: Dr. S K Rasania, Dr. K Krishnamurthi*	
09.00 AM – 09.30 AM	Exploring Interdisciplinary and Collaborative Approaches for Climate Change and Health Research: An Overview	Poornima Prabhakaran (Director, Ashoka University)
09.30 AM - 10.00 AM	Interdisciplinary and Collaborative Approaches for Climate Change and Health Research: Experience Sharing	Rajesh Vedanthan (NYU Grossman School of Medicine)
10.00 AM - 10.30 AM	Role of Environmental Health Surveillance in Planning and Implementing Adaptation Strategies in Response to Climate Change	Aakash Srivastava (National Centre for Disease Control)
10.30 AM - 11.30 AM	**PANEL DISCUSSION: WAY FORWARD FOR INTERDISCIPLINARY RESEARCH TO COMBAT CLIMATE CHANGE IMPACTS ON OCCUPATIONAL HEALTH** *Moderator: Samiran Panda, Editor-in-Chief IJMR*	
	Prabhakaran D, CCDC Shyam Pingle, Occupational Health Specialist Santasabuj Das, ICMR-NIOH Rajnarayan Tiwari, ICMR-NIREH Vikas Kapil, Emory University (USA)	
11.30 PM - 12.30 PM	**VALEDICTORY CEREMONY AND PRIZE DISTRIBUTION**	
12.30 PM - 01.30 PM	**NETWORKING LUNCH**	

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ORAL SESSION 1 (DAY 1)			
Date: 26th Feb 2025		**Chairpersons:**	
Time: 04:15 PM – 06:15 PM		**Theme:** *Heat Stress, Extreme Weather, and Worker Vulnerability*	
		Venue: Hall No. 4, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Krishnan S	Navigating the Heat: Understanding Occupational Heat Stress and Its Health Impacts on Workers in Northeast India
2.	04:25 -04:35	Purvi Patel	Health Sector Preparedness for Extreme Heat: Insights from Summer 2024
3.	04:35 -04:45	Ningombam Joenna Devi	Heat-Related Illnesses among Agricultural Workers in South 24 Parganas, West Bengal: A Cross-sectional study
4.	04:45 -04:55	Aditya Nath	Occupational Heat Exposure Effects on Body Temperature, Hydration Levels, and Productivity of Male Brick Moulders and Harvesters in Eastern India
5.	04:55 -05:05	Ekta Ram	Urban Heat Island (UHI) Effect and its Impact on heat-related morbidity and mortality
6.	05:05 -05:15	Parul Sahu	Impact of Climate Change on the Occupational Health and Well-Being of Solar Salt Workers
7.	05:15 -05:25	Yogi Agarwal	Heatwave effects and mitigation: A demographic, socio-economic, and health perspective
8.	05:25 -05:35	Siddharth Raina	Chronic Dehydration – Fatigue Syndrome in displaced tribal population of Manipur and Community-based Psycho-Pharmaco therapy as effective intervention
9.	05:35 -05:45	Tanwi Trushna	Effect of in-utero exposure to extreme weather events on child health: Systematic Review of Indian evidence
10.	05:45 -05:55	Sudesh Agrawal	Effects of hot temperature on maternal and fetal outcome: A comparative study from desert climate area of India

ORAL SESSION 2 (DAY 1)			
Date: 26th Feb 2025		**Chairpersons:**	
Time: 04:15 PM – 06:15 PM		**Theme:** *Air Quality, Pollution, and Respiratory Health*	
		Venue: Meeting Room No.1, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Farooq Ahmad Lone	Monitoring of Air quality with respect to Particulate Pollution: a potent health risk factor – A case study of Srinagar city
2.	04:25 -04:35	Ashwini Devane	Assessing Predictors of impaired peak expiratory flow rate among rural population: an interim analysis
3.	04:35 -04:45	Nancy Nagdoune	HOME SWEET HOME: “A breath full of fresh air or a lungful of woes”
4.	04:45 -04:55	Ghurumourthy D.	A Community based study to assess the Prevalence of Cognitive Impairment & association with Indoor Air Pollution
5.	04:55 -05:05	Anuj Shrivastava	Particulate Matter (PM) concentration and its respiratory deposition across various indoor micro-environments
6.	05:05 -05:15	Pooja Singhal	Association Between PM2.5 Air Pollution Exposure and Neurodegenerative Disorders: A Correlational Analysis in India
7.	05:15 -05:25	Ritu Parchure	Leveraging Pharmaceutical Data to Enhance City-based Air-Health Surveillance
8.	05:25 -05:35	Ganesh Chandra Sahoo	Preventing Environmental Pollution due to Mercury causing Human Health Hazards at Goldsmith Workshop
9.	05:35 -05:45	Ruchit Nawal	When Air Shapes Immunity: The Untold Narrative of Environmental Influence on Allergic Disease Evolution
10.	05:45 -05:55	Saifi Izhar	Examining the role of particulate matter size and emission sources on toxicity
11.	05:55 -06:05	Monalisa Mishra	Cocos nucifera’s husk smoke as a hypoxia inducer and developmental limiter in Drosophila melanogaster

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POSTER SESSION 1 (DAY 1)			
Date: 26th Feb 2025		**Chairpersons:**	
Time: 04:15 PM – 06:15 PM		**Theme:** *Environmental Toxicology and Pollutants (ETP)*	
		Venue: Poster Presentation Area, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Neha Yadav	Impact of Environmental Quinones on the Morphology of Human Red Blood Cells and Its Function
2.	04:25 -04:35	Jyoti Thaikoottathil	Effect of metal oxide nanoparticles on human respiratory epithelium cell biology
3.	04:35 -04:45	Jyotishree Nath	Impact of Prolonged Urban Air Pollution on Health Parameters in Bhubaneswar
4.	04:45 -04:55	Joshi Poonam	Pharmacological investigations on Capsaicin supplementation in sub-acute Bisphenol-A exposed mice
5.	04:55 -05:05	Ruchi Jha	Perfluorooctanoic acid (PFOA) exposure alters vaccine-induced immune response
6.	05:05 -05:15	Zalak Jain	Metformin in Wastewater: Environmental Risks and Toxicological Insights from a Systematic Review
7.	05:15 -05:25	Shramana Chakraborty	Perfluorooctanoic acid enhances ROS-mediated pathogen killing in human PMNs
8.	05:25 -05:35	Mohd Danish Kamar	Phototoxicity and skin barrier disruption potential of hair dye complex under ambient UV-R
9.	05:35 -05:45	Sakshi Raval	Perfluorononanoic acid (PFNA) enhances neutrophil oxidative burst but suppresses its NET production
10.	05:45 -05:55	Diksha Pathania	Cellular and molecular crosstalk involved in skin allergy induced by Isoeugenol and its photoproduct
11.	05:55 -06:05	Swapnil Tripathi	Bioactive compounds alleviate combined chromium(VI) and arsenic(III)-induced oxidative stress and hepatic apoptosis

POSTER SESSION 2 (DAY 1)			
Date: 26th Feb 2025		**Chairpersons:**	
Time: 04:15 PM – 06:15 PM		**Theme:** *Occupational Exposures and Hazards (OEH)*	
		Venue: Poster Presentation Area, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Sanjeev Gupta	Assessment of Occupational and Environmental Health Risks and Challenges of Migratory Brick Kiln Workers in Gujarat
2.	04:25 -04:35	Sanjay Kotadiya	Workplace thermal microclimate assessment in copper bell-making artisans: A call for occupational health measures
3.	04:35 -04:45	Heena Vidhani	Decoding snake venom proteome and metabolomic changes in snakebite patients
4.	04:45 -04:55	Dharma Raj	Hazardous nature and risk perception of labourers working in the Construction Industry
5.	04:55 -05:05	Nikita Birhman	Assessing the Impact of Occupation on COVID-19 Infection Rates Across India
6.	05:05 -05:15	Vishal Vallabh Nagose	High time to address NCDs (diabetes & hypertension) among metal fume–exposed workers: Observations from a cross-sectional study
7.	05:15 -05:25	Rahul Patel	Occupational exposure to metal fumes and respiratory health effects: A cross-sectional study
8.	05:25 -05:35	Rutu Asodia	Respirable crystalline silica dust and latent TB infection among agate-stone workers in Khambhat, Gujarat
9.	05:35 -05:45	Pankaj Barfal	An assessment of occupational exposure to bioaerosols in vegetable vendors
10.	05:45 -05:55	Poonam Vyas	Airborne Aflatoxins in Oilseed Mills: Occupational Health Risks and Biotechnological Strategies for Sustainable Mitigation
11.	05:55 -06:05	Sripriya Nannu Shankar	Monitoring occupational exposure to airborne respiratory viruses in a healthcare setting
12.	06:05 -06:15	Krithiga Shridhar	Occupational pesticides exposure and breast cancer risk in agricultural workers

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ORAL SESSION 3 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 11:30 AM – 1:30 PM		**Theme:** *Occupational Toxins, Exposures, and Health Implications*	
		Venue: Hall No. 4, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	11:30 -11:40	Priya Modi	Occupational Silicosis in Rajasthan's Mining Districts: An Interdisciplinary Analysis of Health Outcomes and Socio-Economic Impacts
2.	11:40 -11:50	Roshan Kumar Agrawal	An Epidemiological study on health status and perception on mining in PEKB Coal Block of Surguja, Chhattisgarh
3.	11:50 -12:00	Deepsi Rathore	ANA-12 Mitigates Testicular Toxicity by Modulating BDNF-Trk-β Signaling in Pre-clinical Rodent Models of Passive Cigarette Smoking
4.	12:00 -12:10	Vishakha Shrimali	Targeting Nicotinic Acetylcholine Receptors with Mecamylamine Alleviates Developmental and Neurobehavioral Deficits in Offsprings of Pre-clinical Gestational Nicotine Exposure
5.	12:10 -12:20	Anupam Parashar	Pesticide exposure and chronic kidney disease of undetermined aetiology (CKDu) among people living on agriculture in Himachal Pradesh
6.	12:20 -12:30	Prashant Singh	Microplastics in Food from Climate-Driven Pollution and their Neuro-Behaviour Responses in Caenorhabditis elegans
7.	12:30 -12:40	Kartikey Matte	Identification of Oxidative Stress Marker Proteins in Lead-Exposed Battery Recyclers Using Mass Spectrometry
8.	12:40 -12:50	Nayanabai Shabadi	Evaluating Agrochemical Residues in Agriculturists' Biological Samples and Correlating with Potential Health Risks
9.	12:50 -01:00	P K Selvi Permandy	Recovery of zinc from flue gas cleaning residue, waste management and human health
10.	01:00 -01:10	Upasana Jayswal	Hypersensitivity Pneumonitis in Construction Workers facing high dust exposure in Dima Hasao District of Assam
11.	01:10 -01:20	Mugdha Tiwari	Study of levels of pro-inflammatory cytokines in sputum of cotton dust exposed workers
12.	01:20 -01:30	Sunil Kumar Patel	Development of predictive markers for skin sensitization induced by photoexcited cinnamaldehyde via OMICS approaches

ORAL SESSION 4 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 11:30 AM – 1:30 PM		**Theme:** *Climate-Related Disease Burden: Vector-Borne, Infectious, and Chronic Conditions*	
		Venue: Meeting Room No.1, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	11:30 -11:40	Devojit Kumar Sarma	Impact of climate change on Dengue vector Aedes aegypti biology and distribution in Central India: An empirical, surveillance and modelling study.
2.	11:40 -11:50	Prachi Prava Panda	The impact of climatic and socioeconomic factors on vector-borne diseases (Dengue and chikungunya) transmission in rural Odisha
3.	11:50 -12:00	Yash Paul Sharma	Global research trend on Impact of Climate Change on Vector-Borne Disease Dynamics
4.	12:00 -12:10	Ankita Mukul	Impact of Climate Change on the Global Distribution and Burden of Vector-Borne Diseases: A Systematic Review
5.	12:10 -12:20	Soundarya Soundararajan	Overall cardiovascular disease burden attributable to temperature change in India: Explorative study on climate change challenges
6.	12:20 -12:30	Rakesh Balachandar	Cardiovascular disease mortality and morbidity attributable to humidity change in India: Explorative study of climate change challenges
7.	12:30 -12:40	Arpita Naik	Exploring the Dual Impact of Climate Change in Mumbai: Mental and Physical Health Challenges
8.	12:40 -12:50	Jhalak Dhingra	Cardiovascular disease burden attributable to humidity change in India: Explorative study on climate change challenges
9.	12:50 -01:00	Bhanu Dutta Parashar	Artificial Simulation of Pulmonary Disease Progression in Chest X-Rays Based on Localized Climatic Conditions
10.	01:00 -01:10	Sethu Krishnan R	Exploring health vulnerabilities in a coastal zone in Kerala: A case study of Purakkad in Alappuzha district.

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ORAL SESSION 5 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 4:15 PM – 6:15 PM		**Theme:** *Occupational Health, Safety, and Well-Being*	
		Venue: Hall No. 4, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Himalaya Singh	Morbidity Pattern and its Associated Factors among Leather Factory Workers at Agra District, Uttar Pradesh
2.	04:25 -04:35	Sriandaal Venkatesvaran	Working with Pain - A Qualitative Analysis of Dysmenorrheic Garment Factory Workers' Comfort Need and Coping Mechanisms
3.	04:35 -04:45	Supriya A S	Assessment of occupational factors influencing morbidity of construction workers in an urban area
4.	04:45 -04:55	Princee Chauhan	Occupational Health Hazards among Traffic Police in a city of Western India: A Mixed Method Approach
5.	04:55 -05:05	Yogesh Murugan	Prevalence of Burnout and Associated Factors Among Healthcare Workers in India: A Systematic Review and Meta-Analysis
6.	05:05 -05:15	Mohamed Ali	Role of mental health in determining the development of NCD among bus drivers and conductors in Karaikal, South India
7.	05:15 -05:25	Shreyasi Jha	Prevalence of eating disorder risk and body image dissatisfaction among IT professionals, Raigarh, Chhattisgarh
8.	05:25 -05:35	Pravin Modi	Occupational Exposure to Needle Stick Injury among Healthcare Workers of government medical college and hospital
9.	05:35 -05:45	Snehal Chavhan	Hematological outcomes of working in bio mining operations: A cross-sectional pilot among Bio miners of western India
10.	05:45 -05:55	Sakshi Babbar	AI-Powered Worker Safety System with Personalized Alerts
ORAL SESSION 6 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 4:15 PM – 6:15 PM		**Theme:** *Sustainability, Resilience, and Emerging Approaches*	
		Venue: Meeting Room No.1, 2nd Floor, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Harleen Kaur	Building Green Futures: Transforming Hospitals for Sustainability and Resilience
2.	04:25 -04:35	Yogi Agarwal	Implications of climate change on landslide susceptibility in the Western Ghats: An integrated assessment
3.	04:35 -04:45	G. Avinash	Forecasting Rainfall Patterns for the Next Decade: Unveiling Climate Change Impacts Using ML and Deep Learning
4.	04:45 -04:55	Sonam Taneja	Climate Change, Human Health, and Environmental Sustainability: Revisiting Policies and Practices
5.	04:55 -05:05	Subhajyoti Mandal	Tapping Anxiety: Climate Anxiety & Its factors among Date Palm Jaggery Workers in rural villages of Bankura
6.	05:05 -05:15	Rumaan Alam	Exploring the Role of Geographic Information Systems in Mental Health: Addressing Healthcare Access & Climate Impacts
7.	05:15 -05:25	Mayur Mahajan	Exploring the Impact of Salinity on the Microbiome of Sargassum swartzii and Its Implications for Occupational and Environmental Health
8.	05:25 -05:35	Saritha Sendhil	Benefits of Scaling Up Air Pollution Reduction on Climate Change Adaptation
9.	05:35 -05:45	Monalisha Sahu	Solastalgia and Quality of Life in People Residing on the Fringes of Climate Change and Environmental Disruptions in the Sundarbans: A Mixed Method Study

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POSTER SESSION 3 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 4:15 PM – 6:15 PM		**Theme:** *Climate Change and Health Implications (CCH)*	
		Venue: Poster Presentation Area, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Saklain Mustak Alam	Perceptions of Occupational Heat Stress and Its Impact among factory workers of Northeast India
2.	04:25 -04:35	Sindhuprava Rana	Impact of Climate Change on Pollen Allergens and Strategies for preventing allergic reactions: A Computational Study
3.	04:35 -04:45	Pooja Singhal	Measuring and Forecasting Impact of Pollutants on Occupational Health
4.	04:45 -04:55	Debasini Parida	Integrated Approach to Snakebite Management: A Remote Sensing & GIS-Based Model for High-Risk Zone Prediction
5.	04:55 -05:05	Asha Humbal	Climate Change and Zoonotic Diseases: Analysing the Influence of Environmental Changes on Emerging Health Risks
6.	05:05 -05:15	Bhavya Modi	Role of An. stephensi variants' transmission potential with climate change
7.	05:15 -05:25	Nandita Chaurasia	Trends in Gastrointestinal Infections Amid a Changing Climate in India
8.	05:25 -05:35	Chinnu Sara Varughese	Exploring the impact of urban heat islands on health in India - a systematic review
9.	05:35 -05:45	Manju Mathew	Pattern of electrolyte disturbances due to dehydration and viral infections vs. climatic variations in ICU
10.	05:45 -05:55	Amrin Fatma	Mapping Climate Change and its Impact on the Psychological Health of Expecting Women: A Systematic Review
11.	05:55 -06:05	Suresh Kumar Rathi	Spatial variability of summer temperature and its impact on all-cause mortality for Surat (coastal) city
12.	05:55 -06:15	Suresh Kumar Rathi	Heat-related morbidity from a tertiary care hospital: A cross-sectional study

POSTER SESSION 4 (DAY 2)			
Date: 27th Feb 2025		**Chairpersons:**	
Time: 4:15 PM – 6:15 PM		**Theme:** *Innovations, Surveillance, and Waste Management (ISW)*	
		Venue: Poster Presentation Area, Narayani Heights	
S.No.	**Time Slot**	**Name of the presenter**	**Title of the presentation**
1.	04:15 -04:25	Jayashree Gothankar	Assessment of capacity building of ASHA and Community Health Officers for COPD/asthma screening in rural area
2.	04:25 -04:35	Abhishek Sinha	Noise Matters: Exploring Nonauditory Health Impacts among Workers of Occupational Exposure in Northeast India
3.	04:35 -04:45	Reema Kumari	Quantum of Biomedical Waste Generated during COVID-19 in a Tertiary Care Super-specialized Hospital in North India
4.	04:45 -04:55	Debajyoti Bhattacharya	GIS-Aided Mapping and Assessment of Noise Pollution in Urban Puducherry, South India
5.	04:55 -05:05	Anuj Dave	Solid Waste and Its Role in Achieving UN-SDGs
6.	05:05 -05:15	Padmashree Ganapathyraman	Sustainable Care or Compromised Health? The Risks of Telemedicine for Healthcare Professionals
7.	05:15 -05:25	Agraj Abhishek	Detecting Structural Changes in Lungs with Rib Boundary Segmentation
8.	05:25 -05:35	Ekta Vyas	Leveraging Eco-Schools to Address Environmental Health Challenges in Rajkot
9.	05:35 -05:45	Dharati Parmar	Biochanin-A attenuates cadmium-induced oxidative damage by modulating Nrf2/HO-1 signaling in Swiss albino mice
10.	05:45 -05:55	Dharaneesh K.	Increase in discard of wired earphones during summer – A possibility of repurposing them
11.	05:55 -06:05	Tushar Sehgal	An Assessment of the Guideline on Biomedical Waste Management in a Clinical Laboratory
12.	05:55 -06:15	Bhoj Raj Verma	Waste Education Is Not a Waste!

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Oral and Poster Presentation Abstracts

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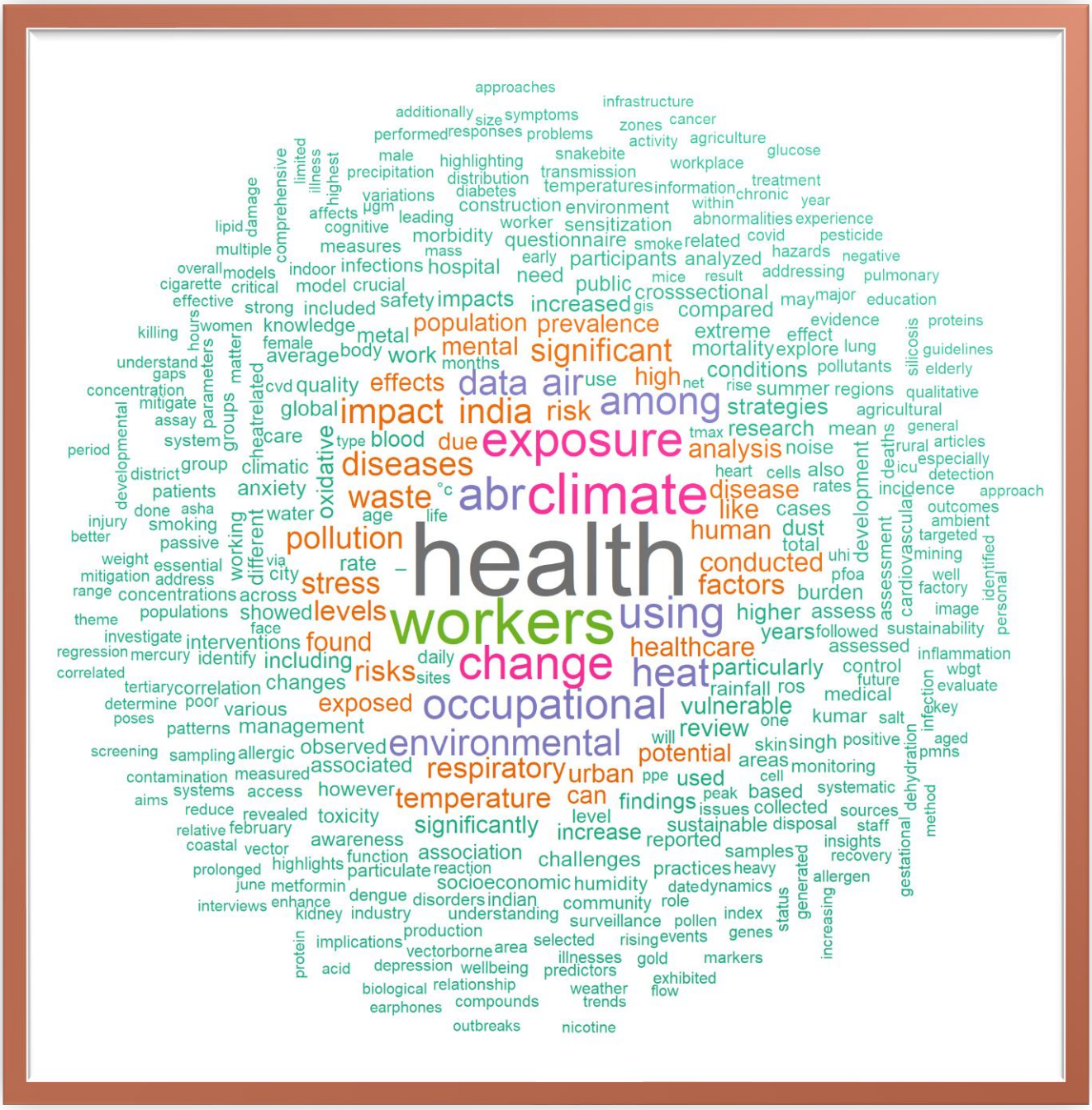
Word cloud of the poster abstracts



Visualization by Dr. Soundarya

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ORAL SESSION 1

Theme: Heat Stress, Extreme Weather, and Worker Vulnerability
Date: February 26, 2025**; Time:** 4:15 PM – 6:15 PM

Abstract ID: ABR010
Title: Navigating the Heat: Understanding Occupational Heat Stress and its Health Impacts on Workers in Northeast India
Authors: Krishnan S*, Manasi Bhattacharjee, Abhishek Sinha, Sundareswaran L, Saklain Mustak Alam, Benzamin Hanse
**All India Institute of Medical Sciences, Guwahati*
Background: Occupational heat stress poses increasing risks in heat-intensive industries, with rising global temperatures worsening heat-related illnesses. Prolonged exposure elevates core body temperature, heart rate, and sweat rate, leading to dehydration and heat exhaustion, necessitating urgent protective strategies for workers
Objectives: To Profile the environmental heat stress using WBGT. To assess the health impact of heat stress by evaluating core body temperature, heart rate sweat rate, visual and auditory reaction time
Methods: This study, conducted from August 2023 to February 2024, evaluated the effects of occupational heat stress on physiological markers such as core body temperature (CBT), heart rate (HR), blood pressure (BP), sweat rate (SR), and visual and auditory reaction times. Ethical approval was granted by AIIMS Guwahati, and 1104 participants provided written informed consent after being informed about the study.
Results: Heat stress measurements ranged from 23.8 oC - 42oC. There was a significant increase in CBT, HR and reaction time mean values in post exposure measurement both during summer and winter ($P < 0.05$). More than 50% of the workers had high sweat rate (>1.2 L/hr) when exposed to heat stress. Positive correlation was obtained between WBGT, CBT, sweat rate and reaction time which indicates that hyperthermia has an impact on neural network processing. Heart rate increased with rise in WBGT.
Conclusions: The study reveals that heat stress significantly impacts workers' physiological responses, with increases in core body temperature, heart rate, reaction time. Correlations between WBGT, sweat rate, cognitive function emphasize the urgent need for interventions to enhance worker safety and health.

Keywords: Climate change, Heat Stress, Heat strain, Global Warming, Occupational Health

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Abstract ID: ABR028

Title: Effect of in-Utero Exposure to Extreme Weather Events on Child Health: Systematic Review of Indian Evidence

Authors: Tanwi Trushna*, Vishal Diwan, Greeshma C. Ravindran, Dharma Raj, Uday Kumar Mandal, Manju Yadav

** ICMR National Institute for Research in Environmental Health, Bhopal*

Background: In South Asia (including India), climate change is expected to result in more frequent/intense heatwaves, precipitation extremes (droughts/floods), and storms. Studies demonstrate that in-utero exposure can adversely affect child health. However, no synthesis of Indian evidence has been published.

Objectives: To identify the pooled effect of in-utero exposure to extreme weather events on child health in India and highlight the gaps in literature, specific to India, that need further exploration.

Methods: Protocol was registered (PROCEED-24-00263). Following PRISMA guidelines, search strings consisting of keywords/synonyms for "India", "Health", and "Climate Change" were run on Web of Science, Ovid MEDLINE, and Embase. Grey literature was identified from Google Scholar, relevant websites, and back-and-forth citation chaining. After de-duplication, two-stage screening was done in the online Rayyan interface followed by critical appraisal, data extraction, and synthesis.

Results: Of 32173 retrieved results, 26115 title-abstracts were screened followed by 507 full-texts. Of the finally included 261 climate change-health Indian studies, 18 specifically dealt with in-utero exposure, with(n=3) or without(n=15) early childhood exposure, to extremes of temperature(n=2), precipitation (flood/drought/monthly rainfall extremes; n=8), temperature & precipitation(n=2), and cyclonic storms(n=6). Health outcomes studied were undernutrition/anthropometry/body fat (n=10, of which 2 also investigated anemia), birth outcomes(n=3), cognition(n=2), and others (mortality=1, disability=1, ADHD=1). Meta-analysis was not feasible due to the heterogeneity of data sources/variables/analysis.

Conclusions: We identified paucity of Indian evidence on early-life health effects of climate extremes, compared to other climate change research areas like vector-borne diseases and heat-related mortality. The available evidence is highly heterogeneous, hindering accurate estimation of the country's pooled burden.

Keywords: Climate Change, Extreme Weather Events, In Utero Exposure, Child Health, Indian Evidence

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Abstract ID: ABR031

Title: Health Sector Preparedness For Extreme Heat: Insights From Summer 2024

Authors: Purvi P*, Aakash Shrivastava

** National Centre for Disease Control, Delhi*

Background: Global monthly average air temperatures have consistently exceeded 1.5°C since June 2023. For summer 2024, India Meteorological Department predicted higher maximum temperatures and longer heatwaves, prompting enhanced health sector preparedness under National Programme on Climate Change and Human Health (NPCCHH).

Objectives: We assessed implementation of heat preparedness measures by central, state and health facility levels of public health sector for prevention and management of heat-related Illnesses (HRI) in summer 2024.

Methods: We extracted health workforce training and community awareness data from seasonal action taken reports. National HRI and Death Surveillance (NHRIDS) informed on reporting trends and health indicators. We examined enhanced monitoring and intersectoral coordination from various process documents and assessed active cooling provisions in public health facilities (HF) from March 1 to July 31, 2024, according to NPCCHH guidelines.

Results: The 2024 heat-health training cycle began in January. All State, District Nodal Officers, and ~18,600 medical officers reported trained in online/in-person sessions guided by National Action Plan. All states conducted community awareness activities. NHRIDS recorded 48,209 suspected heatstroke cases and 162 deaths from 51% of 46,831 participating reporting units. Suspected heat-related death clustering triggered 25 incident report requests and an epidemiological investigation. NHRIDS guided seasonal and general election-specific preparedness. 48% of 5,659 surveyed public HF were prepared for active cooling.

Conclusions: Our assessment highlighted significant national and state-level efforts in extreme heat preparedness in public health sector under NPCCHH i.e. in training, community awareness and intersectoral coordination. However, surveillance and health facility preparedness for rapid active cooling could be further strengthened.

Keywords: Heat related Illnesses, Heatstroke, Climate Change, Health Sector Preparedness, Extreme Heat

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Abstract ID: ABR043

Title: Heat-Related Illnesses among Agricultural Workers in South 24 Parganas, West Bengal: A Cross-Sectional Study

Authors: Ningombam Joenna Devi*, Monalisha Devi

** All India Institute of Hygiene & Pubic Health, Kolkata*

Background: Climate change has escalated global temperatures and intensified heat waves, posing serious health risks, particularly for vulnerable groups such as agricultural workers, whose exposure to extreme heat places them at heightened risk for adverse health effects.

Objectives: This study assesses the prevalence, knowledge, attitudes, and practices related to heat-related illnesses (HRIs) among agricultural workers in South 24 Parganas, West Bengal.

Methods: A cross-sectional study was conducted from March to June 2024 among 110 agricultural workers aged 18-60 years in Srikrishnagar village, Kakdwip CD Block. Data were collected through face-to-face interviews using a structured questionnaire addressing socio-demographic information, symptoms of HRIs, knowledge, attitudes, and preventive practices. The data were analysed using SPSS vs21 software.

Results: The sample consisted of 73.6% males and 26.4% females, with 56.4% aged between 35-55 years. Symptoms of HRIs were reported widely, with fatigue (79%), heavy sweating (80%), and decreased urine output (88.6%) being the most prevalent. Knowledge of HRIs was relatively high, with 82.7% familiar with the term. However, many (85.4%) did not prioritize hydration, and 80.9% never shifted work hours to cooler times. Significant differences in knowledge and practices were observed based on literacy and experience.

Conclusions: The study highlights that the prevalence of self-reported heat related illness and knowledge were around four-fifth. A few more than half of them were confident in recognising the symptoms of HRIs. However, there was lack of practice of prioritizing hydration.

Keywords: Heat related illnesses, Agricultural workers, Practices, Knowledge,

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Abstract ID: ABR068

Title: Occupational Heat Exposure Effects on Body Temperature, Hydration Levels, and Productivity of Male Brick Moulders and Harvesters in Eastern India: A Cross-Sectional Study.

Authors: Aditya Nath*, Subhashis Sahu

** University of Kalyani, Nadia*

Background: Climate change-driven extreme heat events and rising global surface temperatures negatively impact the outdoor workers' health and productivity. Frequent exposure to occupational heat, particularly for outdoor workers like brick moulders and harvesters, imposes significant heat strain.

Objectives: Investigating the effects of occupational heat exposure on workers' body temperature, hydration levels, working heart rates and productivity to understand occupational impact and implications.

Methods: 128 healthy male workers (age range: 20–54 years) were selected from agriculture and brick fields and WBGT, productivity, and subjective responses to heat exposure via HOTHAPS questionnaire were assessed. Pre- and post-shift aural canal temperature, USG, and working heart rates (WHRs) were measured. Statistical analysis included descriptive statistics, Pearson's correlation, and paired t-tests were performed ($p<0.05$).

Results: Excessive sweating was reported by 59.38% of moulders and 75.00% of harvesters. Strong negative correlation ($r=-0.9995$ and -0.9990) existed between mean hourly WBGT and productivity. According to mean WHRs, both groups' works were classified as moderately heavy. Significant increases in aural canal temperature were observed pre- and post-shift for moulders (36.75±0.31℃ to 37.41±0.34℃) and harvesters (36.82±0.27℃ to 37.45±0.40℃). Similarly, pre- and post-shift USG values (1.011±0.003- 1.019±0.005 and 1.012±0.003- 1.020±0.005) indicated mild dehydration for both groups, confirmed by paired t-tests ($p<0.05$).

Conclusions: Although, prolonged exposure to occupational heat causes slight increase in aural canal temperature indicating manageable heat strain and promoting mild dehydration to the workers which signifies either workers were adapted or further studies required to conform these findings.

Keywords: Aural Canal Temperature, Urine Specific Gravity, Dehydration, WBGT

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Abstract ID: ABR074

Title: Chronic Dehydration – Fatigue Syndrome in Displaced Tribal Population of Manipur and Community Based Psycho-Pharmaco Therapy As Effective Population Based Intervention

Authors: Siddharth Raina*

** Assam Rifles, Haflong*

Background: Study is based on tribal population of Manipur displaced in the current conflict. OPD patients and villagers were screened regularly and a unique syndrome of Chronic dehydration and Persistent fatigue symptoms were found to be prevalent and impeding regular life

Objectives: The study documented prevalence of the disorder, followed up he response to pharmaco-psycho therapy, established community help groups and followed up the study population over 1 year to study relapse

Methods: Study involved Clinical interview of 820 patients out of which 210 patients were selected, from 10 villages in Buffer Zone. Psychological tools like The Satisfaction with Life Scale (SWLS), and General Health Questionnaire (GHQ-28); MINI, HAM-D and HAM-A questionnaire for screening mental illness; Certain "Fatigue syndromes" that were found in higher frequency were classified and documented.

Results: Gender, race and age wise distribution of disorders and their resolution with time was charted to give insights in the local epidemiology. Females show 32% higher therapy compliance when compared to males. Females resolution rate of Fatigue and Somatoform type symptoms is 72% while in males its 48%. On the contrary males have much better resolution in symptoms of Post traumatic Syndrome when counselled regularly with Cognitive Behaviour Therapy.

Conclusions: The syndrome found in the population is a "Culture bound syndrome" where chronic dehydration, malnutrition and cultural priors present as disorder. Response to community-based psychotherapy is effective in mild cases where severe cases require psychotropic medication for preventing relapse.

Keywords: Vulnerable Populations, Manipur Conflict, Dehydration, Syndemic Psychiatric disorders, Community based Intervention

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Abstract ID: ABR093

Title: Urban Heat Island (Uhi) Effect and its Impact on Heat-Related Morbidity and Mortality

Authors: Ekta Ram*, Anuj Dave, Roshani Chauhan, Ankit Sheth, Ankit Viramgami, Jhalak Dhingra

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Urban areas experience a higher temperature than surrounding areas; this phenomenon is known as urban heat island effect. It can be intensified by global warming, high-density populations, anthropogenic heat discharge, and urbanization, which exaggerated health risks including morbidity and mortality.

Objectives: The aim of the review is to systematically examine the urban heat island effect (UHI) and it's impact on heat-related morbidity and mortality.

Methods: A review was conducted with PubMed and Scopus electronic databases searched using revenant keywords till October 2024. According to PRISMA guidelines, retrieved 1034 articles from database search, after removing duplicate articles and title abstract screening, 90 studies identified for full text screening. Consensus of two independent reviewers and 20 studies included in review based on pre-defined inclusion and exclusion criteria.

Results: Four studies identified that elderly population (65+) is particularly susceptible to cardiovascular and respiratory conditions during heatwaves. One study documenting a 4.06% annual increase in heat-related mortality from 2000 to 2010 attributed to UHI, with projections indicating a threefold rise by 2080. Three studies demonstrated that 38% of heat-related fatalities, disproportionately impact the vulnerable population (female), including racial minorities and low-income groups. UHI effect is most pronounced at night; conversely, it reduced hypothermia-related mortality among thermally vulnerable regions

Conclusions: The review highlights the health impacts of the urban heat island effect, particularly among vulnerable populations in urban areas and socioeconomically disadvantageous groups. Elevated temperatures exacerbate cardiovascular and respiratory diseases, including heat-related mortality, especially in high UHI areas.

Keywords: Urban heat island, UHI Effect, Heat related morbidity, Heat related mortality, Heat related illness

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Abstract ID: ABR129

Title: Impact of Climate Change on the Occupational Health and Well-Being of Solar Salt Workers

Authors: Parul Sahu*, Pankti Jog

** CSIR Central Salt & Marine Chemicals Research Institute, Bhavnagar*

Background: The Indian salt industry is the third largest globally, producing 30 million tonnes annually and supporting thousands of livelihoods. Climate change affects solar salt production due to its impact on weather conditions like rainfall, humidity, temperature, and sunlight.

Objectives: This study assesses how climate change affects the health and well-being of solar salt workers and identifies adaptive strategies to mitigate climate-related health risks for solar salt workers.

Methods: This study considers a mixed-methods approach, including field visits to salt production sites to observe working conditions and interviews with solar salt workers to understand occupational health hazards. Additionally, analysis of relevant news articles, discussions with salt worker associations and NGOs helped gather insights on existing support systems and climate change adaptation strategies.

Results: Climate change exacerbates the occupational health risks faced by workers in the salt industry, particularly in smaller, unskilled, and temporary salt units. Erratic weather patterns impact production, threatening workers' livelihoods. Additionally, salt workers experience health issues linked to their environment, including eye problems, fungal infections, dermatitis, and muscle pains. To mitigate these risks, comprehensive occupational health & safety measures including ergonomic protective gear and low-cost mechanized tools are essential. Regulatory frameworks to monitor climate impacts on salt production is recommended.

Conclusions: Climate change worsens the occupational health risks for solar salt workers, impacting their livelihoods and well-being. To safeguard their health, it is crucial to incorporate mechanization, provide adequate safety measures, improve working conditions, and embrace policy framework.

Keywords: Solar salt workers, Occupational health hazard, Policy framework, Mechanization,

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Abstract ID: ABR131

Title: Heatwave Effects and Mitigation: A Demographic, Socio-Economic, and Health Perspective

Authors: Sudalai Subramani, Yogi Agarwal*

** D Y Patil International School, Mumbai*

Background: Heat waves are becoming more frequent, severe, and prolonged as the planet warms. Climate change increases heat wave frequency, intensity, and length, which harms the most vulnerable.

Objectives: This study covers heatwaves, cross-cutting demography, socio-economic factors, and health implications. It lists vulnerable groups like elderly, children, pregnant, and migrants, some of whom are poor or deprived of citizenship.

Methods: Following the PRISMA framework, the paper employs methodical literature review approach. The study shows that the current research and understanding is flawed and needs more work on the economic value and equity of an adaptation strategy, the long-term mental health effects of heat waves, the complexity of urban climates, and how heat is distributed among people affected by crippling famine.

Results: This academic work examines the health effects of heatwaves on people with heat-related illnesses like heatstroke, diabetes, heart disease, lung disease, liver disease, renal disorders, and mental disorders like depression and anxiety. The analysis also shows that UHII may be hazardous in heat-related health activities. High crowding or population density generates more surface heat, making these areas vulnerable. The study also suggested treatments, adaptations, new legislation, infrastructure improvements, and cooler living conditions to reduce heat waves.

Conclusions: The paper recommends increasing global and international cooperation to reduce future heat wave frequency. It also stresses the need to work hard and show a genuine commitment to address global challenges before they get out of hand.

Keywords: Heatwaves, Vulnerable, climate change, hospitalisation, elderly

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Abstract ID: ABR135

Title: Effects of Hot Temperature on Maternal and Fetal Outcome: A Comparative Study from Desert Climate Area of India

Authors: Sudesh Agrawal*

** Sardar Patel Medical College, Bikaner*

Background: Heat-exposure can have negative effect on the health of mother and the baby. The increased core temperature, change in body surface area to body mass and difficulty of dissipating heat contribute to increased preterm-labour, still birth and other complications.

Objectives: To compare the maternal and fetal outcome of patients delivering in the summer months (April, May, June), versus the moderate heat months (February, September, October).

Methods: Retrospective, Observational study at the tertiary maternity care centre of Sardar Patel Medical College, Bikaner. Hospital records of patients delivering in the summer months (April, May June) were compared with February, September and October of the current year. Outcome measures were survival of mother and baby, Pregnancy/ intrapartum complications, weight and gestation of the baby, neonatal resuscitation or intensive care,.

Results: Bikaner, Rajasthan, experiences a hot-arid desert climate with average temperatures ranging from 27°C in February to 42°C in May. Highs can reach 48°C in May and June, with sun hours peaking at 12.3 in June. Humidity varies from 19% in April to 45% in September. Maternal and fetal outcomes were worse in summer months, with increased cases of eclampsia, antepartum hemorrhage, low birth weight babies, and neonatal resuscitation requirements compared to moderate heat months.

Conclusions: High temperature has adverse effects on health of pregnant mothers and babies. Creating awareness, minimizing heat exposure, proper clothing and thermal comfort, proper diet and hydration along with optimum health care is needed for better outcome.

Keywords: Effect of heat, maternal outcome, Fetal outcome

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ORAL SESSION 2

Theme: Air Quality, Pollution, and Respiratory Health

Date: February 26, 2025**; Time:** 4:15 PM – 6:15 PM

Abstract ID: ABR005

Title: Monitoring of Air Quality with Respect to Particulate Pollution : A Potent Health Risk Factor – A Case Study of Srinagar City, Kashmir Valley J&K Ut

Authors: Farooq Ahmad Lone*, Thamarasseril Nikhil Savio, Deepasri Mohan

** Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar*

Background: Particulate matter in the ambient air poses serious health risk with increasing respiratory infections, cardiovascular diseases and cancers. The present study was carried out to monitor the air quality with respect to particulate matter in Srinagar city of Kashmir valley.

Objectives: The ambient concentrations of PM1, PM2.5 , PM4, PM10 and TSP were estimated at different areas of highest traffic density as well as tourist sites of the city.

Methods: The air quality sampling was done on every fortnight by using portable Aerosol mass monitor -Aerocet 831 during morning (9:00am-10:30am), afternoon (1:00pm-2:30pm), and evening (4:30pm-6:00pm) with three replications each for all the time period. Sampling were carried out in all four seasons of the year viz. summer, autumn, winter and spring from June 2019-May 2020.

Results: The results showed average PM1 concentrations ranged from 15.10-115.30 µg/m3, PM2.5 concentrations ranged from 28.70-577.50µg/m3, PM4 concentrations ranged from 44.50 - 780.87µg/m3, PM10 concentrations ranged from 57.13-1225.53µg/m3, TSP (Total Suspended Particulates) concentrations ranged from 77.77-1410.27µg/m3.The seasonal concentrations of the parameters were also correlated with the weather parameters like Temperature (Maximum and Minimum) and Rainfall. A significant negative correlation was found for pollutants with temperature and significant negative correlation was found between PM10 and TSP with rainfall.

Conclusions: The study shows that the concentration of the particulates (PM1, PM2.5 , PM4, PM10) exceeded the WHO and CPCB standards at most of the study sites. Furthermore, concentration of PM was maximum during winter followed by autumn, summer and spring.

Keywords: Air quality, Srinagar city, Particulate pollution, seasonal variation

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Abstract ID: ABR009

Title: Assessing Predictors of Impaired Peak Expiratory Flow Rate among Rural Population: An interim Analysis of Implementation Research

Authors: Jayshree Gothankar, Ashwini Devane*, Medha Bargaje, Sanjivani Patil, Prakash Doke, Sachin Desai

** Bharati Vidyapeeth, Pune*

Background: Climate change is responsible for the higher prevalence of chronic respiratory diseases. Measuring Peak expiratory flow rate (PEFR) is an important tool for assessing impaired respiratory function. It is crucial to derive population-specific evidence for early diagnosis of respiratory impairment.

Objectives: To determine the predictors of impaired peak expiratory flow rate among rural population.

Methods: A population-based analytical cross-sectional study was conducted in 35 villages of the Male PHC, Pune district, Maharashtra. A total of 5288 participants were screened by trained ASHA using a validated, pretested questionnaire and EU scale Peak flow meter to identify those with impaired peak expiratory flow rate. Logistic regression was used to assess the predictors of impaired peak flow metry.

Results: The mean age was 51.3 years and 54% were females. Being male (OR=1.54;1.35-1.76), exposure to unclean fuel [OR=1.63;1.40-1.91(95%CI)], smoker [OR=5.12;3.18-8.26(95%CI)], occupational exposure to dust/fumes (OR=1.99;1.25-3.17), presence of cardiovascular morbidity (OR=2.52;2.14-2.97(95%CI) are predictors for impaired peak expiratory flow rate. Passive smoking [OR=1.99(95%CI (1.08-3.68)]is associated with impaired PEFR (95%CI). Poorly ventilated house is a predictor of impaired PEFR value [OR-1.65(95%CI (1.29-2.10)].

Conclusions: A simple screening strategy led to the knowledge of predictors and early identification of respiratory impairment will help to devise strategies to prevent them.

Keywords: Peakflow metry, Screening tool, Respiratory Impairment, predictors

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Abstract ID: ABR023

Title: Home Sweet Home: A Breath Full of Fresh Air or a Lungful of Woes

Authors: Nancy Nagdoune*, R.G Mahajan, Devang A. Raval

** B. J. Medical College, Ahmedabad*

Background: Indoor air pollution from unclean fuel use poses health risks, especially for vulnerable groups. Limited access to cleaner alternatives and poor housing conditions in urban slums sustain its prevalence and worsen health outcomes.

Objectives: a)To identify Determinants of Indoor air pollution; b) To identify the factors influencing the use of unclean fuels; c) to ascertain health risk due to the usage of unclean fuels

Methods: The study, conducted in urban slums under the Community Medicine Department of B.J. Medical College, surveys adult women engaged in cooking through a cross-sectional design. Utilizing NFHS-5 data on unclean fuel usage, 139 households are systematically selected from three slums by surveying every third household, starting from a randomly chosen point.

Results: This ongoing study, expected to conclude by December 2024, reveals concerning trends in urban slums. Preliminary findings indicate that only 43.6% of households exclusively use LPG, while 84% are poorly ventilated, 70% lack separate kitchens, and 59% are overcrowded. Among participants, 62.82% reported at least one acute respiratory infection in the past 15 days, with 83.33% experiencing at least two infections in the last year, particularly affecting those over 50 who rely on unclean fuels.

Conclusions: The study highlights the urgent need for interventions to improve indoor air quality in urban slums, focusing on vulnerable populations. Addressing barriers and enhancing access to cleaner energy sources is crucial for reducing health risks.

Keywords: indoor air pollution, vulnerable groups, unclean fuels, urban slum, health risk

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Abstract ID: ABR025

Title: A Community Based Study to Assess the Prevalence of Cognitive Impairment and its Association with indoor Air Pollution among Middle Aged and Elderly Population in Rural Area of Delhi

Authors: Ghurumourthy Dhandapani*, Shalini Smanla

** Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi*

Background: Cognitive decline, influenced by aging and environmental factors like air pollution, particularly PM2.5, is a growing concern. With India facing poor air quality and an aging population, understanding cognitive impairment's prevalence and its link to indoor air pollution is crucial.

Objectives: To study the prevalence of cognitive impairment among middle aged and elderly population and its association with indoor air pollution and biomass fuel exposure

Methods: A cross-sectional study was conducted over 18 months in Najafgarh, New Delhi, with 300 participants aged 45 and above. Cognitive function was assessed using the Montreal Cognitive Assessment scale, and demographic data with environmental factors like smoking and cooking habits were collected through a semi-structured questionnaire. Indoor PM2.5 and PM10 levels were measured using the Temtop M2000 Air Quality monitor.

Results: In this study, 65.33% of participants exhibited cognitive impairment (CI), with 49.33% having mild CI and 16% moderate to severe. Elderly participants, illiterates, those not gainfully employed, and individuals from joint families had higher rates of CI. Smoking exposure and biomass fuel use were significantly associated with CI, but no association was found with PM2.5 or PM10 levels. Multivariate analysis revealed that being elderly and exposure to indoor smoke significantly increased the odds of cognitive impairment.

Conclusions: This study found a high prevalence of cognitive impairment among middle-aged and elderly populations, significantly associated with age and indoor smoke exposure. The findings highlight the impact of environmental factors and emphasize the need for targeted interventions and further research.

Keywords: Indoor air pollution, Cognitive Impairment, Elderly, Smoking, Biomass fuel

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Abstract ID: ABR041

Title: Cocos Nucifera's Husk Smoke as a Hypoxia Inducer and Developmental Limiter in Drosophila Melanogaster

Authors: Monalisa Mishra*, Seekha Naik, Boopathy Ramasamy, Trupti Das

** National Institute of Technology, Rourkela*

Background: Smoke harms human health. It contains NO2, SO2, CO, and particulate matter (PM). PM penetrates the respiratory system and lowers the amount of oxygen in the lungs, resulting in hypoxia. PM can range in different sizes.

Objectives: The effect of smoke on phenotypic abnormalities of Drosophila melanogaster. further be correlated with hypoxic conditions and histological anomalies and correlated with the relative expression of genes associated with hypoxia.

Methods: 0.1 grams of coconut husk smoke exposed to Drosophila eggs, and the smoke produced contained CO, SO2, and NO2 and distinct PM. The size of the PM was found to be 10, 2.5, and 1.0 µm. The concentrations of CO, SO2, and NO2 were measured. The impact of smoke correlated with the morphological, behavioral, and gene expression level of Drosophila.

Results: Upon exposure to smoke, there is an alteration of the expression level of Sima and Tango leading to hypoxia, which causes morphological abnormalities in the tracheal terminal tube. Significant micronuclei, cell death, and ROS were observed in the tracheal terminal tube. A significant alteration in the developmental cycle was observed. A protruded belly, irregular arrangement of bristles, and defective eyes were found in adult flies. Within the eye, the rhabdoms were found to be missing. Several behavioral anomalies were observed.

Conclusions: the CO concentration was excessive according to the NAAQS range, whereas the concentrations of SO2 and NO2 are within the acceptable range, the major reason behind causing hypoxia, which further change the expression level of hypoxia causing genes.

Keywords: Smoke, Hypoxia, Drosophila, Particulate matter, Trace Gases

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Abstract ID: ABR042

Title: Preventing Environmental Pollution due to Mercury Causing Human Health Hazards at Goldsmith Workshop

Authors: Ganesh Sahoo*, Neetesh Jindal, Sindhuprava Rana, Ashish Kumar, Vibhor Joshi, Krishna Pandey

** Rajendra Memorial Research Institute of Medical Sciences, Patna*

Background: At goldsmith workshop mercury is used to recover gold. Upon heating gold mercury amalgam mercury is released in to environment posing numerous health risks, neurological disorders, immune system suppression, kidney, lung damage, developmental problems, in unborn babies and young children.

Objectives: To explore safer methods for gold recovery from goldsmith workshop that could minimize mercury exposure and a micro-model device designed for gold recovery from goldsmith workshop without environmental mercury pollution.

Methods: The novel micro model device designed for gold recovery incorporates a separate chamber for mercury evaporation and collection, effectively preventing mercury release into the environment. Gold binds with mercury to form an amalgam, facilitating gold recovery while ensuring that the mercury is safely contained and not released into the surrounding environment. This gold extraction will secure goldsmith's life.

Results: The innovative design introduces a micro model device for gold recovery from goldsmith workshop that significantly minimizes mercury exposure and environmental pollution. The extraction process utilizes the reaction $Au+2Hg \rightarrow AuHg_2$ demonstrating gold forms amalgam with mercury. With impeller and motor power system mercury and gold can be sedimented and upon heating a separate chamber collecting Hg in another chamber whereas gold remains as it is, hence preventing release of Hg into the environment pollution and protecting human health.

Conclusions: Heavy metal poisoning due to Hg causes serious human diseases such as neurological disorders i.e. tremors, insomnia, and memory loss which on accumulation becomes an environmental silent killer. This can be prevented using Impeller and motor power system.

Keywords: Mercury pollution, Environmental health, Bioaccumulation, Gold recovery, Toxic substances

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Abstract ID: ABR046

Title: When Air Shapes Immunity: The Untold Narrative of Environmental influence on Allergic Disease Evolution in Vadodara District (2021-2024)

Authors: Ruchit Nawal*, Harsh Patel, Hiren Popat, Devang Raval

** B. J. Medical College, Ahmedabad*

Background: Rising evidence suggests critical knowledge gaps in understanding environmental triggers of allergic diseases in rapidly evolving urban landscapes, particularly in tier-2 Indian cities. Study examines the complex relationship between Air Quality Index (AQI) and allergic sensitization patterns in Vadodara, India.

Objectives: To investigate the relationship between air quality metrics and allergic sensitization patterns in Vadodara (2021-2024), while identifying vulnerable populations and environmental thresholds for increased allergic risk.

Methods: A retrospective analysis of 122 patients' allergy test results (2021-2024) from Mishay Hospital's Allergy Clinic was conducted alongside daily AQI data of same period obtained from Central Pollution Control Board, Nandesari, Vadodara. Statistical approaches including chi-square tests, Spearman's correlation, and multivariate regression analyzed relationships between AQI levels and allergen sensitization.

Results: Significant correlation emerged between AQI levels and sensitization severity ($r=0.68$, $p<0.001$). High AQI periods (>200) showed 2.8-fold increased risk of severe reactions (OR=2.8, 95% CI: 1.9-4.1). Multiple sensitization patterns demonstrated strong association with sustained high AQI exposure ($\chi^2=15.4$, $p<0.001$). Pediatric patients showed highest vulnerability (OR=3.2, 95% CI: 2.4-4.3).

Conclusions: The progressive correlation between declining air quality and allergic sensitization underscores an evolving health crisis in Vadodara. These findings demand immediate environmental interventions, enhanced clinical surveillance, and development of targeted preventive strategies, particularly protecting vulnerable populations like children.

Keywords: Air quality index, allergic sensitization, environmental health, respiratory allergy,

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Abstract ID: ABR057

Title: Leveraging Pharmaceutical Data to Enhance City-Based Air-Health Surveillance

Authors: Ritu Parchure*, Santu Ghosh, Santsosh Satam, Aparna Gokhale, Balasaheb Pawar, Vinay Kulkarni

** Prayas, Pune*

Background: Air-health surveillance is implemented in polluted Indian cities to guide mitigation and health preparedness efforts. It monitors emergency room visits (ERV) for acute respiratory illnesses. A wider network of sentinel hospitals is crucial, though expanding coverage can be challenging.

Objectives: We evaluated the potential of pharmaceutical data ('Respules' used in nebulizers containing corticosteroid and bronchodilator), by examining its association with local ambient particulate matter levels and correlation with ERVs.

Methods: Data on 'Respules' dispensed was obtained from the pharmacy of a tertiary care hospital in Pune, India; focusing on adult patients whose residential pin-codes matched that of the hospital. PM2.5 concentrations were obtained from the Air-Quality Monitoring Station from the same area.
A time-stratified case-crossover design was used to assess the relationship between daily 'Respules' and daily average PM2.5 levels.

Results: From January 2022 to April 2023, average daily 'Respules' dispensed were 16; average daily PM2.5 was 58.64 µg/m3.
A positive correlation, with a lag effect, was observed. A 10 µg/m3 increase in PM2.5 level led to an 8% and 6% increase in Respules dispensed after 3 and 4 days, respectively.
There was a perfect linear association between daily Respules and ERV, till <30 respules/day and then a flattened curve. The monthly ERV showed high agreement (r=0.7) with monthly Respules dispensed.

Conclusions: Respules' dispensed can reliably track respiratory health burden in a city, capturing both emergency and outpatient care burdens. Further research is necessary to explore its potential in existing air-health surveillance in India, particularly when integrated with hyperlocal air quality data.

Keywords: Air pollution, Health surveillance, Pharmaceutical data, Respiratory health

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Abstract ID: ABR110

Title: Particulate Matter (Pm) Concentration and its Respiratory Deposition Across Various indoor Micro-Environment.

Authors: Anuj Shrivastava*, David Konwar, Deepika Bhattu

** Indian Institute of Technology, Jodhpur*

Background: People tend to spend 90% of their time in indoor environments and are exposed to poor indoor-air quality (IAQ) that leads to stress, morbidity, and mortality. According to WHO, indoor air pollution causes ~3.8 million premature deaths every year worldwide.

Objectives: To understand the IAQ in the different micro-environments and investigate the total PM mass exposure and its deposition in different sections of the respiratory tract.

Methods: IAQ indicators, PM mass, and size distribution were measured during September-November 2021 in six different micro-environments (kitchen, mess, canteen, classroom, hostel room, and administrative-office) in a residential campus of the IIT, Jodhpur.

Total PM exposure and its deposited fraction in different respiratory regions (head-airways, tracheobronchial, and alveolar regions) are estimated by using the International Commission on Radiological Protection (ICRP) model.

Results: Under mechanical ventilation, the PM-mass concentration for most of the micro-environments are well within the WHO limit, however under natural ventilation (classroom and hostel room) it exceeds the WHO limit due to addition of coarser particles, which results in increased in total mass deposition in the respiratory regions. Among all the micro-environments, the deposition fraction is maximum in the headway-airway (73-80%), followed by alveolar (12-19%) and tracheobronchial (6-7%) regions. PM-mass and its deposition are varied with human occupancy and activity.

Conclusions: The PM size distribution, ventilation rate, and indoor-outdoor PM ratio affect the PM mass concentration. Results suggest that staying indoors with windows closed and proper ventilation or air purifiers during high outdoor pollution episodes is a better choice.

Keywords: Indore air quality, Particulate Matter, Deposition, Human respiratory tract

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Abstract ID: ABR132

Title: Association Between Pm2.5 Air Pollution Exposure and Neurodegenerative Disorders: A Correlational Analysis in India

Authors: Vaishali Choudhari, Lokesh Kumar Sharma, Pooja Singhal*

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: We hypothesize that air pollution impacts central nervous systems (CNS). While there are studies on prevelance and future estimates on number of cases, there are almost no studies to study correlation (and impact) of air pollutants on such diseases

Objectives: This study aims to evaluate the contribution of particulate matter (PM2.5) or other pollution contributors on neurodegenerative disorders like Alzheimer, Dementia and Parkinson disease.

Methods: Air quality data in India is collected at national to city levels particularly in polluted areas like Delhi NCR. However, data on neurodegenerative disease cases is limited and not readily accessible. Our research relied on scraped data from Alzheimer's Association journals, articles on NIH and recent CSIR reports to analyze correlations between pollution levels and disease cases, including future forecasts.

Results: Evidence indicates significant correlations (0.3-0.56) between fine grained pollutants like PM2.5 and other pollutants with neurodegenerative illnesses for which data is scraped. While correlation doesn't imply causality, such significant correlations opens possibility of in-depth analysis of our hypothesis keeping medical expert in the loop. Additionally, more data from disease side should be collected from authoritative level with government initiatives

Conclusions: In conclusion, PM2.5 exposures threatens health through complex mechanisms inside CNS, including oxidative stress and neuroinflammation which results into diseases like Alzheimer and Dementia. Early studies like ours can be initiative in studying impact of pollutants on these medical conditions

Keywords: Air Pollution, Neurodegenerative Diseases, Central Nervous System, Disease Surveillance

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Abstract ID: ABR137

Title: Examining the Role of Particulate Matter Size and Emission Sources on toxicity

Authors: Saifi Izhar*, Nazneen Tabish

** Indian Institute of Technology (Indian School of Mines), Dhanbad*

Background: Particulate matter (PM) impacts air quality by inducing oxidative stress via reactive oxygen species (ROS). Oxidative potential (OP), the capacity to induce oxidative stress in biological systems, is essential for understanding PM's toxic properties and human health effects.

Objectives: To understand particle size effects on toxicity endpoints of PM
To measure the toxicity characteristics of size-fractionated PM by different toxicity approaches viz chemical assay (Dithiothreitol (DTT) oxidative potential)

Methods: PM2.5 and PM10 were sampled in Dhanbad throughout the year, covering various seasons and emissions sources. Toxicity was evaluated using a dithiothreitol (DTT) assay. Quartz filter quadrants were extracted in water and methanol, ultrasonicated, and filtered. The filtrate was incubated with DTT and DTNB at 37°C, and absorbance was measured at 412 nm to determine the DTT-related oxidative potential (OP).

Results: PM2.5 particles displayed higher oxidative potential than PM10 particles across emission sources. Methanol extraction consistently exhibited higher DTT oxidative potential values for both PM2.5 and PM10 size fractions. Combustion sources, including solid fuels burning (wood, cow dung cake, and coal) and garbage burning, exhibited exceptionally high DTT oxidative potential for both PM2.5 and PM10 size fractions compared to traffic sources, regardless of extraction method.

Conclusions: The results highlight the urgent need for a strict action plan to reduce PM2.5 levels by switching to cleaner cooking fuels. The findings also suggest considering the role of water-insoluble PM despite existing studies emphasizing water extraction-based DTT OP values.

Keywords: Particulate matter, Oxidative Potential, emission sources

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POSTER SESSION 1

Theme: Environmental Toxicology and Pollutants (ETP)

Date: February 26, 2025**; Time:** 4:15 PM – 6:15 PM

Abstract ID: ABR003

Title: Impact of Environmental Quinones on the Morphology of Human Red Blood Cells and its Function

Authors: Neha Yadav*, Santosh Kumar Mondal, Amit Kumar Mandal

** Indian Institute of Science Education and Research, Kolkata*

Background: Quinones, a class of highly reactive environmental pollutants, are significantly released into the environment through vehicle exhaust, fossil fuel combustion, and occupational exposure. Long term exposure to quinones can contribute to pulmonary, cardiovascular diseases.

Objectives: In this study, we investigated the impact of several quinones derivatives like 2-methyl-1,4-benzoquinone, 1,4-naphthoquinone, 9,10-phenanthrenequinone, and 9,10-anthraquinone on morphology, biochemical properties, and functional integrity of human Red Blo

Methods: RBCs isolated from human blood samples were exposed to different quinones, separately. The level of reduced glutathione, reactive oxygen species, and morphology of RBCs were measured using absorption, fluorescence spectroscopic and scanning electron microscopy based techniques. In addition, binding of quinones with hemoglobin and effect on its structural integrity was investigated using mass spectrometry, spectrophotometry, and circular dichroism spectroscopy.

Results: We observed a marked increase in oxidative stress and significant alterations in RBC morphology following exposure to MBQ, NQ, and PQ. Covalent binding of MBQ and NQ to hemoglobin was detected, specifically at the βCys93 residue of hemoglobin. Additionally, an elevated equilibrium dissociation constant was observed in the presence of MBQ, NQ, indicating decreased hemoglobin stability. Furthermore, structural alterations in hemoglobin were observed, coupled with increased aggregation, further supporting the instability of hemoglobin upon exposure to these quinones.

Conclusions: Our findings demonstrate that quinone exposure exerts significant changes that might potentially contribute to the development of cardiovascular and pulmonary diseases. The study highlights the importance of monitoring environmental quinone exposure and protective measures in occupational settings and urban environments.

Keywords: Environmental pollutants, Quinones, Red blood cells, Hemoglobin, Oxidative stress

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Abstract ID: ABR036

Title: Effect of Metal Oxide Nanoparticles on Human Respiratory Epithelium Cell Biology

Authors: Jyoti Thaikoottathil*, Devanshi Soni, Rama Gaur, Alok Pandya

** Institute of Advanced Research, Gandhinagar*

Background: Environmental pollution is one of the leading cause of increased morbidity and mortality worldwide. Epidemiological studies demonstrated a strong correlation between increased ambient particulate matter and increased respiratory and cardiovascular diseases. Metal are often present in the ambient particulate matter.

Objectives: This study aims to investigate the impact of Zinc oxide and iron oxide nano-particles, common air pollutants on the human lung epithelium cell viability, inflammation and antimicrobial function.

Methods: ZnO and Fe3O4 NP (100-300nM range) were synthesized in the laboratory and they were characterized by DLS, FTIR, XRD and SEM. Time and dose dependent effect of these metal oxide NP was studied on human lung epithelial cells. The effect of metal oxide NPs was assessed on cell viability (MTT assay), inflammation (IL-6 & IL-8 mRNA) and antimicrobial activity assays.

Results: Metal oxide NP were successfully synthesized and characterized by different methods. Time and dose dependent cytotoxicity was observed in ZnO NP treated cells. ZnO NP showed higher cytotoxicity compared to Fe3O4 NP. Similarly both particles increased inflammation as determined by inflammatory markers (IL-6 & IL-8 mRNA). Expression of antimicrobial protein was also altered by metal oxide NP. However, direct antimicrobial activity of ZnO and Fe3O4 NP was observed against B. megaterium and P. aeruginosa coli and not against E.coli.

Conclusions: ZnO NP showed higher toxicity and inflammation in human lung epithelial cells compared to Fe3O4 NP. Our results will shed light on how metal oxide nano-particles exposure which are common constituents of ambient particulate matter affect human respiratory health.

Keywords: Environment pollution, Metal oxide nanoparticles, Lung epithelial cells, Respiratory infections, Antimicrobial proteins

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Abstract ID: ABR045

Title: Impact of Prolonged Urban Air Pollution on Health Parameters in Bhubaneswar

Authors: Jyotishree Nath*, Manisha Kar, Nibedita Priyadarsini, R. Boopathy, Trupti Das

** Institute of Minerals and Materials Technology, Bhubaneswar*

Background: A random population study was conducted in Bhubaneswar city among 50 volunteers (≥20 - ≤70 years) exposed to urban air pollution, examining the impact of exposure on various health parameters.

Objectives: To investigate the effects of prolonged exposure to urban air pollution on anthropometric, biochemical, pulmonary, and cardiovascular parameters among different demographic groups.

Methods: Participants were categorized by gender, exposure duration, and age. Parameters measured included BMI, blood pressure, Malondialdehyde (MDA), Oxidised low density lipoprotein (Ox-LDL), Forced expiratory volume in the first second to forced vital capacity (FEV1/FVC), baPWV, low frequency to high frequency ratio (LF/HF), and Reactive hyperemia index (RHI). Serum metal profiles were analysed using Inductively coupled plasma-Optical emission spectroscopy (ICP-OES).

Results: Biochemical and pulmonary parameters were normal. Average baPWV was higher in males and those with prolonged exposure. Sympathetic dominance (LF/HF) was noted in males and individuals >40 years. RHI indicated endothelial dysfunction in all categories. Significant variations in serum metals (Na, K, Ca, Mg, Al, Fe, Cu, Zn, Se, Sr, I) were found, particularly between genders.

Conclusions: The Cu/Zn ratio deviations correlated with endothelial dysfunction, highlighting the health risks of prolonged urban air pollution exposure among diverse demographic groups.

Keywords: Air contaminants, baPWV, RHI

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Abstract ID: ABR095

Title: Pharmacological Investigations on the Effects of Capsaicin Supplementation in Sub-Acute Bisphenol-A Exposed Mice For Glucose and Lipid Metabolism-Related Transcription Factors.

Authors: Joshi Poonam*, Riva Mehta, Vandana Bijalwan, Shweta Gupta, Santasabuj Das, Dhirendra Pratap Singh

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: BPA, a legacy endocrine disrupting chemical (EDC), can potentially alter the metabolic programming owing its effects on signaling pathways in glucose and lipid metabolism leading to metabolic disorders.

Objectives: To evaluate the effects of capsaicin against BPA induced-alteration in glucose and lipid metabolism related genes in adipose tissues and liver.

Methods: qRT-PCR based analysis for glucogenic, gluconeogenic, adipogenic and lipolytic genes, biochemical investigation for oxio-nitrosative stress markers such as lipid peroxidation, nitrite and endogenous antioxidants, along with H&E staining based histological investigations and ELISA based proinflammatory cytokines estimations have been performed in white and brown adipose tissue, and in liver.

Results: Capsaicin supplementation prevented BPA-induced alterations in adipogenic and lipolytic genes in both visceral white and brown adipose tissues, including PPARγ, PPARα, C/EBPα, and PRDM16. It also counteracted BPA-induced changes in liver genes related to lipid and glucose metabolism, such as ACC, FASN, PPARs, and GLUT2. Additionally, capsaicin reduced inflammatory markers (IL-1β, IL-6, TNFα) and prevented lipid peroxidation, while lowering glutathione and superoxide dismutase levels in liver and white adipose tissue.

Conclusions: Capsaicin, known for its anti-inflammatory and antioxidant properties, could potentially target metabolic aberrations caused by BPA-induced transcriptional changes in white and brown adipose tissues, thereby reducing inflammation and lipid buildup, thus mitigating BPA's negative effects.

Keywords: Bisphenol A, Endocrine Disrupting Chemicals, Capsaicin, Energy metabolism, Metabolic regulation

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Abstract ID: ABR109

Title: Perfluorooctanoic Acid (Pfoa) Exposure Alter Vaccine Induced Immune Response

Authors: Ruchi Jha*, Shramana Chakraborty, Kunal Tarane, Shweta Pasi, Dhirendra Pratap Singh, Santasabuj Das

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Perfluorooctanoic acid (PFOA) is a per and polyfluoroalkyl substance, resistant to biodegradation, widely used in industries. Human exposure occurs through water, food, soil, air and different occupation. PFOA exposure suppresses vaccine induced antibody production, however mechanistic details are still unexplored.

Objectives: Present study was designed to explore impact of PFOA on function of innate immune cells.

Methods: To elucidate vaccine induced immunity post PFOA exposure, BALB/c mice were exposed to PFOA, and immunized with ova-peptide. On day 7 post-immunization mice were euthanized and immune parameters, including cellularity of peritoneal exudate cells (PECs) and spleen (by haemocytometer), ROS generation and phagocytic activity of PECs (by flow cytometry) and lymphoproliferation (by MTT assay) was assessed.

Results: This study showed that total cellular count of PECs and spleen was significantly decreased post PFOA exposure as compared to control and only immunized group. Along with this PECs showed elevated ROS generation and a decline in phagocytic activity and a significant decrease in ova-peptide stimulated lymphoproliferation was observed at 7.5 mg/kg b.w./day post PFOA exposure.

Conclusions: Elevated ROS generation in PECs and decrease in their phagocytic activity suggest inflammation, while decline in total cellularity and lymphoproliferation indicate immunosuppression. These preliminary results indicate that PFOA alter vaccine induced immune response however this needs to be further explored.

Keywords: PFOA, Immunosuppression, ROS generation, lymphoproliferation, PECs

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Abstract ID: ABR111

Title: Metformin in Wastewater: Environmental Risks and Toxicological insights from a Systematic Review

Authors: Zalak Jain*, Anuradha Gajjar, Chirag Patel

** L. M. College of Pharmacy, Ahmedabad*

Background: High concentrations of metformin have been detected in effluents from various sources, significantly contributing to water contamination due to the high global prevalence of diabetes. Hence, metformin is emerging as major contaminant in aquatic environments which can adversely affect ecosystems.

Objectives: To review global studies, analytical methods, and toxicity assessments used for metformin concentrations in wastewater and its environmental impacts.

Methods: A systematic review of literature was conducted using PubMed, Embase and Science Direct. Search terms included "wastewater," "environmental toxicity," "metformin," and "Emerging contaminants." A detailed study of the relevant articles was undertaken to assess the analytical methods used to determine the concentration of metformin and the toxicity study.

Results: Analysis of 28 studies revealed that metformin is frequently detected in wastewaters, with concentrations ranging 1 - 40 µg/L, posing harmful effects on aquatic organisms. Over 50% of river sampling sites globally reported presence of metformin. Concentrations varied by source: effluent (0.004–269 µg/L), hospital wastewater (up to 154 µg/L), and river (up-to 7.5 µg/L). Studies have highlighted toxic effects of metformin as aggressive behaviour and indications of endocrine disruption in aquatic animals exposed to wastewater at 40 µg/L concentrations.

Conclusions: Metformin is commonly found in various wastewater sources, where it poses toxic effects on aquatic organisms and plants. Immediate regulatory action is essential to control wastewater discharge and safeguard the environment from metformin and other similar pharmaceutical pollutants.

Keywords: Metformin, Wastewater, Environmental toxicity, Emerging contaminants, Effluent

TAKE ME TO THE TABLE OF CONTENTS

Abstract ID: ABR113

Title: Perfluorooctanoic Acid Enhances Ros Mediated Pathogen Killing in Human Pmns

Authors: Shramana Chakraborty*, Ruchi Jha, Sakshi Raval, Shweta Pasi, Dhirendra Pratap Singh, Santasabuj Das

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Perfluorooctanoic acid (PFOA) used for decades in industries, is very stable and difficult to degrade because of C-F backbone. It enters humans through water, air, occupational exposure, soil, consumer products. Its immunotoxic, neurotoxic and teratogenic nature is of great concern.

Objectives: Present study was designed to investigate immunotoxic potential of PFOA, aiming to explore its impact on different modes of killing of pathogens by PMNs, like NETosis and ROS.

Methods: Polymorphonuclear neutrophils also called PMNs were isolated from freshly drawn human blood and exposed to PFOA. Functional assays were performed, whereby ROS was quantified fluorometrically, phagocytic ability of human PMNs was analysed by using fluorescein labelled E. coli bioparticles and Neutrophil Extracellular Trap (NET) was measured using PicoGreen dye. Pathogen killing was also assessed by using Bacterial Killing Assay.

Results: PMNs were isolated with high purity and viability. PMNs pretreated with PFOA showed increased production of ROS as compared to the untreated ones. ROS consistently increased up to two hours. PFOA exposed PMNs were found to kill more bacteria as compared to the unexposed ones. However, when NET was quantified both exposed and unexposed PMNs showed similar result. Also, our preliminary study suggests no difference in phagocytosis activity between exposed and unexposed PMNs.

Conclusions: Preliminary experiments on ex vivo exposure of PMNs to PFOA indicate high ROS generation, a powerful antimicrobial weapon of innate immunity against pathogens. However excessive ROS production by PMNs is likely to be a pathological condition due to excessive inflammation.

Keywords: Perfluorooctanoic acid, Polymorphonuclear neutrophils, ROS, NET, Bacterial killing assay

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Abstract ID: ABR114

Title: Phototoxicity and Skin Barrier Disruption Potential of Hair Dye Complex Compared to Individual Ingredients Under Ambient Uv-R

Authors: Ratan Singh Ray, Mohd Danish Kamar*, Madhu Bala, Ashish Dwivedi

** CSIR Indian Institute of Toxicology Research, Lucknow*

Background: Permanent hair dyes contain ingredients that can cause skin sensitization, irritation, and penetration. UV radiation may enhance their toxic effects since these ingredients absorb light.

Objectives: There is insufficient information on the toxicity of hair dye mixtures, as most studies focus on the hazard potential of individual ingredients. Therefore, further investigation is necessary.

Methods: We used various in-chemico and in-vitro techniques for our study. Absorbance and photodegradation were assessed using spectrophotometer. Photocytotoxicity was evaluated through MTT and NRU assays. We measured reactive oxygen species(ROS) generation using DCF and DHE assays and assessed lipid peroxidation with BODIPY C-11. Additionally, we studied endoplasmic reticulum stress using ER Tracker and evaluated skin barrier genes with RT-PCR.

Results: Hair Dye Complex's(HDC) absorption spectra show peaks at 289 nm and 498 nm in the UV and visible regions. Cell viability assays on HaCaT cells revealed that HDC is more toxic than its ingredients under UV radiation exposure. DCF and DHE assays confirmed that HDC generates more reactive oxygen species (ROS) than the individual components. The combination of UV radiation and HDC induces lipid peroxidation in keratinocytes due to oxidative stress, significantly downregulating skin barrier genes loricrin and involucrin.

Conclusions: Hair dye complex can pose greater hazards than the individual components, particularly when exposed to sunlight. Consequently, individuals applying hair dye should avoid direct sunlight exposure during the application process to mitigate the risks of skin inflammation and allergic reactions.

Keywords: Phototoxicity, Hair Dye, Reactive oxygen species, Skin barrier

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Abstract ID: ABR115

Title: Perfluorononanoic Acid (Pfna) Enhances Neutrophil Oxidative Burst But Suppress its Net Production

Authors: Sakshi Raval*, Shramana Chakarborty, Kunal Tarane, Shweta Pasi, Dhirendra Pratap Singh, Santasabuj Das

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Perfluorononanoic acid (PFNA) is a persistent toxic substance due to its stable non-degradable carbon-fluorine bonds. Human exposure of PFNA occurs through water, air, occupational exposure, soil, and cookware etc. It is a potent immunotoxin and neurotoxin.

Objectives: We evaluated the immunotoxic effects of PFNA, with primary focus on neutrophil functions such as respiratory burst (in terms of ROS), NET formation and pathogen killing.

Methods: Neutrophils were isolated from freshly collected human blood and exposed to PFNA. Functional assays were conducted for respiratory burst (ROS) through fluorometric quantification of ROS and measurement of Neutrophil Extracellular Traps (NETs) using PicoGreen dye. Moreover, Bacterial Killing Assay was carried out to assess pre-treated neutrophils' pathogen killing capacity.

Results: Neutrophils pretreated with PFNA exhibited higher respiratory burst (in terms of ROS production) compared to untreated cells. PFNA-exposed neutrophils demonstrated enhanced pathogen killing compared to unexposed neutrophils. When NET formation was assessed, PFNA-treated neutrophils demonstrated low level of NET release in comparison to control.

Conclusions: Preliminary experiments indicate that PFNA exposure affects key neutrophil functions such as respiratory burst, NET production and pathogen killing.

Keywords: Perfluorononanoic acid, Oxidative burst, Neutrophil Extracellular Traps, Bacterial killing assay

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Abstract ID: ABR116

Title: Cellular and Molecular Crosstalk involve in Skin Allergy Induced by Isoeugenol and its Photoproduct

Authors: Diksha Pathania*, Sunil Kumar Patel, Apeksha Vikram, Ratan Singh Ray, Ashish Dwivedi

* *CSIR Indian Institute of Toxicology Research, Lucknow*

Background: Isoeugenol (Ise), a natural phenol derivative used in cosmetic industries as a fragrance or fragrance mix in various consumer products such as soaps, shampoos, detergents, and topical cosmetic applications. These fragrances cause occupational skin problems, including allergic contact dermatitis (ACD).

Objectives: Despite its established role as a skin allergen, leading to sensitization in users, the photosensitization potential and subsequent allergic responses under UV exposure remain unexplored.

Methods: Utilizing various tools (in-chemico, in-silico, and in-vitro) based on the Adverse Outcome Pathway (AOP) of Allergic Contact Dermatitis (ACD), the study investigates the cellular crosstalk and molecular mechanism of Ise under UV-A exposure. Moreover, to check the cellular crosstalk, the coculture of keratinocytes and THP-1 cells has been performed.

Results: Preliminary findings reveal that Isoeugenol undergoes photodegradation into eugenol under UV-A radiation, enhancing the sensitization potential via strong binding with heptapeptide cysteine as confirmed by in-chemico and in-silico studies. Intracellular fluorescence staining further implicates mitochondrial ROS in mediating skin sensitization by Ise under UV-A exposure. In-vitro studies revealed that Ise sensitizes the keratinocytes by activating inflammatory pathways. Interestingly, the cytokines secreted by keratinocytes in coculture induced the overexpression of the co-stimulatory CD86 and CD54 cell surface markers on THP-1 cells.

Conclusions: Such evaluations are crucial to prevent exaggerated skin sensitization and other allergic diseases, ensuring human safety in the use of cosmetic products.

Keywords: ACD, Isoeugenol, UVA, THP 1, ROS

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Abstract ID: ABR142

Title: Bioactive compounds alleviate combined chromium (VI) and arsenic (III)-induced oxidative stress and hepatic apoptosis through upregulation of SIRT1/Nrf2/HO-1/NQO1 signalling pathway

Authors: Swapnil Tripathi*, Dharati Parmar, Gyanendra Singh

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Chromium and arsenic contamination infiltrate the ecosystem and pose a global threat due to widespread use in households, agriculture, and industry, exposing lifeforms to toxicity. Natural compounds such as phloretin, biochanin-A, and coenzyme Q10 provide a variety of pharmacological advantages.

Objectives: This study explored the therapeutic potential of selected nutraceuticals in Swiss albino mice exposed to co-administration of chromium (Cr) and arsenic (As) for mitigating toxicity effects.

Methods: Potassium dichromate (75 ppm) and sodium meta-arsenite (100 ppm) were given in drinking water to induce hepatotoxicity, conjugated with PHL and BCA (50 mg/kg each), and CoQ10 (10 mg/kg) intraperitoneally for 2 weeks. Mice were sacrificed, and liver tissues were harvested to analyze the metal load, oxidative stress indices, histopathological aberrations, and relative mRNA expression of Nrf2 dependent genes.

Results: Statistical analysis revealed that the Cr+As-intoxicated mice had an upsurge in the hepato-somatic index and altered antioxidant activity. Further histopathological aberrations, DNA breaks, reduced SIRT1, Nrf2, HO-1, and NQO1 gene expressions, as well as elevated expressions of caspase 8 and caspase 3, which indicated apoptotic cell death, confirmed the previously indicated results. On the other hand, treatment with natural compounds reversed the above altered parameters, highlighting their potential in mitigating heavy metal-induced oxidative stress and cellular damage.

Conclusions: Based on the aforementioned data, it can be inferred that the selected natural compounds mitigated the hepatotoxicity caused by Cr+As in mice by combating oxidative stress-induced apoptosis and consequently upregulating the Nrf2-AREs signalling, which in turn preserves the cellular milieu.

Keywords: Heavy metals, Oxidative stress, Antioxidants, Nrf2 dependent genes

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POSTER SESSION 2

Theme: Occupational Exposures and Hazards (OEH)

Date: February 26, 2025**; Time:** 4:15 PM – 6:15 PM

Abstract ID: ABR055

Title: Assessment of Occupational and Environmental Health Risks and Challenges of Migratory Brick Kiln Workers in Gujarat

Authors: Sanjeev Gupta*, Suresh Yadav

** Indian Council of Medical Research, New Delhi*

Background: Brick kiln workers exposed to toxic substances like particulate matter, carbon monoxide, sulfur dioxide causing respiratory and health issues. Addressing occupational health and safety concerns is crucial to mitigate adverse effects on workers well-being and ensure a safer working environment.

Objectives: To study occupational health hazards, assessing work environment impact on health of brick kiln workers by measuring biological parameters for respiratory, hematological, liver, kidney function to identify potential health risks.

Methods: A total 273 brick kiln workers in the age group between 18-60 years from 10 sites in Adalaj and Uvarsad villages of Ahmadabad district were enrolled, excluding those with infectious diseases like TB, cancer, etc. A personal interview using a pre-tested questionnaire gathered data on demographics, occupation, respiratory symptoms, medical history, and habits. Informed consent was obtained from all participants.

Results: The average age of workers was 29.8±10.0 years and mostly uneducated (52%). They primarily belongs to Chhattisgarh (47.6%) and Uttar Pradesh (39.9%) and personal habits showed smoking (21%), tobacco use (58.6%), and alcohol abuse (34.4%) and many (54.6%) were underweight (BMI <18). They reported excessive work hours, body aches, and health symptoms. Work duration was linked to altered biochemical parameters, posing health risks. Exposure duration affected liver function, metabolism, and kidneys, with long-term exposure leading to chronic changes.

Conclusions: The findings of study emphasizes the need for comprehensive interventions, including education, health awareness, improved working conditions, and access to healthcare services to address the occupational health risks and promotes the overall well-being of brick kiln workers.

Keywords: Brick Kiln, Occupational Health, Environmental Pollution, Migratory Workers

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Abstract ID: ABR098

Title: Workplace Thermal Microclimate Assessment in Copper Bell-Making Artisans: A Call for Occupational Health Measures.

Authors: Sanjay Kotadiya*, Ankit Sheth, Ankit Viramgami

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: The copper bell-making industry is a unique household-based, hereditary craft sustained by small numbers of skilled artisans. Workers face significant heat-related health risks due to tasks being labor-intensive, requiring close furnace proximity and the region's extreme climate.

Objectives: To estimate the workplace thermal microclimate parameters in the copper bell-making handicraft industry, and to determine their compliance with international standards to identify potential occupational heat stress risks.

Methods: We conducted a cross-sectional study in copper bell-making industry of Kutch-Bhuj, Western India, to estimate thermal microclimate using wet bulb globe temperature (WBGT) index with a QUESTemp°36 Heat Stress Monitor. Measurements were taken at three randomly selected households throughout the entire work shift, with the device placed 2-feet above the ground to match the seated work position near the workstation.

Results: Our study reported a mean (±SD) WBGT index of 34.1°C (±1.9°C), exceeding OSHA thresholds for continuous exposure across all work intensities (30°C for light, 27.8°C for moderate, 26.1°C for heavy work). The highest mean WBGT (35.7°C) occurred during midday (11 AM–1 PM), while the lowest (31.7°C) was recorded in the evening session (6–8 PM). ACGIH guidelines recommend 50% work - 50% rest cycles every hour with only light workloads to mitigate heat stress risks under the latter condition.

Conclusions: Copper bell-making industry exposes artisans to extreme heat stress, with WBGT levels surpassing recommended standards. Applying engineering controls, implementing work-rest cycles, and adjusting work hours to relatively cooler periods are essential to mitigate heat-related health risks and ensure worker safety.

Keywords: Copper Bellmaking Artisans, Occupational Heat Stress, WBGT Index, Thermal Microclimate Assessment,

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Abstract ID: ABR119

Title: Decoding Snake Venom Proteome and Metabolomic Changes in Snakebite Patients.

Authors: Heena Vidhani*, Dhirendra Singh

** Gujarat University, Ahmedabad*

Background: A serious but often overlooked worldwide health concern, snakebite envenomation affects rural communities in tropical and subtropical areas. 1.2-5.5 million snakebite envenomation cases are reported each year, leading to more than 1,25,000 fatalities and cases of permanent disability.

Objectives: Proteomic research has shown a wide range of venom constituents, such as metalloproteinases, phospholipases A2, and three-finger toxins, each of which contributes differently to hemostatic, neurotoxic, and cytotoxic effects.

Methods: LC-MS/MS analysis was performed to investigate venom-induced metabolic alterations. The methodology focused on identifying biomarkers associated with oxidative stress, inflammation, and organ dysfunction in snakebite victims. Advanced proteomic tools were employed to quantify significant proteins, enabling detailed analysis of their roles as potential diagnostic and prognostic markers of envenomation severity.

Results: Significant alterations in biomarkers linked to oxidative stress, inflammation, and organ dysfunction, particularly acute kidney injury (AKI) have been found in the metabolic profile of snakebite victims. Beta-2-microglobulin (B2M) and retinol-binding protein 4 (RBP4) are two proteins that have been identified as possible prognostic and diagnostic indicators for the severity of envenomation.

Conclusions: The public health burden of snakebite envenoming will eventually be lessened via the knowledge gathered from these investigations, which will also enhance the efficacy of antivenom and aid in advancing the development of adjunct therapies.

Keywords: metabolomics, proteomics, snakebites

TAKE ME TO THE TABLE OF CONTENTS

Abstract ID: ABR139

Title: Hazardous nature and risk perception of labourer working in the Construction Industry

Authors: Dharma Raj*

** ICMR National Institute of Research in Environmental Health, Bhopal*

Background: The study examines the demographic and socio-economic characteristics of construction workers in Varanasi City, India. It also includes essential information on their health and sanitation practices, shedding light on the living conditions and challenges faced by these workers.

Objectives: The study aims to assess the hazardous nature and risk perception along with social mobility of the workers engaged in construction work.

Methods: The study targeted construction workers in Varanasi using a multi-stage convenience sampling method. A primary survey was conducted at the individual level between June-September 2016 to collect relevant data on their demographic, socio-economic, health-sanitation and hazardous risk perception. Data was summarized using frequencies, percentages, and descriptive statistics. Chi-square test analyzed associations, with bar and line charts used for visualization.

Results: Over half of local workers were injured at the worksite in the past two years, with safety equipment like gloves, dust masks, concrete shoes, and helmets being critically underused. Average numbers of labourer working in field as well as searching jobs have awareness about their safety measures such as nature, environment, health etc.

Conclusions: This study underscores the urgent need to enhance the educational system to improve the socio-economic and working conditions of construction workers. In Varanasi, there is an immediate requirement for skill-training, drinking-water and public-toilets at labor mandis.

Keywords: Construction, Hazardous, Labourer

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Abstract ID: ABR147

Title: Assessing the Impact of Occupation on COVID-19 Infection Rates Across India

Authors: Nikita Birhman*, Gitika Kharkwal, Tanu Anand, Navsin Shaikh, Khangembam Jitenkumar Singh, Prakash Kanti

** Indian Council of Medical Research, New Delhi*

Background: In India, the diverse occupational landscape and socioeconomic disparities intensified the challenges faced by workers. Workers in certain professions, particularly those with frequent interpersonal interactions or limited protective measures, are more vulnerable to exposure.

Objectives: This study investigates the correlation between occupation and COVID-19 infection rates across India, providing insights to inform targeted interventions and policies.

Methods: A cross-sectional observational study was conducted using data retrieved from the Indian Council of Medical Research (ICMR) COVID-19 testing data portal. Contact information for individuals aged >18 years tested for SARS-CoV-2 across four Indian regions was utilized. Data collection involved telephonic interviews. The study was coordinated by ICMR HQ (North and East regions) and ICMR-NIOH (South and West regions).

Results: A total of 28,023 participants were contacted, of whom 7,240 (25.83%) had invalid contact details, and 9,868 (35.22%) were non-responsive. Of the 4,855 respondents (17.32%), 2,150 (44.29%) tested COVID-19 positive. Occupation-wise analysis revealed higher infection rates among frontline healthcare workers (e.g., paramedics: 3.72% positive cases) and essential workers (e.g., restaurant employees: 3.86% positive cases). Vulnerable groups, such as household staff (1.67%), security guards (1.11%), and vegetable sellers (0.60%), also showed notable positivity rates.

Conclusions: The findings underscore significant occupational variations in COVID-19 infection risk, emphasizing the need for targeted occupational health interventions. Enhanced workplace safety protocols, vaccination drives, and public health campaigns tailored to high-risk occupations are crucial for mitigating future outbreaks.

Keywords: COVID Pandemic, infection rates India, occupational health, Vaccination, workplace safety

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Abstract ID: ABR148

Title: High time to address NCDs (diabetes & hypertension) among metal fume exposed workers: observations from cross sectional study

Authors: Vishal Nagose*, Mehul Madia, Shilpa Ingole, Ankit Viramgami

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Workers involved in welding and metal cutting face risks of non-communicable diseases due to workplace factors like noise, heat, fumes, long hours, and stress. Poor diet, low education, and limited healthcare access exacerbate these risks further.

Objectives: To identify prevalence and risk factors associated with diabetes and hypertension among metal fume exposed workers.

Methods: In cross sectional study, upon receipt of informed verbal consent, total 523 workers representing admin, supervisor and worker group were randomly selected and enrolled from the metal scrapping industry. Along with relevant sociodemographic & occupational details, measurement of blood pressure and HBA1C were performed with standard technique. Data was analysed with SPSS 26.0 software.

Results: Study reported prevalence of hypertension and diabetes were 51% and 8%, respectively. Whereas, prevalence of pre-hypertension and pre-diabetic were 34% and 22%, respectively. Study reported significant difference for hypertension and diabetes among supervisor group in comparison to admin and worker group.

Conclusions: Periodic medical check-ups with stringent screening for hypertension and diabetes are essential to detect early diseases and prevent severe outcomes. Employers should implement tailored workplace interventions, engaging workers in participative programs to reduce the risk of non-communicable diseases (NCDs).

Keywords: Metal fume exposure, Hypertension and diabetes, Occupational health risks, Workplace intervention programs

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Abstract ID: ABR149

Title: Occupational exposure to metal fumes and respiratory health effects: A cross sectional study

Authors: Rahul Patel*, Rakshit Shah, Mehul Madia, Ankit Viramgami

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: The inhalation of heavy metal fumes increases the production of free radicals and oxidative stress within the biological system, leading to both local and systemic inflammatory responses. Prolonged exposure among workers may elevate the risk of respiratory diseases.

Objectives: To determine and compare the respiratory health profile among differentially fume exposed work group.

Methods: With cross sectional study design, after obtaining informed written consent, about 200 iron plate cutters and their admin staff were enrolled as exposed and comparison group. Essential occupational and demographic information collected on semi-closed questionnaire. Along with medical history (special focus on respiratory symptoms), spirometry evaluation was performed for each participant. Data was analyzed with SPSS version 26.0.

Results: Nearly, 1/3rd of the exposed group workers were reported one/more respiratory symptoms, whereas the same reported in 1/10th of the control group. Dyspnoea was the most common symptom for both groups. Significant high prevalence (three times) of compromised pulmonary function were observed among exposed group compared to control group (18% v/s 6%, $p < 0.05$). Exposed group exhibited markedly diminished small air conduction parameters (FEF25-75%) compared to the control group ($p < 0.05$)

Conclusions: Occupational exposure to fumes associated with risk of pulmonary compromise. The study warrants an urgent need for workplace intervention to reduce the risk of metal fume exposure and stringent respiratory evaluation during periodic check-up.

Keywords: Metal fumes, Respiratory Health, PFT

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Abstract ID: ABR150

Title: Respirable crystalline silica dust concentrations among agate-stone workers and relationship of work types with latent tuberculosis infection in Khambhat, Gujarat

Authors: Krishna Vaghela, Rutu Asodia*, Mansi Savaliya, Nikhil Kulkarni, Mihir Rupani

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Agate-stone workers face significant health risks from occupational exposure to Respirable crystalline silica (RCS) dust. Previous studies showed high RCS levels in Khambhat, but post-shift from factory to cottage industries, RCS levels remain unassessed, highlighting the need for updated evaluations.

Objectives: Our objective was to estimate RCS levels among agate-stone workers in Khambhat and to determine the relationship between work types with different RCS exposures with latent tuberculosis infection (LTBI).

Methods: We measured total and RCS dust among 107 agate-stone workers using personal air samplers and estimated utilizing KBr and estimated using Fourier Transformer Infrared (FTIR). LTBI was detected using interferon gamma release assay (IGRA). Data for 438 silica dust levels were imputed using Multiple Imputations by Chained Equations. Data was analyzed using ANOVA and logistic regression in SPSS.

Results: Mean (±SD) RCS dust levels among agate-stone workers in Khambhat was 0.155 (±0.321) with highest levels found in cutting (0.359 mg/m^3). ANOVA showed these differences were statistically significant ($p = 0.003$), with post-hoc highlighting higher dust risks in cutting and polishing vs. chipping and drilling activities. Logistic regression revealed those involved in cutting process are four times (95% CI 1.4-9.4) more likely at the odds of LTBI as compared to those drilling, after adjusting for RCS levels.

Conclusions: The RCS levels are higher than the prescribed permissible limit meaning that levels that can lead to silicosis are still persistent among agate-stone workers in Khambhat. Stringent dust control measures are warranted in cutting and polishing of agate stones.

Keywords: Agate workers, Respirable Silica dust, Latent Tuberculosis Infection, Occupational Setting, Silicosis

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Abstract ID: ABR152

Title: An assessment of occupational exposure to bioaerosols in vegetable vendors

Authors: Pankaj Barfal*, Poonam Vyas

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Vegetable vendors are exposed to high concentration of bioaerosols generated from both the vegetable as well as from its waste which poses harmful effects on their respiratory health.

Objectives: The study was aimed to calculate the microbial loads, endotoxin, (1-3)-⊠⊠-D Glucan in dust and its adverse effects on the respiratory health of the workers.

Methods: bioaerosols sampling were analyzed by Andersen six-stage viable sampler and Air samplers for the determination of the microbial load such as bacteria, fungi, organic dust, endotoxin and (1-3)-⊠-D Glucan from different sites of vegetable markets of Ahmedabad as well as compared with those in residential outdoor air. The standardized questionnaire was filled to evaluate worker's health.

Results: The highest microbial load were observed during monsoon season followed by winter season. Gram negative species were dominant bacterial isolates and Aspergillus, Fusarium, Penicillium, Curvularia, Mucor species were dominant fungi reported from vegetable markets. Dust concentration calculated were ranged from 1.18 to 5.21 mg/m3. Endotoxin and (1-3)-⊠⊠-D Glucan were reported higher in such environment. The respiratory health morbidities like cough, phlegm, dyspnea, allergy were found higher in exposed workers compared to residential control.

Conclusions: The vendors are exposed to elevated level of bioaerosols. Periodic monitoring of the Pulmonary Lung Function (PFT) test is required for respiratory health assessment of the vegetable vendors. Corrective measures should be taken to prevent and reduce environmental bioaerosol exposure.

Keywords: Vegetable vendors, Bioaerosols, Endotoxin, Dust,

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Abstract ID: ABR153

Title: Airborne Aflatoxins in Oilseed Mills: Occupational Health Risks and Biotechnological Strategies for Sustainable Mitigation

Authors: Poonam Alok Vyas*, Pankaj Barfal, Mahesh Chandra Sahu

** ICMR National Institute of Occupational Health, Ahmedabad*

Background: Aflatoxins produced by Aspergillus flavus and Aspergillus parasiticus is a Group 1 carcinogen, hepatotoxic, immunosuppressive, and pose severe occupational health risks. Despite the known hazards, there is limited understanding of the extent of exposure, health implications, and effective mitigation strategies.

Objectives: This study addresses these gaps by investigating aflatoxin exposure in groundnut and cotton oilseed mills in Gujarat, India, while proposing innovative biotechnological solutions to mitigate risks.

Methods: Air sampling, using Andersen Six-Stage viable sampler and Settle plates methods were conducted across various departments of groundnut and cotton oilseed mills to determine fungal contamination. Dust samples were analyzed for total aflatoxin concentrations using Enzyme-Linked Immunosorbent Assay (ELISA), while urinary AFM1, a biomarker of aflatoxin exposure, was measured in workers using High-Performance Liquid Chromatography (HPLC).

Results: The study revealed that processing departments were hotspots for fungal contamination, with Aspergillus flavus as the dominant species. Dust samples from environment showed alarmingly high aflatoxin concentrations. Exposed workers exhibited significantly elevated urinary AFM1 levels underscoring the critical need for intervention. To address challenges, a comprehensive strategy combining biotechnological innovations and sustainable practices required. The development of genetically modified, aflatoxin-resistant crops could reduce contamination. Biosensors enabling real-time aflatoxin detection and microbial bioremediation using toxin-degrading organisms offer additional promising solutions..

Conclusions: Findings stress the importance of integrating advanced biotechnological approaches with occupational health measures as well as stricter safety regulations and sustainable practices to combat aflatoxin contamination in oilseed mills. This generate safer industrial environments for managing this persistent mycotoxin threat.

Keywords: Aflatoxins, Aspergillus, Oilseed mills, Biotechnology, Bioremediation

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Abstract ID: ABR161

Title: Monitoring occupational exposure to airborne respiratory viruses in a healthcare setting

Authors: William B. Vass, Amin Shirkhani, Mohammad Washeem, Sripriya Nannu Shankar*, Yuetong Zhang, Tracey Moquin

**University of Cincinnati, Ohio*

Background: Healthcare workers (HCWs) can be exposed to pathogens when they care for patients. It is challenging to address the infection from exposure to airborne viruses when there is little to no information on their transmission through the air.

Objectives: Monitor exposure to airborne viruses within a clinic, test the performance of different types of air samplers and assess work-specific exposures through a reliable surrogate method of air sampling.

Methods: Samples were collected using a stationary and 7 personal air samplers, from two clinics - a primary care clinic (labelled as "Blue" clinic) and the other dedicated to respiratory illness treatment ("Red" clinic). Reverse transcription quantitative polymerase chain reaction (RT-qPCR), conventional RT-PCR followed by gel electrophoresis; Sofia® 2 Immunoassay Analyzer and culturing were followed based on the sample type (environmental/clinical).

Results: The detectability of virus in air samples was significantly correlated with the detectability of virus in clinical samples ($p=0.02$). The positivity rates were 15.6% and 19.2% in the Red and Blue clinics, respectively. Samples were most frequently positive at stationary samplers located in reception areas (60%), followed by waiting areas (16%) and exam rooms (9.1%). 12.5% of mobile samplers collected detectable viruses. The quantities of viruses detected in samples were different by job category and the air sampler used.

Conclusions: This study illustrated the importance of using personal air samplers in occupational hazard assessment plans and sampling for full shifts or workdays to avoid potential underestimations of risk from using only stationary samplers or shorter sampling times.

Keywords: Environmental surveillance, Personal sampling, Bioaerosols, Infectious aerosols, Influenza

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Abstract ID: ABR162

Title: Occupational pesticides exposure and breast cancer risk in agricultural workers

Authors: Krithiga Shridhar*, Gurpreet Singh, Neil Pearce, Sandeep Singh, Jarnail Singh Thakur, Preet Kaur Dhillon

**Ashoka University, Sonipat*

Background: A lower risk of breast cancer in female agricultural workers due to reproductive, lifestyle and socioeconomic factors, can pose methodological challenges in assessing pesticides-associated risks in female agricultural workers, when compared to women in general population.

Objectives: To compare breast cancer risk factors between 'women in general population' and 'women in farming'; and to explore if there is an added risk associated with occupational exposures to pesticides.

Methods: A multi-centre case-control study was conducted in the North Indian regions of Punjab and Haryana. Eligible cases (N=400) were women aged 30-69years, with newly diagnosed breast cancer from hospitals or population-based cancer registries. Controls (hospital-/population-based, N=354) were frequency-matched to cases on age, urban/rural location and region. Information about occupation, lifestyle, reproductive, and socio-demographic factors was collected using structured interviewer-administered questionnaires.

Results: Study participants included 'women in general population' (n=479), 'women with spouses in farming' (n=153), and 'women in farming' (n=122). Compared to the rest 'women in farming' were older, less educated, breast-fed less, more vegetarian, with lower BMI, younger age-at-first pregnancy, and less comorbidities. They had insignificant lower breast cancer risk than 'women in general population' (odds-ratio(OR)(95%confidence-intervals(CI)):0.76(0.42-1.36)). 'Women in farming' with pesticides exposures (n=56) tended to show an increased risk (OR(95%CI):1.24(0.59-2.61)) than 'women with spouses in farming' without self-occupational pesticides exposure.

Conclusions: Internal comparisons within female agricultural workers by intensity of pesticides exposures and matching controls on established risk factors (example, age-at-first pregnancy/childbirth or parity) may be utilized to evaluate the added breast cancer risk due to pesticides exposure in agricultural workers.

Keywords: breast cancer, female agricultural workers, occupational pesticides exposure, case control study, India

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ORAL SESSION 3

Theme: Occupational Toxins, Exposures, and Health Implications
Date: February 27, 2025**; Time:** 11:30 AM - 1:30 PM

Abstract ID: ABR024
Title: Occupational Silicosis in Rajasthan's Mining Districts: An interdisciplinary Analysis of Health Outcomes and Socio-Economic Impacts
Authors: Priya Modi*
**Vivekananda Global University, Jaipur*
Background: Silicosis disease caused by inhaling silica dust, plagues Rajasthan's mining communities. This preventable occupational hazard leads to premature deaths, devastating families economically and socially. Despite its severity, inadequate safety measures and healthcare infrastructure perpetuate the crisis in this state
Objectives: To investigate silicosis among mining workers, assess: disease prevalence, mining unit safety, worker health, socioeconomic factors, awareness, and policy effectiveness, considering age, dust control, comorbidities, and healthcare access.
Methods: This research employs a mixed-methods approach, combining quantitative and qualitative methodologies to provide a comprehensive understanding of the silicosis crisis in Rajasthan's mining communities. Study components: Quantitative (surveys, medical exams, record analysis) and Qualitative (in-depth interviews, focus groups, key informant interviews)
Results: The study revealed that 18.2% of mining workers had silicosis (95% CI: 14.5–22.1), with 70% of units lacking adequate dust control measures. Respiratory issues were reported by 40% of workers, and 25% had comorbid tuberculosis. On average, lung function declined by 10.5% (SD: 5.2). Qualitative findings highlighted delayed diagnoses, inadequate healthcare access, limited awareness among workers and communities, and insufficient training and resources for healthcare providers, underscoring the multifaceted challenges of addressing silicosis effectively.
Conclusions: The study highlights the alarming prevalence of silicosis among mining workers, emphasizing the need for improved safety measures, healthcare access and awareness. Effective policy implementation and support systems are crucial to mitigate this occupational health hazard.

Keywords: silicosis, mining, safety, healthcare access, awareness

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Abstract ID: ABR030

Title: An Epidemiological Study on Health Status and Perception on Mining in Pekb Coal Block of Surguja, Chhattisgarh

Authors: Roshan Kumar Agrawal*, Sofia Noor, Shailendra Agrawal

**Late Shri Lakhiram Agrawal Memorial Government Medical College, Raigarh*

Background: Coal mining has a direct negative impact on health through environmental pollution. It is responsible for ecological imbalance and affects the health of living beings.

Objectives: To have a baseline Knowledge about the Socioeconomic and health condition in the study area. To know the Perception of the villagers about mining.

Methods: Baseline Community based cross-sectional study conducted in the 14 affected villages within 10kms radius of PEKB Coal block for a period from 6 months. The study subjects included 940 adult populations. Data was collected through a Pretested, Predesigned, Semi-structured questionnaire, measurement tape, weighting scale, Glucometer, Hemoglobinometer, BP apparatus, spirometer.

Results: 43.61% people had multiple types of respiratory problems. 74% males were having haemoglobin less than 13.8 gm% and 323 females 71% were having haemoglobin less than 12.1gm%. 67.97% participants had normal blood glucose levels, 18.29% participants were pre-diabetic while 3% participants were diabetic 49.25%. 32.98% were prehypertensive, whereas 12.98% and 4.79% where found to be hypertensive stage I & II respectively. 77.87% participants had neither positive nor negative perception may be due to low level of literacy.

Conclusions: The mine workers should have a through pre-placemental examination and periodic examination at 6 monthly intervals. Periodic Examination for General population at yearly interval should be must.

Keywords: Mining, Determinants of health, Perception, ,

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Abstract ID: ABR067

Title: Ana-12 Mitigates Testicular Toxicity By Modulating Bdnf-Trk-B Signaling in Pre-Clinical Rodent Models of Passive Cigarette Smoking

Authors: Deepsi Rathore*, Vishakha Shrimali, Nibedita Naha

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Exposure to passive cigarette smoking differentially affects several organ systems like testis, and neurotransmitter modulators BDNF, dopamine, etc. However, lack of knowledge on 'testicular toxicity and brain-testis axis regulation' emphasizes the needs of pre-clinical study that mimicking real-life smoking scenario.

Objectives: The aim of the study is to explore whether ANA-12 as a potential therapeutic agent, restores the testicular function with respect to BDNF-Trk-β signaling in passive smoke exposed pre-clinical model.

Methods: Adult male Wistar rats were exposed to passive cigarette smoke through a whole-body inhalation chamber with pre-treatment of ANA-12 for 4- and 12-weeks period, where the animal model may closely resemble the human smoking situation. Post-exposure/treatment, the rats were euthanatized for comet assay, redox homeostasis, testicular protein/gene expression, sperm count, etc., and results were compared with the untreated healthy controls.

Results: ANA-12, selective small-molecule Trk-β antagonist, significantly restores serum redox potential and epididymal sperm count to baselines with lowering of DNA damage by comet assay as compared to the passive cigarette smoke-exposed groups, irrespective of the duration of exposure. Further, ANA-12 counteracts downregulation of gene (MOBP, GJC-2) expressions, as well as upregulation of proteins (dopamine, BDNF, Trk-β) in the testis of the passive smoking groups than the age/sex-matched healthy untreated controls. ANA-12 treatment also downregulates nicotine acetylcholine receptors in the testis.

Conclusions: This first-ever study provides an insight into neuroprotective role of ANA-12 in passive cigarette smoke-induced testicular toxicity by regulating local neuro-transmitters/modulators, and genes for myelination/connexin-based cell-to-cell communication, which could underpin 'brain-testis axis' as new therapeutic target, particularly for passive smoking.

Keywords: Passive cigarette smoking, ANA 12, Preclinical testicular toxicity, Neurotransmitters neuromodulators, Myelination gap junction

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Abstract ID: ABR071

Title: Targeting Nicotinic Acetylcholine Receptors with Mecamylamine Alleviates Developmental and Neurobehavioral Deficits in Offsprings of Pre-Clinical Gestational Nicotine Exposure

Authors: Vishakha Shrimali*, Deepsi Rathore, Nibedita Naha

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Passive cigarette smoking affects pregnancy trimester and causes developmental and neurobehavioral abnormalities in offspring. However, lack of knowledge on 'nicotine acetylcholine receptor (nAChR) regulation', emphasizes the needs of pre-clinical gestational nicotine exposure and offspring's brain behaviors with/without nAChR blocker, mecamylamine.

Objectives: Explore mecamylamine's role on developmental and neurobehavioral outcomes of F1 pups at postnatal days (PNDs) of gestational nicotine exposure through passive cigarette smoking, where nicotine doses mimic real-life smoking situations.

Methods: Wistar rats (2:1=female-to-male) were breed, and dams were separated on gestational day 1 (GD1), followed by passive cigarette smoke through a whole-body inhalation chamber from GD5,11 and 18, till parturition. Mecamylamine was given every 5th day of exposure. Developmental and neurobehavioral parameters of pups were studied from PND1–30. Post-euthanasia, pups' brains were analysed for DNA damage and redox homeostasis.

Results: Mecamylamine shows significant recovery in developmental parameters like pinna detachment, incisor eruption, eyes opening, fur development, and ear unfolding upon gestational nicotine exposure, compared to age-/sex-matched healthy control pups. Mecamylamine improves motor- and cognitive-behaviors (swimming ontology), neuromuscular strength (horizontal bar, hand grip), and reflexes (cliff avoidance, negative geotaxis) in F1 pups of passive cigarette smoking groups at GD5 and GD11. Mecamylamine treatment also reduces DNA damage and rebalances redox potential towards baselines of gestational nicotine exposure groups, compared to controls.

Conclusions: Thus, mecamylamine potentially alleviates developmental delays, cognitive deficits, motor-impairments of F1 pups through restoration of redox homeostasis and counteracting of DNA damage upon gestational nicotine exposure. This first-ever study targeting nAChR, may have significant promise in passive gestational smoking interventions.

Keywords: Gestational nicotine exposure, Passive cigarette smoking, Nicotine acetylcholine receptor, Mecamylamine, Developmental neurobehavioral deficits

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Abstract ID: ABR069

Title: Recovery of Zinc From Flue Gas Cleaning Residue, Waste Management and Human Health

Authors: P K Selvi*, P Prakash, P Saranya, J Chandra Babu, Bharat K Sharma
**Central Pollution Control Board, Bengaluru*

Background: Hazardous Waste i.e Flue Gas Cleaning Residue generated from Bag Filter attached to Induction Furnace of Scrap Steel melting is utilized to recover zinc. Waste management has positive impact on human health arising from mining to attain sustainable development goals.

Objectives: Assessment of emission and health impact reduction by utilizing Flue Gas Cleaning Residue in recovering Zinc under Rule 9 of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

Methods: Hydrometallurgical process was adopted for zinc recovery from waste. Ambient Monitoring (waste storage, combustion, office roof) for Particulate Matter, Ammonia and Fugitive emission monitoring (leaching area) for PM10, Ammonia, Lead, Nickel, Cd, ZnO were carried out.

Source emission/stack monitoring in electrolysis section, analysis of Process waste water (TDS, heavy metals), APCD dust, Filter Residues and Zinc strip/sheet recovered were done.

Results: Leaching solution prepared by adding Flue gas cleaning residue (1000 Kg) and Hydrogen peroxide. 10 batches required to run electrolysis (150 – 160 m3).

Fugitive emissions were (i) 87.7 µg/m3 - mixing tank and (ii) 57.4 µg/m3 - electrolysis. Stack monitoring reveal (i) PM10 - 43.2 µg/m3 at leaching Tank & Electrolytic Unit, (ii) 104.9 µg/m3 at combustion chamber. Ambient monitoring shows waste utilization has no impact on PM. Process wastewater (spent electrolyte) reveal no presence of heavy metals.

Conclusions: About 1250 Kg of Flue gas cleaning residue yields 500 Kg of Zinc using hydrometallurgy. Recycle of Bleed,pump sealing water and spent electrolyte ensures zero discharge. Fume suction hood system at leaching, electrolysis and neutralization avoids fugitives at work environment.

Keywords: Zinc, Hazardous Waste Management, Human Health, Hydrometallurgy, Sustainable Development Goals

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Abstract ID: ABR075

Title: Hypersensitivity Pneumonitis in Construction Workers Facing High Dust Exposure in Dima Hasao District of Assam

Authors: Upasana Jayswal*

**Government of Gujarat, Godhara*

Background: Study is based on construction workers of Dima Hasao district. Workers were screened for Hypersensitivity Pneumonitis and followed up post intervention of Reusable and/or Disposable dust masks. Symptomatic relief and radiographic findings were correlated.

Objectives: Study found risk factors & prevalence of Hypersensitivity Pneumonitis, followed up radiographic findings and symptomatic changes post intervention. Awareness campaign and distribution of dust masks was carried out for workers.

Methods: Study screened 324 workers out of which 28 patients were found to meet the criteria of Hypersensitivity Pneumonitis, further radiological tests including X-Ray and CT scans were done for documentation. Specialist referral and Dust Mask was provided to the individual and follow-up was done for symptomatic improvement.

Results: Demographic and occupational pre-disposition was correlated with the prevalence of the disorder and the prognosis. For mild cases Dust mask caused clinical resolution in 40% cases after 2 months and 94% cases had minimal symptoms after 5 months. On the contrary 60% progressive cases had discomfort and palpitations after using any kind of dust mask (disposable/reusable). Specialist consultation and basic physiotherapy and breathing exercises were found to be helpful and associated with giving psychological reassurance to the patient.

Conclusions: Hypersensitivity Pneumonitis is more prevalent in workers and associated with significant morbidity. It can be mitigated by dust masks for mild cases and holistic treatment for progressive cases. Awareness campaign and mask distribution helped in spreading awareness to workers.

Keywords: Vulnerable Populations, Hypersensitivity pneumonitis, Workers Health, Respiratory Health, Dust Masks

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Abstract ID: ABR080

Title: Pesticide Exposure and Chronic Kidney Disease of Undetermined Aetiology (Ckdu) among People Living on Agriculture in the State of Himachal Pradesh

Authors: Anupam Parashar*, Sanjay Vikrant, Ajay Jaryal, Anupama Dhiman
**All India Institute of Medical Sciences, Bilaspur*

Background: Chronic Kidney Disease of undetermined etiology (CKDu) is a rising health concern in India. In Himachal Pradesh, widespread pesticide use in agriculture may play a significant role, warranting an investigation into its potential association with CKDu among farming communities.

Objectives: Primary Objective: To assess agrochemical use as a potential cause of CKDu.

Secondary Objective: To evaluate CKDu's association with occupation, PPE usage, and drinking water sources.

Methods: A case-control study enrolled 100 CKDu patients and 101 age- and sex-matched healthy controls without diabetes or hypertension. Acetylcholine esterase activity was used as a biomarker for organophosphorus pesticide exposure. Odds ratios, 95% confidence intervals, and p-values assessed the association between pesticide exposure and CKDu risk.

Results: A pre-tested, self-designed questionnaire enrolled 100 CKDu cases and 101 controls. Fertilizer usage and pesticide handling practices were common in both groups, showing no significant differences. Groundwater use was reported in 26% of cases and 23.8% of controls, with most relying on surface water. Farming and pesticide exposure were prevalent, and further analysis is ongoing to explore the association.

Conclusions: Farming and pesticide exposure were common in both groups. Large-scale studies in Himachal Pradesh's apple belt and advanced tests like organochlorine pesticide analysis using GC-MS/LC-MS are needed better to understand the link between pesticide use and CKDu.

Keywords: Chronic kidney disease, CKDu, pesticide use, agriculture, case control study

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Abstract ID: ABR089

Title: Microplastics in Food From Climate-Driven Pollution and their Neuro-Behaviour Responses in Caenorhabditis Elegans

Authors: Prashant Singh*, Rakhi Agarwal

**National Forensic Sciences University, Delhi*

Background: Plastics, originally designed to simplify life, have become an environmental and human health threat. Due to high use, poor waste management, and degradation, they break into microplastics, which are found prevalently in soil, air, and, water.

Objectives: The study aims to investigate microplastic contamination in red chili powder as literatures of microplastic contamination in food are scanty. Study also aims to evaluate neuro-behavioural effects in Caenorhabditis elegans

Methods: In order to understand microplastic contamination in food commodities, red chili powder samples that are a crucial part of every household meal were monitored via physical morphometric characterization for microplastic contamination and further toxicity of microplastics using a standard was evaluated using neuro-behavioural changes like locomotion, feeding, sensory responses, and growth in Caenorhabditis elegans.

Results: Results highlighted the abundance of microplastic contamination in red chili samples. Further, toxicity study revealed alterations in the feeding, locomotion, sensation and growth of the exposed animals.

Conclusions: Red chili powder is contaminated with microplastics and at moderate concentration, it causes neuro-behaviour toxicity. Further studies are required for better understanding towards the risk and strict policies are needed to reduce microplastic pollution and to protect food.

Keywords: Microplastics, Climate Driven Pollution, Environmental Health, Neurotoxicity, Food Contamination

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Abstract ID: ABR102

Title: Identification of Oxidative Stress Marker Proteins in Lead-Exposed Battery Recyclers using Mass Spectrometry

Authors: Kartikey Matte*, Shubhangi Pingle, Manjula Kr, Rajani Tumane

**ICMR NIOH Regional Occupational Health Centre (S), Bengaluru*

Background: Lead exposure poses significant occupational hazards, especially in battery recycling industries, where oxidative stress causes lipid peroxidation, protein oxidation, DNA damage, mitochondrial dysfunction, and inflammation, necessitating early biomarker identification to safeguard worker health and improve occupational safety standards.

Objectives: This study identifies oxidative stress marker proteins in lead-exposed individuals, aiming to understand lead's biological impact and develop targeted strategies to reduce health risks in battery recycling workers.

Methods: Blood samples were collected from lead-exposed individuals, and blood lead levels were estimated using the Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) method. Serum was separated from the blood samples and subjected to One-Dimensional SDS-PAGE. Protein bands of interest were excised and analyzed using mass spectrometry for accurate detection and quantification of specific proteins.

Results: Preliminary findings indicate the presence of distinct protein markers like STOX1_HUMAN and KEAP1_HUMAN in the serum of lead-exposed individuals. These proteins could serve as early indicators of oxidative damage, providing insights into the biological effects of lead exposure.

Conclusions: This research emphasizes monitoring oxidative stress in workplaces and surroundings with high lead exposure risks. Identifying oxidative stress marker proteins enables targeted interventions, safeguarding workers' health and enhancing occupational safety in such environments.

Keywords: lead, oxidative stress, biomarkers, mass spectrometry

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Abstract ID: ABR117

Title: Development of Predictive Markers for the Skin Sensitization Induced by Photoexcited Cinnamaldehyde Via Omics Approaches

Authors: Ashish Dwivedi, Sunil Kumar Patel*, Diksha Pathania, Apeksha Vikram, Prakriti Gaur, Medha Bajpai, Ratan Singh Ray

**Indian Institute of Toxicology Research, Lucknow*

Background: Skin sensitization exerts a significant burden on society by cosmetic fragrances like cinnamaldehyde, which exhibits strong UVB absorption, changes from trans to cis enhances sensitization potential. These excited sensitizers involve activation and modification of protein cascades, leading to skin sensitization.

Objectives: Skin sensitization in real-time scenario involves cellular interaction via proteomic signaling, interaction and study is designed to explore the proteomic markers induced by photosensitized cinnamaldehyde using the OMICS approaches.

Methods: We used proteomics by HRMS and metabolomics by NMR techniques to explore the protein markers involved in allergenicity and molecular events occurring by skin sensitizers (cinnamaldehyde) under ambient UVB exposure.

Results: Photoactivated cinnamaldehyde sensitizes HaCaT cells, releases signaling molecules that activate THP-1 in the coculture, expressing the CD86 marker. Further, Keratinocytes release metabolites promoting THP-1 cell activation analyzed in the medium by NMR. Later, proteomics by HRMS reveals that CA induces the protein markers involved in dendritic cell activation, ultimately leading to T-cell activation. Moreover, our findings showed that CA sensitizes the HaCaT cells and activates THP-1 cells via the upregulation of proteins involved in skin sensitization cascade.

Conclusions: Insights into prediction marker identification via proteomics and metabolomics studies are crucial for managing triggers of skin sensitization, allergic diseases caused by fragrance and concurrent exposure to environmental UV irradiation.

Keywords: Skin sensitization, HRMS, Cinnamaldehyde, Proteomics, Metabolomics

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Abstract ID: ABR120

Title: Study of Levels of Pro-inflammatory Cytokines in Sputum of Cotton Dust Exposed Workers

Authors: Mugdha Tiwari*, Sukhdev Mishra

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Occupational lung diseases may arise from a vast array of exposures. Textile mill workers are continuously exposed to cotton dust, a complex bio-aerosol capable of initiating an inflammatory response by releasing inflammatory cytokines, which can reflect in airway fluids.

Objectives: To estimate pro-inflammatory cytokine levels in the sputum of cotton dust-exposed workers which can provide information about cotton dust-related lung pathogenesis patterns and can serve as biomarkers of airway inflammation.

Methods: This cross-sectional study was done on cotton dust-exposed workers of the ginning mill. Data on workers' occupational and lifestyle information was collected using a standard questionnaire. For sputum collection sputum induction, and for processing the 'plug method' were used. Spirometry was performed to observe the pulmonary function of workers. Eight Pro-inflammatory cytokines were measured using Micro-sphere-based Luminex xMAP technology.

Results: Total of 320 workers participated in the study. Normal spirometry profile was observed in 91.25% of subjects, whereas ventilatory impairments were observed in 8.83% of workers. In all exposed subjects, levels of all inflammatory cytokines were observed high as compared to control subjects. Levels of IL-1 β and IL-8 levels were observed significantly high in exposed workers. A significant difference was observed in levels of IL-10 and IL-6 in the sputum of grade 2 byssinosis subjects.

Conclusions: Ventilatory impairments and elevated levels of pro-inflammatory cytokine were observed in cotton dust-exposed workers of ginning mills. A significant difference was observed in levels of IL-10 and IL-6 cytokines in the sputum of grade 2 byssinosis subjects.

Keywords: Occupational lung diseases, airway inflammation, Cotton dust, Proinflammatory cytokine, Biomarkers

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Abstract ID: ABR127

Title: Evaluating Agrochemical Residues in Agriculturists' Biological Samples and Correlating with Potential Health Risks

Authors: Nayanabai Shabadi*, Basavanagowdappa H, Rajesh Kumar T

**JSS Medical College, Mysuru*

Background: Agricultural workers are exposed to various chemical hazards, such as pesticides, fertilizers, and other agrochemicals, which can significantly impact their health. Understanding these risks is essential for developing effective preventive strategies and improving occupational health standards.

Objectives: 1. To investigate pesticide residues in the biological samples like blood and urine of agriculturists; 2. To examine the association between the health status of agricultural workers and agrochemical exposure.

Methods: A cross-sectional survey of 415 agriculturists collected data on demographics, health, agricultural practices, and agrochemical use through questionnaires and exams. Blood and urine samples were tested for residues using Liquid Chromatography. Data were analyzed with SPSS, presenting discrete data as frequencies/percentages and continuous data as means/standard deviations. Statistical associations between health status and chemical residues were assessed

Results: Most(31%) were aged 35-45 years. The mean RBS level was 120.31 ± 23.44 mg/dL, and 42.2% had BMI > 25. Among 415 blood samples, 89 (25.8%) tested positive for agrochemicals: 51 (14.8%) for Hexaconazole and 40 (11.6%) for Chlorpyrifos. 415 urine samples 15 (2.6%) showed Chlorpyrifos and 18(3.5%) Hexaconazole. 58 were diabetics, 40 hypertensive, and 10 thyroid disorders. However there was no statistical significance between chemical residues and disease. 36% of participants did not use personal protective equipment

Conclusions: Agrochemical residues were found in the blood and urine of many agricultural workers, with a notable prevalence of non-communicable diseases. Regular monitoring of chemical exposure and preventive measures are crucial to improving occupational health in agriculture

Keywords: Agrochemicals, Pesticide residues, Agriculture workers, Health status, Occupational Health

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ORAL SESSION 4

Theme: Climate-Related Disease Burden: Vector-Borne, Infectious, and Chronic Conditions

Date: February 27, 2025**; Time:** 11:30 AM - 1:30 PM

Abstract ID: ABR066

Title: Impact of Climate Change on Dengue Vector Aedes Aegypti Biology and Distribution in Central India: An Empirical, Surveillance and Modelling Study.

Authors: Devojit Kumar Sarma*, Gaurav Sharma, Deepanker Das, Manoj Kumar, Samradhi Singh, Rajnarayan R Tiwari, Pradyumna Kumar Mishra

**ICMR National Institute for Research in Environmental Health, Bhopal*

Background: Climate change significantly impact vector-borne diseases, particularly affecting vector competencies and distribution. However, there remains limited understanding of how climatic factors, especially temperature, influence the development and survival of dengue vector Aedes aegypti, and subsequently its distribution in Central India.

Objectives: To evaluate the effects of varying temperature regimes on the biology of Ae. aegypti, and to model its future fine-scale distribution under different climate change scenarios in Bhopal, Madhya Pradesh.

Methods: Ae. aegypti eggs from F3 generation were reared under controlled temperature regimes ranging from 10°C to 40°C. Key life history parameters, including development time, survival rate, fecundity, and net reproductive rate, were estimated. Furthermore, the current and projected distribution of Ae. aegypti in Bhopal city under various climate change scenarios (RCP 2.6, RCP 4.5, and RCP 8.5) was modelled.

Results: Temperature significantly influenced larval development durations, with higher temperatures shortening development times. Optimal survival rates were observed at 26°C and 32°C, with no significant difference in female survival between these temperatures. However, significant differences were found in female life expectancy ($p=0.01$) and net reproductive rates ($p=0.03$). Currently, Ae. aegypti is predominantly concentrated in the central city area, but projections suggest its potential spread across the entire city by 2040, increasing the dengue risk in the region.

Conclusions: Our findings highlight the importance of considering temperature-dependent changes in vector biology to predict and manage dengue outbreaks amid climate change. Understanding the complex interactions between climate, vector ecology, and disease transmission is crucial for developing effective vector control strategies.

Keywords: Climate change, Dengue, Aedes aegypti, Temperature, distribution

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Abstract ID: ABR077

Title: The Impact of Climatic and Socioeconomic Factors on Vector-Borne Diseases (Dengue and Chikungunya) Transmission: Insight From a Rural Cohort of Tigiria Block of Cuttack District, Odisha.

Authors: Prachi Prava Panda*, Debasini Parida, Subrata Kumar Palo, Srikanta Kanungo, Jaya Singh Kshatri, Sanghamitra Pati

**ICMR Regional Medical Research Centre, Bhubhaneswar*

Background: Tropical and sub-tropical regions mostly provide favorable conditions for the spread of vector-borne diseases (VBD) especially those transmitted by mosquito vectors. Mosquito-borne diseases, such as dengue and chikungunya continue to be a significant public health concern in rural Odisha.

Objectives: GIS-based risk zone mapping for vector-borne diseases in rural Tigiria.

To identify the high-risk seasons and vulnerable populations through AFI surveillance and analyzing socioeconomic and environmental factors influencing dengue transmission.

Methods: Populations in high-risk mosquito breeding areas will be identified using two approaches: dengue and chikungunya incidence from AFI surveillance and satellite imagery analysis of environmental and climatic factors like NDVI, LST, NDMI, NDWI, rainfall, and humidity.

The association between dengue incidence and various socioeconomic and environmental factors will be analyzed using a negative binomial regression model, in Stata version 14.

Results: Satellite and climatic data from 2018–2021 were analyzed to identify mosquito breeding sites in Cuttack district, classifying 11,730.07 ha as high-risk, 28,053.99 ha as medium-risk, and 12,669.69 ha as low-risk zones. A 12-month AFI surveillance has been conducted in the Tigiria block, with a sample size of 755, showing a 47% incidence of dengue and chikungunya. Higher dengue rates are associated with lower socioeconomic status, households with 3–4 members, the presence of domestic animals, and poor drinking water access.

Conclusions: This study highlights a strong association between dengue incidence rates and socioeconomic status across households in Tigiria block. By monitoring seasonal changes, the findings offer valuable insights to inform policy and direct dengue prevention efforts to areas where most needed.

Keywords: Vector borne disease, Geographical information system, NDVI, climatic factor, LST

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Abstract ID: ABR079

Title: Exploring Health Vulnerabilities in a Coastal Zone in Kerala: A Case Study of Purakkad in Alappuzha District.

Authors: Sethu Krishnan R*, Kesavan Rajasekharan Nayar

**Kerala University Of Health Sciences, Thiruvananthapuram*

Background: Coast plays a crucial role in promoting ecological sustainability. Sea erosion and disappearance of large areas of land requires vigil, monitoring and assessment. flooding,storms, sea level rise, lack of infrastructure and adaptive capacity create physical, socio-economic and health vulnerabilities.

Objectives: Identify different types of vulnerabilities faced by the coastal population.

To Document the challenges faced by the community focusing on livelihood and health.

Understand the coping mechanisms of the community.

Methods: Qualitative design with in-depth interviews of participants aged 30 years and above who were selected from 2 wards out of 18 till data saturation. who lives within 50 meters from shoreline. we also conducted 5 key informant interviews with panchayath leaders and health authorities and 2 focus group discussion among the fishermen who were working in Purakkad harbour.

Results: Found vulnerabilities arising out of housing deprivation, flying soil debris, proliferating vectors, increase in number of cancer, heart and stroke patients, damp and mouldy housing, external invasive waste disposal & rodent proliferation, poor work environment, poor ground water quality, unreliable pipeline supply, alcohol and drug use along coastal Groyne, Flooding, sea level rise, coastal erosion, creating stress affecting mental and physical wellbeing.

Conclusions: Coastal population face multifaceted vulnerabilities, including environmental, socio-economic, political and cultural challenges. Gender aswell found to be an important factor. These intersecting factors exacerbate health risks, economic instability and social inequalities, highlighting the need for a gender-based comprehensive solutions.

Keywords: Coastal population, Health vulnerabilities, Risks, Comprehensive solution,

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Abstract ID: ABR083

Title: Overall Cardiovascular Disease Burden Attributable to Temperature Change in India: Explorative Study on Climate Change Challenges During Previous Decade

Authors: Soundarya Soundararajan*, Bhavanishankara Bagepally, Rakesh Balachandar, Jhalak Dhingra, Nimitha Mohan

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Climate change, particularly the rise in global temperatures, has significantly increased the burden of cardiovascular disease (CVD).

Objectives: To examine the relationship within the context of India's diverse climate conditions, we investigated the CVD burden attributable to temperature from 2011 to 2019.

Methods: ERA5 temperature data for Indian states (average, median, mode, minimum, maximum, and variation) was analyzed alongside CVD burden—disability-adjusted life years (DALY), years of life lost (YLL), and years lived with disability (YLD) per 100,000 population sourced from GBD study. Poisson panel regressions examined the relation between temperature percentiles (2.5th and 97.5th) and CVD burden, yielding incidence rate ratios (IRRs).

Results: A unit increase in the daily average temperature values increased the DALY, YLD and YLL by ~2%. The 97.5th percentile consistently showed strong associations across all burden indices studied.

Conclusions: These findings reinforce existing research and underscore the impact of temperature variations on the CVD burden, highlighting the need for public health interventions to mitigate the effects of temperature on cardiovascular health.

Keywords: Climate change, Cardiovascular disease burden, Temperature variations, ERA5 temperature data, India

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Abstract ID: ABR084

Title: Global Research Trend on Impact of Climate Change on Vector-Borne Disease Dynamics

Authors: Yash Paul Sharma*, Sanjay Kumar Chaturvedi, Krishna Pandey, Rakesh Bihari Verma

**ICMR Rajendra Memorial Research Institute of Medical Sciences, Patna*

Background: Climate change alters vector-borne disease dynamics, affecting habitats, reproduction, and transmission. Understanding global research trends through citation network analysis highlights collaboration networks, thematic gaps, and targeted interventions to address the challenges posed by climate-sensitive diseases effectively.

Objectives: This study aims to map global research trends and collaborations on the impact of climate change on vector-borne disease dynamics by identifying key themes, leading authors and their collaborations.

Methods: Bibliometric data of more than 3 decades from Web of Science was analyzed using VOSviewer software. Citation network analysis (CNA) included mapping co-authorship networks, keyword co-occurrence, and thematic clustering. Metrics such as article frequency, citation counts, and the h-index were assessed.

Results: This study employs CNA to examine 906 articles with 312017 citations, h index of 87, contributed by 3744 authors from 121 countries. to understand the global research landscape and identify gaps in addressing climate-driven VBD dynamics. Research focus has intensified since 2010, reflecting growing global awareness. However, studies on the socioeconomic impacts of VBDs and specific regional vulnerabilities remain limited. Influential publications driving policy discussions were concentrated in high-income countries, leaving gaps in addressing challenges in low-resource settings.

Conclusions: Citation network analysis highlights growing research on climate change and vector-borne diseases but reveals gaps in addressing socio-economic vulnerabilities. Prioritizing interdisciplinary, region-specific studies and equitable resource allocation is crucial for effective interventions and global collaboration against climate-driven health risks.

Keywords: Climate change, Vector borne Diseases, Citation Network Analysis, Global warming, Dengue

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Abstract ID: ABR085

Title: Cardiovascular Disease Mortality and Morbidity Attributable to Humidity Change in India: Explorative Study on Climate Change Challenges During Previous Decade

Authors: Rakesh Balachandar*, Bhavanishankara Bagepally, Soundarya Soundararajan, Jhalak Dhingra, Nimitha Mohan

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Climate change, has significantly increased the overall disease burden and cardiovascular disease (CVD) is mostly reported among the non-communicable diseases. Temperature is often investigated while relative humidity another vital parameter of climate change is less often discussed.

Objectives: To examine this relationship within the context of India's diverse climate conditions, we investigated the CVD mortality and morbidity attributable to relative humidity (RH) from 2011 to 2019.

Methods: 2.5th and 97.5th percentiles of the daily RH data of Indian states for 2011-2019 sourced from ERA5 dataset was used as key predictors. CVD mortality, incidence, and prevalence per 100,000 population from the Global Burden of Disease study. We used Poisson panel regressions to analyze the relationship (incidence rate ratio) between the RH predictors and overall CVD burden.

Results: A unit increase in daily average RH increased the overall CVD burden by ~1%. Wherein, a unit increase in the daily 97.5th percentile of average RH values increased the mortality (1.002 [1.001,1.003]), prevalence (1.002[1.002,1.002]) and incidence (1.002[1.001,1.002]). Similarly, a unit increase in the daily 2.5th percentile of average RH values increased the mortality (1.01 [1.004,1.017]), prevalence (1.016[1.015,1.017]) and incidence (1.013[1.01,1.016]).

Conclusions: These findings reinforce existing research and underscore the impact of RH variations on the CVD burden, highlighting the need for public health interventions to mitigate the effects of RH on cardiovascular health.

Keywords: Climate change, Relative Humidity, Cardiovascular disease, Incident risk ratio

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Abstract ID: ABR086

Title: Exploring the Dual Impact of Climate Change in Mumbai: Mental and Physical Health Challenges

Authors: Arpita Naik*, Aishe Debnath

**University of Mumbai, Mumbai*

Background: Mumbai, a low-lying coastal city, faces flooding during periods of heavy rain. In recent years, the city has faced intensified climate-related risks in the form of stronger winds, shifting rainfall patterns, unseasonal downpours, deteriorating air quality, and rising temperatures.

Objectives: To understand healthcare professionals' responses to health issues resulting from climatic changes in Mumbai and provide insights into health implications of climate change impact, in ecologically vulnerable cities like Mumbai.

Methods: This study analyzes archival records and conducts semi-structured interviews with healthcare professionals, focusing on mental health practitioners and general physicians. A thorough review of Scopus and Web of Science-indexed literature contextualizes health implications of extreme weather events.

Results: The findings reveal how environmental stressors affect individual well-being, with emphasis on seasonal air quality issues and potential increases in health issues due to extreme heat. Perspectives on climate change anxiety vary among mental health practitioners, highlighting the need for support systems.

Conclusions: The study provides nuanced insights into the health implications of climate change, emphasizing the urgency to address these issues in ecologically vulnerable cities like Mumbai and enhance support for climate-related mental health concerns.

Keywords: Climate change, Mental health, Healthcare practitioners, Urban environmental stressors, Climate change anxiety

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Abstract ID: ABR087

Title: Artificial Simulation of Pulmonary Disease Progression in Chest X-Rays Based on Localized Climatic Conditions

Authors: Bhanu Dutta Parashar*, Agraj Abhishek, Manika Sharma

**Institute for Plasma Research, Ahmedabad*

Background: Lung diseases are influenced by climatic and occupational conditions, in both occurrence and progression, Augmenting data for Chest X-Rays as well as modelling the progression
of the disease using generative AI can help in diagnosis and treatment.

Objectives: This work will present an overview and use of generative artificial to simulate disease progression in chest X-rays, using localized climatic-data, particularly the AQI, which fluctuates daily in different cities

Methods: The developed Generative AI model is trained on data set of Chest X Ray images - with significant & with no abnormality. The developed Generative AI model was used to generate artificial but realistic CXR images with varying abnormalities on the near normal CXR images, further post processing algorithm using image processing algorithm was developed for the final results

Results: The result is an end to end application which takes a normal chest X-Ray image as input with certain specifications e.g the target location of abnormalities needed to be generated, and it generated an artificial X-Ray image with abnormalities. The CXR images so generated can be validated & used by medical practitioners, for understanding infectious disease/s on individuals working in hazardous environments by visualizing probable disease progression , and also for training & testing AI models for detection of diseases.

Conclusions: The resulting model can be applied to new cases, offering physician & Radiologists insights into disease trajectory for specific patients, thus facilitating better preventive and
personalized care

Keywords: Generative AI, Air Quality Index, Pulmonary Diseases, X Ray, AI for Healthcare

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Abstract ID: ABR091

Title: Cardiovascular Disease Burden Attributable to Humidity Change in India: Explorative Study on Climate Change Challenges During Previous Decade

Authors: Jhalak Dhingra*, Bhavanishankara Bagepally, Soundarya Soundararajan, Rakesh Balachandar, Nimitha Mohan

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Studies have been conducted to explore temperature's effect on CVD ,while keeping humidity as confounder or covariate in humidex like indicator but independent role of humidity's influence for CVD risk especially for Indian climatic conditions is yet to be explored.

Objectives: To examine this relationship within the context of India's diverse climate conditions, we investigated the CVD burden attributable to relative humidity (RH) from 2011 to 2019.

Methods: RH data for all Indian states was sourced from ERA-5. From RH summary aggregates, 2.5th and 97.5th percentiles were identified as key predictors. To analyse the RH predictors and overall CVD burden in terms of Disease-Adjusted-Life-Years (DALY), Years-Lost-due-to-Premature-Death (YLL) and Years-Lost-due-to-Disability (YLD), Poisson panel regressions were used to obtain incidence rate ratios (IRRs).

Results: Based on non-collinearity among RH metrics daily average RH (2.5th and 97.5th) and daily RH fluctuation was considered. Poisson regression model indicated that for every 1% increase in average RH above 2.5th percentile, and above 97.5th percentile, significantly increased the DALY by ~0.1%, whereas an increase in the daily RH fluctuation increased DALY by ~0.4%. Interestingly, the increase in extreme RH values impacted (IRR) both the disability (1.002[1.001, 1.003]) and mortality (1.001[1.001, 1.001]).

Conclusions: This suggests that per unit change, in daily average RH and daily fluctuation RH, increase DALY, and with climate change escalating, via humidity, disproportionately impacting on CVD illnesses ,necessitates climate informed strategies towards reducing the impact of RH.

Keywords: Cardiovascular diseases, Humidity, Climate change, India,

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Abstract ID: ABR105

Title: Impact of Climate Change on the Global Distribution and Burden of Vector-Borne Diseases: A Systematic Review

Authors: Dewesh Kumar, Shashi Bhushan Singh, Smiti Narain, Vidya Sagar, Ankita Mukul*, Aishwarya Bhushan

**Rajendra Institute of Medical Sciences, Ranchi*

Background: Climate change has emerged as a critical driver of public health challenges globally, particularly affecting vector-borne diseases (VBDs). Rising temperatures, altered precipitation patterns, and shifting ecosystems are reshaping the distribution and burden of diseases.

Objectives: This systematic review aims to synthesize evidence on how climate change influences the geographic spread, transmission dynamics, and epidemiological burden of key VBDs, highlighting trends, vulnerable populations, and mitigation strategies.

Methods: A comprehensive search was conducted across PubMed, Scopus, and Web of Science databases using predefined keywords related to climate change and vector-borne diseases. Studies published between 2000 and 2024 (October) were included. Data extraction focused on temperature, precipitation, and ecosystem changes, alongside VBD incidence, prevalence, and distribution. Risk of bias was assessed using the Cochrane methodology.

Results: The review included 112 studies from diverse climatic regions. Evidence indicates that higher temperatures and humidity enhance mosquito longevity and reproduction, expanding the geographic range of diseases such as dengue and chikungunya to temperate zones. Shifts in precipitation patterns were linked to outbreaks of malaria and Rift Valley fever in tropical areas. Regions with fragile healthcare infrastructure, especially in low-income countries, face heightened risks and economic burden.

Conclusions: Climate change significantly impacts the global burden and distribution of VBDs, necessitating proactive measures. Integrated surveillance systems, community-based interventions, and climate-resilient health infrastructure are critical for mitigating these impacts. Further interdisciplinary research is essential to adapt to evolving disease dynamics.

Keywords: Climate change, vector borne diseases, global health, vaccine preventable diseases, adaptation strategies

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ORAL SESSION 5

Theme: Occupational Health, Safety, and Well-Being Conditions

Date: February 27, 2025**; Time:** 4:15 PM - 6:15 PM

Abstract ID: ABR016

Title: Morbidity Pattern and its Associated Factors among Leather Factory Workers at Agra District, Uttar Pradesh, India

Authors: Himalaya Singh*, Panchsheel Sharma, Rashmi Singh

**Sarojini Naidu Medical College, Agra*

Background: The development of Agra as leather footwear industry began pre-independence. The condition of workers in Agra footwear industry is far from being satisfactory and affects their health and efficiency. An assessment of occupational health status among workers has been conducted.

Objectives: 1. To find out the prevalence of various health problems among the workers in leather factories; 2. To assess the association between occupational risk factors and health problem.

Methods: Community based cross-sectional study was carried out in Agra district from September 2019 to November 2019 among leather factory workers. The sample size of 110 was calculated and by using multistage simple random sampling 11 factories from Agra was selected and randomly 10 employees from each factory were surveyed. Socio-demographic profile, health complaints, general and physical examination were examined.

Results: Majority, 30.9% of study participants were between 30-44 years while 77.3% were male, 62.7% of were illiterate and 37.3% were working as leather cutter. Among all 51.8% belongs to lower-middle class. 48% having history of any one illness in last 1 year, among them 31.8% of study participants had musculo-skeletal problems including joints pain, backache etc. followed by dermatological problems and ear problems, 31% of them were ill-nourished and 73% were working for 9 to 12 hours in a day.

Conclusions: Long working hours and poor working conditions are responsible factors for musculo-skeletal problems and other illnesses among leather factory workers. Regular health check-up for factory workers at their workplace with health education and awareness regarding prevention of illness are advisable.

Keywords: leather factory workers, occupational health, occupational risk factors, occupational health problems

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Abstract ID: ABR017

Title: Working with Pain - A Qualitative Analysis of Comfort Need Assessment and Coping Mechanism Used by Dysmenorrheic Garment Factory Workers

Authors: Sudhir Nelson, Sriandaal Venkatesvaran*, Sriranganathan Thirunavukkarasu

**Velammal Medical College Hospital & Research Institute, Madurai*

Background: Dysmenorrhea, the pain associated with menstruation, affects upto 50% of adult Indian women of reproductive age. Women constitute > 80% of workforce in textile industry. Dysmenorrhea can lead to both sickness absenteeism and period pain presenteeism; both decreases overall productivity

Objectives: To explore the coping mechanisms employed by female garment industry workers during dysmenorrhea and investigate their comfort needs during the period they experience dysmenorrhea.

Methods: This is a qualitative study conducted among female garment factory workers of Madurai district over a period of 3 months with a history of primary dysmenorrhea with not less than 3 months experience in the same factory. By purposive sampling technique, an in-depth analysis was conducted and recorded. Interview transcripts were coded and thematic analysis was done.

Results: Among the twenty Dysmenorrheic female workers interviewed three themes were identified. In the coping mechanism, the themes were non-pharmacological management and pharmacological over-the-counter interventions. Under comfort needs assessment the themes were ‘short sleeping breaks’ and ‘colored mild carbonated drink’. The suggestion most of the workers feel is to ‘provide Tablet Meftal Spas in the company itself’

Conclusions: Dysmenorrhea does cause significant interruption to the lives of workers. The women have a wide range of coping mechanisms both non-pharmacological and pharmacological. In terms of comfort needs, we found that the requests were reasonable and could be easily implemented.

Keywords: Dysmenorrhea, Factory workers, Coping mechanism, Comfort Needs

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Abstract ID: ABR020

Title: Assessment of Occupational Factors influencing Morbidity of Construction Workers in an Urban Area -A Cross Sectional Study

Authors: Supriya A. S.*, Sujata Lavangare

**Seth G.S.Medical College, Mumbai*

Background: Construction workers form the second largest unorganized sectors. They belong to one of India's most vulnerable sectors in which workplace conditions contribute significantly to their health. Building construction workers suffer more health issues compared to other construction workers.

Objectives: To find the proportion of morbidity among construction workers and to assess the occupational factors , substance use and determine their influence on the morbidities of construction workers.

Methods: : A cross sectional analytical study conducted in construction workers working in construction sites coming under the jurisdiction of one of the wards under the municipal corporation of a metropolitan city.The sample size was 175. Simple random sampling was done to select five sites out of the fifteen sites in the area using the lottery method.

Results: More than 50% of the study participants, 119 (68.0%), were under the age of 34. All study participants were males, i.e.,175(100%). Out of 175 , 99(56.5%) had one or more than one morbidity. Most of the participants worked 8-12 hours per day, 144(82.2%).Majority of the workers i.e 163 (93.1%), were using PPE at work. Out of 175 ,100(57.1%) had one or more than one type of substance use among which most of them were using tobacco i.e 77(44.0%) .

Conclusions: Sociodemographic factors such as age and socioeconomic status were found to have a significant association with morbidity.Occupational factors such as duration as a construction worker and utilization of PPE were found to have a significant association with morbidity.

Keywords: Construction workers, Morbidity, Occupational factors

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Abstract ID: ABR022

Title: Occupational Health Hazards among Traffic Police in a City of Western India: A Mixed Method Approach

Authors: Princee Chauhan*, Harsha Solanki

**Pandit Dindayal Upadhyay Medical College, Rajkot*

Background: Growing Indian cities led to increase use of motor vehicles with subsequent rise in road-traffic which contributes significantly high levels of air pollution. Air pollution is significant contributor to respiratory illness and traffic-police are occupationally exposed to it daily.

Objectives: To estimate magnitude and to assess respiratory morbidities among traffic- police as well as to explore key stakeholder's perspectives related to air pollution and its effect on health of traffic-police.

Methods: Cross-sectional study was carried out among 147 traffic-police personnel using mixed-method approach. Semi-structured questionnaire was used by adopting European-Community-Respiratory-Health-Survey-III questionnaire and Medical-Research-Council-Questionnaire to obtain information on socio-demographic, occupational, personal, respiratory morbidities. Anthropometric measurements were taken and pulmonary function testing (PFT) was done using alveoair-portable-digital-spirometer. In-depth-interviews were conducted among six stakeholders to explore their perspectives. Data were analyzed using Epi-Info software-version-7.2.2.6.

Results: Respiratory complaint's prevalence was 29.9%. Obstructive-lung and restrictive-lung morbidities' prevalence was 30.6% and 27.2% respectively (PFT). Complaint-wise, workplace-area (PM2.5> 40 µg/m3) and males were significantly associated with obstructive-lung-morbidity and obesity with restrictive-lung-morbidity (PFT). In multivariate-analysis, workplace-area (PM2.5> 40 µg/m3) was significantly associated with respiratory-complaints and obesity with restrictive-lung-morbidity (PFT). Three themes emerged on qualitative analysis; AQI is worsening in city. In-spite of existing policies, there are challenges in implementation and there is need for community-participation, Intersectoral-coordination and advocating- technology.

Conclusions: Impaired lung function among traffic-police is mainly due to air pollution, requiring early identification by PFT screening at time of recruitment and then periodically. Stakeholders should be encouraged to install air pollution monitoring-devices in areas having high vehicular density.

Keywords: Air pollution, Respiratory morbidities, Pulmonary function test, Traffic police

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Abstract ID: ABR053

Title: Prevalence of Burnout and Associated Factors among Healthcare Workers in India: A Systematic Review and Meta-Analysis

Authors: Yogesh M*, Rohankumar Gandhi

**M. P. Shah Medical College, Jamnagar*

Background: Healthcare worker burnout has emerged as a critical occupational health concern in India, yet there lack of a comprehensive synthesis of its prevalence and associated factors.

Objectives: To estimate the prevalence of burnout among healthcare workers in India, identify associated factors, and examine variations across different healthcare settings, worker categories, and geographical regions.

Methods: We conducted a systematic review and meta-analysis following PRISMA guidelines, searching major databases from January 2013 to January 2024. Random-effect models were used to calculate pooled prevalence estimates and odds ratios. Subgroup analyses, meta-regression, and sensitivity analyses were performed to explore heterogeneity and assess result robustness.

Results: A meta-analysis of 21 studies (N=8,794) shows 52% overall burnout prevalence among healthcare workers in India. Doctors (56%) experienced higher burnout rates than dentists (27%) and ASHA workers (25%). Burnout manifested through depersonalization (43%), reduced personal accomplishment (41%), and emotional exhaustion (38%). West India reported the highest prevalence (67%). Insomnia (OR=26.76), stress (OR=9.30), and anxiety (OR=6.96) showed strong associations. Emergency duties (OR=2.21) and night shifts (OR=2.00) moderately correlated with burnout.

Conclusions: This meta-analysis highlights significant burnout among Indian healthcare workers, varying by profession and region. Strong links to psychological and work factors underscore the need for targeted mental health support and workload management strategies to address this critical healthcare challenge.

Keywords: Burnout, Healthcare Workers, Mental Health, India, Occupational Health

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Abstract ID: ABR059

Title: Role of Mental Health in Determining the Development of Non-Communicable Diseases among Bus Drivers and Conductors: A Cross-Sectional Study in Karaikal, South India

Authors: Mohamed Ali*, Nancy Sebastian, K. Mujibur Rahman Md

**Vinayaka Mission's Medical College, Karaikal*

Background: Bus drivers and conductors are facing various health hazards due to their stressful working conditions. The common mental health issues faced by them are anxiety and depression. Further, mental health is contributing to the development of non-communicable diseases.

Objectives: The present study was executed to identify the prevalence of mental health issues among bus drivers and conductors and to determine the association between mental health and non-communicable diseases.

Methods: A cross-sectional study was conducted among the bus drivers and conductors working in Karaikal, Puducherry. After IEC clearance, 450 transport workers were interviewed to assess their mental status according to Hospital Anxiety and Depression Scale (HADS). In addition, blood glucose levels and blood pressure were assessed using standard guidelines. Bivariate and Multivariate logistic regression analysis were employed using SPSS software.

Results: About 16% and 13% transport workers were suffering from anxiety and depression respectively. Age, education, marital status, bus route type and years of experience influenced anxiety. Whereas, type of employment and years of experience were predictors for depression. About 6.9% were diabetic and 50.2% were hypertensives among bus drivers and conductors. Marital status, habitation and years of experience were significant predictors for diabetes and hypertension. Notably, anxiety and depression were significantly associated with diabetes and hypertension. ($P < 0.05$)

Conclusions: Psychological distress in drivers and conductors constitute a major public health problem and it plays a pivotal role in the development of non-communicable diseases. Proper job rotation, enabling good ergonomics and social support were some recommendations to promote mental health.

Keywords: transport workers, mental health, anxiety and depression, non communicable diseases

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Abstract ID: ABR060

Title: Prevalence of Eating Disorder Risk and Body Image Dissatisfaction among it Professionals, Raigarh, Chhattisgarh : A Cross-Sectional Study

Authors: Shreyasi Jha*, Sofia Noor, Roshan Kumar Agrawal, Manu Saxena

**Late Shri Lakhi Ram Aggarwal Memorial Government Medical College, Raigarh*

Background: Individuals gaining weight due to a sedentary work life leading to excessive concern about body image and body image misconceptions causes dissatisfaction, disturbed eating patterns, affecting the nutritional status and also leading to depression and anxiety disorder.

Objectives: The purpose of the study is to study the Body image dissatisfaction and potential risk for eating disorders among IT professionals at Raigarh, Chhattisgarh.

Methods: A descriptive, cross-sectional study aiming to investigate body image dissatisfaction among IT professionals who lead a sedentary work life in Raigarh, Chhattisgarh. A sectioned questionnaire was used. All professionals were invited to participate and those who consented were enrolled in the study. After data collection, descriptive statistics was used to analyze the result, and necessary conclusions and recommendations were made.

Results: We analyzed 50 employees (74.3% female) 59% of whom gained weight since starting the job, 2.9 kg on average. Women reported having acquired poorer dietary habits. 87.3% and 60% respectively a desire to lose weight. Around 27.3% of respondents diet in order to control their weight. 36.4% of respondents feel they have to control their weight in order to control their life. 27.3% face extreme pressure from society to get to a certain weight.

Conclusions: Weight gain, changes in dietary habits, body image distortion and dissatisfaction point to the need for dietary and nutritional awareness programs at workplace that promote healthy eating habits and changes in behavior relating to diet and body image.

Keywords: BODY IMAGE, EATING DISORDERS, eating habits, society, sedentary work life

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Abstract ID: ABR062

Title: Occupational Exposure to Needle Stick Injury among Healthcare Workers of Government Medical College and Hospital

Authors: Pravin Modi*, Sofia Noor, Roshan Agrawal

**Late Shri Lakhi Ram Agarwal Memorial Government Medical College, Raigarh*

Background: Healthcare workers are at high risk of occupational exposure to needle stick injury. Occupational exposure to NSI represents the most common sources of infection. NSI is an occupational health hazard and it is most common among health care workers (HCWS).

Objectives: To determine the prevalence and factors associated with occupational exposure to needle stick injury among healthcare workers.

Methods: This cross-sectional study will be conducted amongst healthcare workers of MCH of Raigarh, Chhattisgarh. All healthcare worker of medical college and hospital will participate and those who consented for interview will be enrolled in study conducted for a period of 3 month. After data collection, descriptive statistics will be used to analyses the result.

Results: A large number 115 (74.7%) of HCW sustained at least one Needle Stick Injury in last 3 months. Most of the injuries occurred by disposable needles (81.7%), followed by suturing needle (18.3%). In response to their most recent NSI, 76.5% remained unreported to appropriate authorities, 91.3% washed the site of injury with water and soap. Only 7.8% of those HCW took post-exposure prophylaxis for hepatitis B and none of them received post-exposure prophylaxis for HIV after their injury.

Conclusions: The occurrence of Needle stick injury was found to be quite common. Avoidable practices like recapping of needles were contributing to the injuries. There can be serious consequences of NSI if HCW do not take appropriate measures of protection.

Keywords: Needlestick Injury, HealthCare Worker, Cross Sectional Study, Prevalence

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Abstract ID: ABR101

Title: Hematological Outcomes of Working in Bio Mining Operations: A Cross-Sectional Pilot among Bio Miners of Western India

Authors: Snehal Chavhan*, Santasabuj Das, Anupriya Minhas

**ICMR National Institute of Virology, Pune*

Background: 'Bio miners' are a specialized subset of municipal solid waste workers getting exposed to physical, chemical, and biological hazards such as bioaerosols and organic dust during bio-mining operations. Complete blood count is a primary tool for identifying potential infectious causes.

Objectives: 1. To explore hematological abnormalities among bio-miners
2. To identify occupational risk factors associated with hematological abnormalities among bio-miners.

Methods: Study Design – Cross-sectional. Study Setting – Solid waste disposal sites and transfer stations of major municipal corporations of western India. Study Participants- 120 randomly selected bio miners involved in biomining processes. Study duration- 3 months. Study tools – Structured questionnaire for sociodemographic variables, and hematology by auto analyser. Statistical tools- Proportions, mean ± SE, and Multiple linear regression.

Results: WBC abnormalities were found in 87 (72.5%), RBC abnormalities in 71(59.16%), significantly higher than platelet abnormalities in 9 (7.5%) ($p<0.0001$). Eosinophilia 39/87 (44.83%) and monocytosis 6(6.90%) was significantly higher; the same was reflected in mean eosinophil and monocyte count which were significantly higher ($p<0.0001$). Early work experience predicted eosinophilia(>500cells/µL) (ANOVA-F-3.260, Adj r squared-0.071, $p=0.014$). RBC abnormalities such as elevated RDW, lower hematocrit, and MCHC were found. Lower platelet count and higher mean platelet volume (MPV) were found.

Conclusions: Eosinophilia and its association with early work experience indicate probable allergen exposure to bio-miners. Further research is warranted to explore allergic diseases and allergen exposure. RBC and Platelet abnormalities require further exploration.

Keywords: Bio Miners, Haematological abnormalities, Eosinophilia, Allergic disorder

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Abstract ID: ABR118

Title: AI-Powered Worker Safety System with Personalized Alerts

Authors: Sakshi Babbar*, Richa Babbar

**Amity University, Mumbai*

Background: Workers at manufacturing and construction sites are vulnerable to health risks and injuries often stemming from lapses, ignorance regarding Personal Protective Equipment protocols. To address this, the study proposes AI models to ensure PPE compliance through personalized alerts.

Objectives: To develop a real-time system that recognizes workers on the site, detects missing PPE on their body, and provides personalized audio warnings for non-compliance.

Methods: It utilized a 5 step approach namely human detection, face recognition, PPE detection, identification of humans with no PPE and personalized audio warning using transfer learning techniques in deep learning using YOLOv5 and FaceNet as baseline models. The models were trained on a custom dataset of 7,600 images of workers and their PPE.

Results: The system achieved an 87% mean average precision (mAP) for PPE detection and a 90% precision for human detection. Face recognition accuracy reached 85%, with personalized warnings issued for PPE violations. Results demonstrated high effectiveness in real-world scenarios demonstrating high robustness in dynamic industrial settings.

Conclusions: This system proposed PPE compliance for worker safety in industrial environments with personalized alerts. Future work will integrate health sensors to monitor workers' vital signs, creating a more comprehensive safety solution.

Keywords: Worker Safety, Real time Monitoring, Artificial Intelligence, Deep Learning, PPE detection

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ORAL SESSION 6

Theme: Sustainability, Resilience, and Emerging Approaches
Date: February 27, 2025**; Time:** 4:15 PM - 6:15 PM

Abstract ID: ABR058
Title: Exploring the Impact of Salinity on the Microbiome of Sargassum Swartzii and its Implications For Occupational and Environmental Health
Authors: Mayur Mahajan*, Imran Pancha, Chandrashekar Mootapally, Neelam Nathani
**Gujarat Technological University, Ahmedabad*
Background: Climate change-induced salinity variations affect marine ecosystems, particularly seaweed-associated microbiomes. Understanding these interactions in Sargassum swartzii is crucial as its microbiome composition and bioactive properties may be altered under varying environmental conditions.
Objectives: To analyze the effects of varying salinity on S. swartzii's surface microbiome composition and evaluate its therapeutic potential through cytotoxicity and anti-diabetic activity assessment.
Methods: S. swartzii from Beyt Dwarka was exposed to controlled hypo- and hyper-salinity (25-70 ppt). Surface microbiome diversity and taxonomy were analyzed using 16S amplicon sequencing. Bioactivity was assessed through cytotoxicity tests on HEK293T cells and glucose uptake assays on HepG2 cells, with results compared to metformin as a control.
Results: Microbiome analysis revealed dominant phyla including Proteobacteria, Bacteroidota, and Cyanobacteria. Higher salinity favored Halomonas and Mesonia genera, while control conditions showed prevalence of Pseudoalteromonas and Cobetia. Cytotoxicity testing demonstrated 78% cell viability at maximum extract concentration. The seaweed extract exhibited superior anti-diabetic effects compared to metformin in glucose uptake assays.
Conclusions: Salinity significantly influences Sargassum swartzii's microbiome composition, favoring specific bacterial genera under different conditions. The seaweed's bioactive potential was confirmed, showing cytotoxicity within safe limits and enhanced anti-diabetic effects compared to metformin, highlighting its therapeutic promise in varying environmental scenarios.

Keywords: Sargassum swartzii, Salinity variations, Microbiome composition, Cytotoxicity, Antidiabetic activity

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Abstract ID: ABR063

Title: Benefits of Scaling up Air Pollution Reduction on Climate Change Adaptation

Authors: Saritha Sendhil*, Vigneswari A, Sankar S, Kalpana Balakrishnan

**Sri Ramachandra Institute of Higher Education and Research, Chennai*

Background: Air pollution and climate change are interconnected global challenges that demand immediate attention. WHO estimates people breathe polluted air, resulting in around 7 million premature deaths annually. Climate change worsens air pollution by increasing the formation of gases and particles.

Objectives: To review and synthesize the existing literature on the benefits of scaling up air pollution reduction strategies for climate change adaptation, focusing on co-benefits and policy implications.

Methods: We conducted a comprehensive literature search using multiple databases. This review included studies published between 2010 and 2024. Using carefully selected search terms we synthesized all the published articles that addressed the air pollution reduction strategy and climate change adaptation measures. This study examined various air pollution reduction strategies resulting in mitigating the factors contributing to climate change.

Results: Efforts to cut GHG emissions in Asia support achieving NDC targets of reducing global warming to 2°C, preventing 790,000 early deaths. China with stringent environmental regulations, is anticipated to achieve a 23% reduction in mortality rates linked to PM2.5 and ozone by 2030. City level climate change response policies showed improved air quality in India. The interplay between air pollution reduction and climate change mitigation highlights the need for integrated policy approaches that may result in health and economic benefits.

Conclusions: This systematic review synthesizes the evidence on the benefits of scaling up air pollution reduction strategies for climate change adaptation. The review highlights the critical importance of integrating air quality and climate agendas to maximize co-benefits.

Keywords: Air pollution Reduction, Climate change, Benefits, scaling up, mitigation

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Abstract ID: ABR065

Title: Building Green Futures: Transforming Hospitals for Sustainability and Resilience

Authors: Harleen Kaur*, Gagandeep Singh, Keerti B Pradhan

**Chitkara University, Punjab*

Background: The healthcare industry is a major contributor to environmental degradation, consuming large amounts of energy and producing significant waste. Hospitals, especially in India, face challenges in adopting sustainable practices despite growing concerns over climate change and resource conservation.

Objectives: To integrate green design strategies into a tertiary care hospital and facilitate its transition into an environmentally sustainable healthcare facility.

Methods: A qualitative-exploratory study was conducted at a tertiary hospital in Amritsar. Data were collected from 233 hospital employees using closed-ended questionnaires and an observational checklist. The green practices of the hospital were assessed through statistical analysis, including Chi-square tests.

Results: 69.5% of hospital staff demonstrated good knowledge of green practices. While 90% of green strategies were implemented, 10% were not followed, including the use of solar panels and monitoring of greenhouse gas emissions.

Conclusions: The hospital demonstrates strong knowledge and implementation of green practices. By addressing remaining gaps, such as renewable energy adoption and emissions monitoring, it can achieve green certification, furthering its commitment to environmental sustainability and sustainable healthcare practices.

Keywords: Green healthcare, sustainability, hospital design, energy efficiency

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Abstract ID: ABR078

Title: Solastalgia and Quality of Life in People Residing on the Fringes of Climate Change and Environmental Disruptions in the Sundarbans: A Mixed Method Study

Authors: Monalisha Sahu*, Ranjan Das, Bobby Paul, Joenna Devi Ningombam

**All India Institute of Hygiene & Public Health, Kolkata*

Background: Solastalgia, coined by philosopher Albrecht, describes the emotional suffering from environmental harm to one's home. In the Sundarbans, 4.5 million people face mental and livelihood challenges due to rising sea levels, cyclones, erosion, and salinization, impacting their well-being deeply.

Objectives: This study aims to assess the proportion of Solastalgia, explore experiences, and evaluate its impact on quality of life.

Methods: This convergent parallel mixed-method study was conducted in riverine areas in the Sundarbans between April 2023 and March 2024. Quantitative data was gathered from 210 participants selected by cluster sampling, using a pre-tested structured questionnaire and WHO QOL-BREF. Qualitative data was collected through in-depth interviews, focus group discussions, and observation. Data triangulation was done to integrate quantitative and qualitative findings.

Results: The findings revealed a strong sense of Solastalgia among respondents, with 60% expressing sadness and 66.7% disappointment over the Sundarbans' riverine belt degradation. Alienation (63.8%) and nostalgia (33.3% strongly agree, 38.6% agree) were prominent. Higher Solastalgia levels correlated with deeper place attachment, concerns for future generations, and diminished safety and hope. Age and length of residence significantly influenced nostalgia and emotional responses.

Conclusions: The study generated critical evidence on environmental distress and its impact on quality of life, offering insights for policies and interventions addressing climate resilience in vulnerable communities.

Keywords: Solastalgia, Climate, Sundarbans

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Abstract ID: ABR112

Title: Implications of Climate Change on Landslide Susceptibility in the Western Ghats: An integrated Assessment

Authors: Venkata Ramana Gunturi, Yogi Agarwal*

**D Y Patil International School, Mumbai*

Background: The study examines the differences that could arise in landslide susceptibility due to climate change in order to quantify climate change exposure to landslides in the Western Ghats and how they are associated with changes in rainfall patterns, climate change.

Objectives: Examine the frequency and intensity of landslides due to altered precipitation patterns and extreme weather events. Analyze the complex interactions between meteorological, geomorphological, and anthropogenic factors that contribute to landslide.

Methods: The study comprehensively assessed climate change impacts on landslide susceptibility by synthesizing findings from meteorology, geology, geography, and environmental science. A systematic search of academic databases, including Google Scholar, was conducted with prioritization criteria for study inclusion. Data were extracted, synthesized, analyzed, and interpreted to provide implications and recommendations. Ethical considerations were adhered to throughout the research process.

Results: Total precipitation thresholds show 40.5% of the area is of average sensitivity, 49% highly sensitive and 6.9% in real trouble. These patterns point to the main contribution which mighty rainfall events make towards that. The "distance to road" factor contributes 26% to landslide susceptibility, showing infrastructure development on slopes greatly increases risk. Changes in land-use and human activities are major amplifiers of these dangers. The proximity to roads increases 26% to landslide susceptibility; land-use changes have set off catastrophic events.

Conclusions: The study calls for an integrated approach that balances natural resource conservation with human safety and socio-economic development. It urges a paradigm shift in the management of environmental risks, particularly landslides, in response to the challenges posed by climate change.

Keywords: western ghats, landslide, climate change, prevention and mitigation, environmental risks

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Abstract ID: ABR121

Title: Forecasting Rainfall Patterns for the Next Decade: Unveiling Climate Change Impacts using Machine and Deep Learning Models Across Agro-Climatic Zones of Andhra Pradesh

Authors: B. Samuel Naik, V C Karthik, Sukhdev Mishra, G. H. Harish Nayak, Samarth Godara, G. Avinash*

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Rainfall prediction is critical for understanding the impact of climate change on agricultural sustainability and water resource management in Andhra Pradesh, a state characterized by diverse agro-climatic zones and significant rainfall variability.

Objectives: To evaluate rainfall variability and forecast future rainfall trends (2023–2032) using 40 years of monthly rainfall data (1983–2022) across six agro-climatic zones and the entire Andhra Pradesh region.

Methods: Historical monthly rainfall data (1983–2022)from NASA POWER was spatially interpolated using the IDW method. The dataset was split into training (1983–2017), validation (10%) and testing(2018–2022)sets. Ten models including GRU,CNN1D,LSTM,RNN,XGBoost, RandomForest, RBFNN,GaussianProcess,MLPNN and SVR were assessed using RMSE and MAE. The best-performing models for each zone and the overall region were used to forecast rainfall for 2023–2032.

Results: The analysis revealed significant rainfall variability over the past four decades. Gated Recurrent Units consistently outperformed other models, achieving the lowest RMSE (40.09) and MAE (30.79) for overall state. Zone-specific results showed GRU excelling in Zones 1,3and 5, while CNN1D and RNN were the best for Zones 2 and 6, respectively. Zone 4 showed mixed results, with GRU, Long-Short Term Memory achieving the lowest metrics (RMSE:49.80,MAE:37.53). Forecasts for 2023–2032 indicate rising erratic rainfall due to impact of climate change.

Conclusions: This study reveals increasing rainfall variability due to climate change. GRU and other DL models excelled in forecasting trends, emphasizing the need for advanced models and climate considerations in planning to mitigate agriculture and water resource challenges.

Keywords: Agricultural Sustainability, Decadal rainfall forecasting, Erratic rainfall trends, Spatial interpolation, Temporal analysis

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Abstract ID: ABR124

Title: Climate Change, Human Health, and Environmental Sustainability: Revisiting Policies and Practices

Authors: Sonam Taneja*, Oznur Karaca, Anil Kumar Haritash

**Delhi Technological University, Delhi*

Background: The environment and health are the foundational pillars of sustainable development, yet both are increasingly threatened by the impacts of climate change. Developing nations, like India, are more vulnerable to climate-induced health risks owing to their environmental and socio-economic landscape.

Objectives: The objective of this study was to examine the interlinkages between human health and climate change, and the adaptive and mitigation strategies to achieve environmental sustainability in the Indian context.

Methods: The research methodology involved a comprehensive review of relevant literature, including empirical studies through the data collected for meteorological, epidemiological, and socio-economic factors from 2013 to 2023, to identify the direct and indirect effects of climate variability. Moreover, the study assessed the vulnerability and adaptability of different regions across India, drawing on evidence from policy frameworks.

Results: The study highlighted that India faces significant environmental health risks, encompassing physical, chemical, biological, and occupational factors. Vulnerability varied regionally due to disparities in socio-economic conditions, infrastructure, and adaptive capacities, with agriculture being the most vulnerable sector to climate-induced events. While interventions at technological, economic, and social levels by national and international agencies have demonstrated successes, critical gaps remain in addressing the intensity of climate health risks.

Conclusions: Adaptive and mitigation strategies must be integrated to enhance resilience in the face of climate change. Strengthening socio-economic equity, behavioural change, and public awareness is essential for ensuring public health and environmental sustainability.

Keywords: Climate Change, Public heath, Resilience, Vulnerability, Sustainability

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Abstract ID: ABR126

Title: Tapping Anxiety: Climate Anxiety & its Factors among Date Palm Jaggery Workers in Rural Villages of Bankura

Authors: Subhajyoti Mandal*, Monalisha Sahu

**All India Institute of Hygiene & Public Health, Kolkata*

Background: Datepalm Jaggery, commonly known as "NolenGur," is produced from datepalm sap during winter. "Climate change" significantly impacts seasonal occupational groups, especially datepalm jaggery workers. This study examines climate anxiety, connecting environmental changes to health, livelihoods, and adaptation in rural WestBengal.

Objectives: 1. To determine the level of climate-change anxiety among datepalm jaggery workers working in a Panchayet of Bankura, West Bengal.
2. To identify factors associated with it in the participants

Methods: This community-based study surveyed 114 randomly sampled datepalm jaggery workers in Bankura, West Bengal. Data were collected using a structured interview schedule to assess socio-demographics, Occupational profile, climate anxiety levels, and perceptions of climate impacts. Data were analysed to identify associations between anxiety and occupational, environmental, and personal factors affecting this vulnerable population. Ethical permission was taken from relevant bodies.

Results: Total 114 datepalm jaggery workers participated. The mean age was 39 years; 78% were male, and 22% were female. Moderate to high climate anxiety was reported by 64%, with severe anxiety in 28% as per the Climate Anxiety Scale. Higher anxiety levels were significantly associated with age ≥40 years ($p < 0.01$), lower education level ($p<0.05$), and over 10 years of work experience ($p < 0.05$). Key stressors included declining sapyield (74%), extreme weatherevents (68%), and rising production costs (62%).

Conclusions: The study reveals significant climate anxiety among datepalm jaggery workers, linked to occupational and environmental stressors. Implementing targeted interventions to improve mental health, enhance production strategies, and teaching alternate source of livelihood is essential for this vulnerable group.

Keywords: Climate Change Anxiety, Anxiety, Datepalm Jaggery, Vulnerable Population

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Abstract ID: ABR130

Title: Exploring the Role of Geographic information Systems in Mental Health: Addressing Healthcare Access, Utilization, and Climate Impacts

Authors: Rumaan Alam*, Hariom Pachori

**International Institute for Population Sciences, Mumbai*

Background: GIS and Spatial Analysis offer transformative potential in mental health by mapping healthcare access, utilization, and environmental influences. However, their application remains underexplored, especially in addressing climate change's impact on mental health outcomes.

Objectives: To review GIS applications in mental health for analyzing access, utilization, and trends.

To assess climate and environmental impacts on mental health using GIS.

Methods: A systematic review was conducted using databases like PubMed, Google Scholar, and ScienceDirect, focusing on articles published between 2000-2023. Keywords included "GIS," "Spatial Analysis," "Mental Health," "Healthcare Access," and "Climate Change." Sixty articles were identified, and 25 were included based on relevance to GIS applications in mental health and climate-related factors.

Results: The review reveals significant potential for GIS in mental health, including mapping disorders, analyzing healthcare access and utilization, and exploring the impact of climate change on mental health. GIS helps identify vulnerable populations, assess environmental stressors, and guide mental health interventions. The findings suggest that GIS can enhance mental healthcare delivery, policy-making, and climate-responsive solutions, offering innovative approaches to address mental health challenges in the context of environmental factors and sustainable public health strategies.

Conclusions: GIS holds immense potential in advancing mental health research and practice, particularly in addressing healthcare disparities and climate change impacts. Its application can drive innovative, sustainable solutions for mental healthcare delivery and inform policy-making for better public health outcomes.

Keywords: Mental Health, Geographic Information System, Climate Change, Healthcare Accsess, Spatial Analysis

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POSTER SESSION 3

Theme: Climate Change and Health Implications (CCH)
Date: February 27, 2025**; Time:** 4:15 PM - 6:15 PM

Abstract ID: ABR019
Title: Perceptions of Occupational Heat Stress and its Impact among Factory Workers of Northeast India.
Authors: Saklain Mustak Alam*, S. Krishnan, Manasi Bhattacharjee, Abhishek Sinha, L. Sundareswaran, Benzamin Hanse
**All India Institute of Medical Sciences, Guwahati*
Background: Occupational heat stress, exacerbated by climate change, presents significant health risks to workers across various industries. Rising temperatures from industrialization heighten heat-related hazards, leading to an increase in core body temperature, dehydration, and prolonged heat exhaustion among workers.
Objectives: To study the workers perceptions and adaptive behavioural responses to extreme thermal conditions in heat-generating factories during periods of peak summer and winter.
Methods: A cross-sectional survey using the HOTHAPS questionnaire was conducted from August 2023 to February 2024 to assess workers' perceptions and adaptive responses to occupational heat stress. Permission was obtained from the industrial facilities, and 1,300 participants from three industrial settings in North East India were included. Perceptions were evaluated across two seasons to capture seasonal variations.
Results: The result reveals that most workers perceived heat as a significant stressor that affects their performance.85% reported it as a significant issue and 87% felt that heat exposure reduces their ability to work. Additionally, 79% mentioned experiencing task delays and fatigue due to heat stress, while 91% observed a drop in productivity. Furthermore, 87% experienced excessive sweating, and 97% felt extremely thirsty.
Conclusions: The findings reveal how occupational heat stress significantly affects workers' health and productivity. Prioritizing better heat management and support systems in heat-generating industries, especially in Northeast India, is essential to protect workers and ensure a safer, healthier work environment.

Keywords: Occupational Heat stress, Perceptions, workers, North East India

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Abstract ID: ABR049

Title: Impact of Climate Change on Pollen Allergens and Strategies For Preventing Allergic Reactions: A Computational Study

Authors: Sindhuprava Rana*, Vibhor Joshi, Ganesh Chandra Sahoo, Pramod Kumar, Neetesh Jindal, Rajnarayan R Tiwari

**ICMR National Institute of Research in Environmental Health, Bhopal*

Background: Climate change is influencing prevalence and intensity of allergic reactions associated with pollen exposure. Human protein receptors Jun a 1, pollen allergen Phl p1 have shown correlating with environmental changes, leading to longer pollen seasons and heightened sensitization in populations.

Objectives: To know the presence of computational atomic level interactions of major allergens of pollen and human allergen receptors and identifying major antiallergic compounds inhibiting the allergic activities of the pollen.

Methods: Compounds of pollen 3-epiloleandrigenin, ursolic acid and betulin were extracted from pubchem and PDB ids of different human receptors recognizing compounds Jun a 1, Pollen allergen Phl p 1, H1 receptor and Human alpha1B adrenergic receptor were from PDB database. Antiallergic compounds were extracted from Pubchem. The interactions of the receptors and the compounds were done in PyRx program.

Results: Allergen compounds of pollen grains such as 3-epiloleandrigenin, ursolic acid and betulin are having interactions with human allergen receptors such as major pollen allergen Jun a 1, pollen allergen Phl p 1, H1 receptor and human alpha1B adrenergic receptor. Compounds of tulsi, ginger and garlic such as gingerol, allicin, zingiberene, eugenol, ocimene were taken; zingiberene has exhibited highest biding affinity towards the allergenic receptors.

Conclusions: To address the intertwined challenges of climate change and respiratory allergic reactions, it is crucial to implement strategies improving air quality. This computational study signifies that among different compounds zingiberene have exhibited highest binding affinity towards the corresponding receptor (alpha1B).

Keywords: Climate change, human alpha1B, Pollen Allergens, zingiberene, adrenergic receptor

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Abstract ID: ABR082

Title: Measuring and Forecasting Impact of Pollutants on Occupational Health

Authors: Pooja Singhal*, Lokesh Kumar Sharma, Vaishali Choudhari

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: According to ILO (International Labor Organization), around 70% of global workforce is at risk of climate related health-hazard. Informal workers in India belongs to agriculture, construction and other manual labors, makes them more susceptible to pollutants and toxins in climate

Objectives: To establish correlation between increase in pollutants (specially in hubs like mega-cities) and increase in diseases like COPD, Asthma, Lung-cancer, Cardiovascular diseases and Diabetes, approximating severity of future risk

Methods: City-wise time-series data related to pollutants (particularly air-borne), population growth and rise of related diseases is accumulated from government sources or publically available surveys.

After pre-processing and accounting for some delay (5-10 years) for progression of disease, we calculated multiple pair of correlations of air-pollutants like PM2.5 or NO2, increase in population and reported cases of potentially associated health issues

Results: Multiple pairs of moderate to strong correlations (0.4-0.7) were found for different pollutants against number of reported cases. Particularly strong correlations (~0.67) were found both between rise in air-pollutants and population growth to the number of reported cases. Adjusting for population growth, positive correlations persisted, highlighting pollution's impact in mega-cities.

Two-step time-series forecasting first estimates future pollutant levels at city-level, that is fed into down-stream model to predict disease severity (MAPE: 18-42%). Cross-validated back-testing establishes some credibility in this method.

Conclusions: Manual labor workforce in India migrate to mega-cities for better job opportunities. However higher pollutants level do increase their risk to health issues due to prolonged or high exposure at their job, which is problem when paired with population (density)

Keywords: Megacity pollutants, Pollution related diseases, Timeseries forecasting, Multi correlation analysis, Population Growth

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Abstract ID: ABR090

Title: Integrated Approach to Snakebite Management: Development of a Remote Sensing & Gis-Based Model for High-Risk Snakebite Zone Prediction with Qualitative Exploration of Healthcare-Seeking Pathways, Delays, and Barriers in Rural Tigiria, Odisha.

Authors: Debasini Parida*, Prachi Prava Panda, Srikanta Kanungo, Subrata Palo, Jaya Singh, Sanghamitra Pati

**ICMR Regional Medical Research Centre, Bhubaneswar*

Background: Snakebite envenoming is a major public health issue in India, particularly in the poorer regions of the warmer tropics and subtropics leading globally SBE-related deaths, where 75% of deaths occur before reaching the hospital due to technological, and societal, barriers.

Objectives: Analyze geographic patterns of snakebite incidence and develop a risk prediction model using geospatial, climatic, and socio-demographic data.
Explore care-seeking pathways, barriers and determine the bite-to-needle time among snakebite victims

Methods: A snakebite risk zone was identified by analyzing time-series data on environmental, climate, and socio-demographic factors, alongside remote sensing satellite data. SRTM data (90m resolution) was integrated with GIS (ArcGIS) for land elevation and infrastructure including rivers, and agriculture analysis using NDVI. FGDs and IDIs were conducted among with a semi-structured questionnaire, and qualitative analysis was performed using MAXQDA software.

Results: The risk zone for snakebite identified and classified the Tigiria block, 2648.99 ha as high-risk, 1045.18 ha as medium-risk, and 1429.62ha as low-risk zones. Patients with bite-to-needle times exceeding 24 hours experienced a higher number of ASV vials, more complications, longer hospital stays, and increased mortality. The results reveal significant treatment delays, particularly in remote areas, where poor road access & inaccessible health care, limited availability of antivenom, and shortages of trained healthcare professionals contribute to the problem.

Conclusions: The study provides a critical insight into the urgent need for targeted interventions to address snake bite morbidity and mortality, focusing on improving healthcare access, increasing public awareness, and ensuring timely treatment in high-risk regions.

Keywords: Bite needle time, Care seeking Pathways, Climatic factor, NDVI, socioeconomic Factor

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Abstract ID: ABR094

Title: Climate Change and Zoonotic Diseases: Analysing the Influence of Environmental Changes on Emerging Health Risks

Authors: Asha Humbal*, Lokesh Kumar Sharma, Ajay Neeraj, Nareshkumar Patani

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Climate change significantly influences zoonotic disease dynamics by altering habitats, vector behavior, pathogen dynamics, and their interactions. Nipah virus, a bat-borne zoonotic pathogen, demonstrates strong links between climatic variables and outbreaks, necessitating studies on environmental impacts for effective prevention strategies.

Objectives: To analyze the impact of climatic factors (temperature and precipitation) on Nipah virus outbreaks in India, highlighting the role of environmental changes in zoonotic disease transmission and prevention strategies.

Methods: A comprehensive meta-analysis was conducted by collecting data on Nipah virus (NiV) outbreaks and climate variables (temperature, precipitation, humidity) from sources such as WHO, the India Meteorological Department (IMD), and peer-reviewed studies. The dataset was analyzed using Pearson's correlation to assess the relationship between climatic factors and NiV outbreaks in India, providing insights into environmental influences on disease spread.

Results: The meta-analysis revealed notable correlations between climatic factors and Nipah virus outbreaks in India. A strong positive Pearson's correlation ($r = 0.67$) was found between seasonal rainfall and outbreak incidence, particularly during monsoon months in West Bengal and Kerala. Heavy rains likely coincide with increased bat activity and migration. Additionally, a moderate positive correlation ($r = 0.52$) was observed between average temperatures (28°C–35°C) and outbreaks, highlighting the critical role of climatic variables in influencing Nipah virus transmission dynamics.

Conclusions: The results highlight the importance of integrating climate monitoring into public health strategies for zoonotic outbreak prevention. Enhanced surveillance in high-risk areas, considering rising temperatures and altered rainfall patterns, is vital for establishing effective early warning systems to mitigate risks.

Keywords: Zoonotic diseases, Climatic variables, Nipah virus, Environmental impacts,

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Abstract ID: ABR097

Title: Role of An. Stephensi Variants Transmission Potential with Climate Change

Authors: Rajendra Baharia, Bhavya Modi*, Ajeet Mohanty, Sachin Sharma, Courtney Murdock, Michael Wimberley

**ICMR National Institute of Malaria Research (Field Unit), Nadiad*

Background: An. stephensi is major malaria vector has increased markedly over the past several decades., many tropical cities exhibit high spatial variation in human population densities, housing type, basic sanitation, public health infrastructure, and landscape features affecting mosquito habitats and microclimate.

Objectives: 1. Assessment of relative humidity and temperature-malaria transmission relationship; 2. Parameterize the mosquito-human transmission dynamics of urban malaria; 3. Predict malaria risk and incidence in heterogeneous urban environments.

Methods: Data loggers are fixed indoor and outdoor to monitor the temperature and humidity. An. stephensi were collected from the site and reared in ICMR-NIMR insectary. Collected eggs were subjected to 40× Compound microscope for ridge count for variant determination i.e. Mesorensis, intermediate and type. Transmission dynamics of An. stephensi will be underway.

Results: An. stephensi were reared in Percival chambers with specific temp and humidity. Eggs of An.stephensi were examined under 40× Compound microscope for ridge count for variant.

On the basis of the egg ridges counting, Mesorensis (10-13), intermediate (14-17), type (18-22). Type variant found in urban, intermediate in periurban, Mesorensis were found in rural.

These variants will be subjected for malaria diseases transmission dynamics.

Conclusions: This study will be explored in transmission dynamics and vector-borne diseases prediction modeling.

Keywords: Anopheles stephensi, Malaria, climate, vector, transmission

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Abstract ID: ABR099

Title: Trends in Gastrointestinal Infections Amid a Changing Climate in India

Authors: Nandita Chaurasia*, Pallavi Joshi

**Amity University, Noida*

Background: Climate change poses significant threats to public health in India, particularly through its impact on gastrointestinal infections. Rising temperatures, shifting rainfall patterns, and increased frequency of extreme weather events can exacerbate the spread of pathogens, compromising food and water safety.

Objectives: This study aims to investigate the association between climate change related extreme events such heat waves and precipitation extremes & prevalence of gastrointestinal infections in India, identifying determinants vulnerable populations.

Methods: The association is estimated using a regression model with self-reported gastrointestinal illnesses from NSSO 75th Round (Social Consumption on Education 2017-18) as the primary variable and average annual extreme heat and precipitation days (in previous year) as the primary predictors. The exposure data assignment is done at village/sub district as per location information for each morbid respondent's record.

Results: The rural population (10.4%) exhibited slightly higher hospitalisation rates for gastrointestinal infections than urban areas (9%). The findings suggest a robust association between temperature extremes and increased risk of gastrointestinal infections (OR: 1.5, $p < 0.05$). According to ERA 5 Reanalysis satellite data, 35.94% of days in India exceeded the 90th percentile temperature range. Our analysis found a 4.7% ($p < 0.05$) increase in intestinal infection with each additional hot day

Conclusions: Heat & precipitation extreme events are significantly associated with prevalence of gastrointestinal infections in India, necessitating urgent public health interventions. Enhancing sanitation infrastructure, improving water quality, and targeting vulnerable communities are essential strategies for mitigating health impacts of climate change.

Keywords: Gastrointestinal Pathogens, Extreme Events,Vulnerable Population, Temperature Extremes, Public Health Sanitation

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Abstract ID: ABR108

Title: Exploring the Impact of Urban Heat Islands on Health in India - A Systematic Review

Authors: Chinnu Sara Varughese*, Sapna Meryl Mani, Vineetha Vincent, Sunu Alice Cherian, Nisha Kurian

**Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla*

Background: Rapid urbanisation in India has given rise to urban heat islands (UHI). While human health impact of UHI has been studied worldwide, tailored evidence is required in the Indian context, to guide urban planning and interventions for urban heat mitigation.

Objectives: The objective is to provide a review of the human health impacts of urban heat islands in India.

Methods: We searched multiple databases, including PUBMED and EMBASE, from inception till June 2024. We considered all study designs, including modelling studies on UHI and their impact on various health outcomes like all-cause mortality and morbidity, heat-related illnesses, specific disease burden and thermal comfort. Included studies were critically appraised using the JBI checklist. Results were synthesised using narrative summaries and tables.

Results: We included 40 articles, out of which 10 directly measured UHI effect. Rest measured heat related health impact and supported the main findings. Delhi was the most studied urban region. The studies exhibited high heterogeneity in UHI measurement and health outcomes across different urban areas. Thermal comfort emerged as a predominantly analysed outcome. UHI areas are increasing across the country, with significant decrease in thermal comfort, increased heat related health risk, mortality and outbreak of infectious and vector borne diseases.

Conclusions: Evidence from this review suggests that UHIs affect human health in India, thus requiring appropriate urban planning and heat mitigation strategies. Future directions for research include having a standardised UHI measurement and studying direct health outcomes. (PROSPERO 2024 CRD42024588528)

Keywords: Climate change, Heat stress, LMIC, Urban health, Urbanization

Abstract ID: ABR133

Title: Pattern of Electrolyte Disturbances due to Dehydration and Viral infections and its Association with Climatic Variations in Patients Admitted in Icu of A Tertiary Care Centre in South India -A Retrospective Study

Authors: Manju Mathew*, Chinchu Steby

**Pushpagiri Medical College, Thiruvalla*

Background: Climatic variations can increase the spread of viral infections. Kerala, has been prone to frequent viral outbreaks due to its geography and heavy monsoons. This study investigated the relation of incidence and pattern of ICU admissions to climatic variations.

Objectives: To estimate the incidence of ICU admissions with dyselectrolytemia as part of dehydration or viral infection length of hospital stay and association of dyselectrolytemia with climatic changes.

Methods: Retrospective design, hospital based, Dec1st, 2023 to Nov 31st, 2024, medical records screened for ICU admissions, >18 years with sodium imbalance due to dehydration or viral infections. Dyselectrolytemia from preexisting diseases excluded.

Incidence of ICU admissions with hypovolemic hyponatremia with or without viral infections estimated. Association of climatic variations to pattern of sodium imbalance and viral infections analysed.

Results: ICU admissions for viral infections and dehydration in the elderly have been high which included H1N1 and occasional SARS CoV2 infections in the last one year. Sudden climatic variations affect the vulnerable population like elderly, immunocompromised, the frail, on diuretics or requiring feeding assistance causing infections. They present in serious medical conditions like hypotension, severe electrolyte disturbances and acute kidney injury8. Anorexia, vomiting, diarrhoea associated with infections along with the ambient temperature result in the hypovolemic hyponatremia and diabetic ketoacidosis.

Conclusions: The incidence of ICU admission for infections and electrolyte disturbances are on the rise. This study aimed to investigate a possible association to the climatic changes in the region. This knowledge will equip the vulnerable population to take appropriate precautions.

Keywords: Hyponatremia, climate change, water electrolyte imbalance, viral infections, Intensive care units

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Abstract ID: ABR134

Title: Mapping the Climate Change and its Impact on Psychological Health of Expecting Women: A Systematic Review

Authors: Amrin Fatma*, Rumaan Alam, Margubur Rahaman, Shierie Fatma

**International Institute for Population Sciences, Mumbai*

Background: The climate crisis poses significant risks to maternal health, complicating pregnancy and childbirth globally. This review examines the impact of climate change and psychological distress on gestational health, summarizing current research and offering recommendations for future adaptation strategies.

Objectives: This review analyzes climate change's impacts on gestational health, highlights research gaps, and provides evidence-based recommendations for adaptive strategies to safeguard maternal well-being.

Methods: We conducted a systematic review to explore climate change's impact on the psychological health of expecting women. In November 2024, we searched electronic databases (Scopus, Medline, PreMEDLINE, EMBASE, CINAHL, PubMed) using keywords such as "Climate Change," "Expecting Women," and "Psychological Health." Only English-language studies from the past 10 years were included, focusing on original quantitative and qualitative research.

Results: Ten publications met the inclusion criteria for this review. The majority highlighted climate change as a significant factor affecting maternal health, with climate-related anxiety linked to antenatal depression and worry. One study found that 81.6% of pregnant women expressed concerns for their children, connecting these fears to increased psychological risks, stillbirth, preterm birth, and developmental issues. Additionally, extreme weather events were found to significantly raise the risks of postpartum depression, post-traumatic stress disorder, and low birthweight infants.

Conclusions: Given the escalating impacts of climate change, it is crucial to further investigate its role as a significant stressor contributing to anxiety and psychological distress, especially among vulnerable populations like expectant women.

Keywords: Climate change anxiety, Antenatal depression, Expectant women, Antenatal distress

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Abstract ID: ABR145

Title: Spatial variability of summer temperature and its impact on all-cause mortality for Surat (coastal) city

Authors: Suresh Kumar Rathi*, P R Sodani

**Sumandeep Vidyapeeth, Vadodara*

Background: Global public health scenario is changing because of the remarkable burden of diseases and mortality due to climate change. Influence of extreme heat on mortality for Surat (coastal) city workers is currently one of the most demanding public health issues.

Objectives: To characterize the high ambient temperature effects on all-cause mortality for summer months (March to June) from 2006 to 2015 for urbanites of Surat (coastal) city.

Methods: A retrospective cross-sectional analysis of temperature, humidity, and heat index with all-cause mortality data of Surat city was conducted for the summer months for the years 2006 to 2015. Temperature and humidity data were obtained from Tutiempo Network, S.L., while data on deaths from Surat Municipal Corporation were utilized. Multiple linear regression and time series analysis were conducted.

Results: A total of 53,042 deaths were examined for 2006-2015 for 1,180 summer days. Mean daily mortality was 44.95 ± 8.52. Daywise mean deaths at Tmax of ≥40oC were 53.24 (18.4% rise). One-degree increase of HI leads to raising the deaths by 0.844 ($p<0.0001$). Lag impact of Tmax and HI on deaths was highest on the same day of Tmax ($r = 0.283$, $p<0.01$) and HI ($r = 0.302$, $p<0.01$). Tmax threshold was 40oC for increase in deaths.

Conclusions: A total of 53,042 deaths for summer of 2006 - 2015 were considered. Daywise mean deaths increased to 53.24 (18.4% rise) at Tmax ≥40oC. Every city is unique; hence, a city-specific heat action plan is required, especially for workers.

Keywords: Temperature, Coastal, Heat Index, Deaths

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Abstract ID: ABR146

Title: Heat related morbidity from tertiary care hospital: A cross-sectional study

Authors: Suresh Kumar Rathi*, P R Rathi

**Sumandeep Vidyapeeth, Vadodara*

Background: Many studies in India have looked at heat-related mortality; however, very limited evidence available regarding heat-related morbidity. However, the influence of extreme heat on morbidity is currently one of the most demanding public health issues.

Objectives: We tried to estimate the heat-related morbidity from a tertiary care teaching hospital during the summer of 2017.

Methods: Data on total admission, ICU referral, and deaths in ICU among referral patients were collected from the Medicine Department of a tertiary care teaching hospital through a summary sheet of the patients for the summer months (March to June) of 2017. Daywise temperature and humidity data were downloaded from Tutiempo Network, S.L. http://www.tutiempo.net/en/Climate/.html. Descriptive statistics were performed.

Results: Mean Tmax, humidity and heat index for 2017 summer were 34.66 ± 2.7oC, 63.72 ± 16.3% and 45.9 ± 5.9oC. There were only 9 days with Tmax ≥40oC. Total admissions in Medicine ward were 3,181 (Male = 1,666, Female = 1,515). Out of 3,181 cases, 2,909 were discharged, 77 died in the ward, 195 referred to ICU while 4 deaths among referral at Tmax ≥40oC. Daily mean ICU referral increased from 1.53 at Tmax <35oC to 1.71 Tmax ≥40oC.

Conclusions: High hospitalizations are linked with exposure to very high temperatures during summer. Although this study did not find any heat illness case but continuous exposure to high temperature for vulnerable population including workers may be responsible for heat illnesses.

Keywords: Temperature, Heat illness, Humidity, Workers

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POSTER SESSION 4

Theme: Innovations, Surveillance, and Waste Management (ISW)

Date: February 27, 2025**; Time:** 4:15 PM - 6:15 PM

Abstract ID: ABR006

Title: Assessment of Capacity Building of Asha and Community Health officers for Screening and Diagnosis of Copd and Asthma in Rural Area

Authors: Jayashree Gothankar*, Medha Bargaje, Sanjivani Patil, Ashwini Devane, Prakash Doke, Sachin Desai

**Bharati Vidyapeeth, Pune*

Background: COPD and asthma are impacted by environmental factors. These diseases are underdiagnosed in rural areas due to poor accessibility. Hence, capacity building and strengthening of the existing government resources will help early diagnosis and management of these chronic diseases.

Objectives: To assess the knowledge and skills learned for screening and diagnosis of COPD/asthma after capacity building of ASHA and Community Health Officers using OSCE

Methods: This is part of an ongoing study funded by ICMR. The ASHA and CHO under the selected Male PHC of the Pune district of Maharashtra were trained separately for three days. This is a pre-and post-test evaluation of training using a proforma and checklist for ASHA and an observed structured clinical examination (OSCE) checklist for CHO for COPD/ asthma.

Results: There was a significant improvement in knowledge of ASHA after training with the median score increasing from 0 [(IQR: 0, 0)] in the pre-test to 5 [(IQR: 4, 6] in the post-test ($p < 0.001$). Skills assessment showed around 25/35 (71%) of the ASHA could correctly do the peak flow metry. OSCE evaluation showed an increase in post-test skills of CHO however, the improvement was not statistically significant $p>0.05$.

Conclusions: Most ASHA and CHO could learn the knowledge and skills required to suspect and diagnose COPD. However, one more hands-on session will be conducted for CHO to make them competent to interpret the spirometry report independently.

Keywords: OSCE, peak flow metry, knowledge, skills, spirometry

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Abstract ID: ABR011

Title: Noise Matters: Exploring Nonauditory Health Impacts among Workers of Occupational Exposure in Northeast India

Authors: Abhishek Sinha*, Manasi Bhattacharjee, Krishnan Srinivasan, Sundareswaran Loganathan, Saklain Mustak Alam, Benzamin Hanse

**All India Institute of Medical Sciences, Guwahati*

Background: The global burden of disease has shifted to non-communicable diseases. Noise pollution at the workplace is shown to impair cognitive performance. There is an increase in the trend of nonauditory health impacts of noise pollution which are less documented.

Objectives: To assess the factory noise levels using a noise meter. To assess cognition using Reaction time, cardiovascular and metabolic function by measuring Blood pressure, heart rate, blood sugar, and cortisol

Methods: This study, was conducted from August 2023 to December 2023. A total of 590 participants provided written informed consent. Ambient noise levels were measured using noise level meters at various industry locations. Nonauditory health impacts were assessed using reaction time, blood pressure, heart rate, blood sugar, and cortisol before and after exposure to noise at the workplace.

Results: Area noise levels ranged from 62.2 dB to 91.8 dB. There was a significant increase in reaction time, heart rate, blood pressure, and blood cortisol in the post-exposure measurements ($p < 0.05$). More than 50% of the workers had blood glucose levels and cortisol above the reference range. A positive correlation was obtained between the noise stress level and reaction time.

Conclusions: The study shows that noise exposure led to an increase in reaction time, heart rate, blood pressure, blood glucose, and cortisol levels. There is a need for further evaluation and intervention on the nonauditory health impact of factory workers

Keywords: Noise stress, Occupational Health, Nonauditory Health Impacts, serum cortisol, Reaction time

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Abstract ID: ABR050

Title: Quantum of Biomedical Waste Generated During Covid-19 in a Tertiary Care Super Specialized Hospital in North India: Practices From Response to Recovery

Authors: Reema Kumari*, Kriti Srivastava, Ginic Gupta, Aakriti Verma

**K.G. Medical University, Lucknow*

Background: Biomedical waste disposal during covid-19 is an important issue; proper covid-19-related waste management is very essential step to slow down the infection rate. This study investigated the status of bio-medical waste management practices during the first wave of Covid-19

Objectives: quantification of wastes generated from different covid-19 management sites in a tertiary care hospital in North India.

Methods: Surveys and interviews with members of the Bio-medical waste management committee, staff members, waste handlers, and others engaged in the collection, transportation, and disposal processes were undertaken

Results: -Maximum (14,168 kg) waste generated from the isolation ward during September 2020 (peak of the first wave of covid-19) belonged to the yellow category and 3607 kg belonged to the red category and showed decreasing trend till January 2021. Almost 4205 kg of black category waste was generated from the quarantine area during August 2020 and showed decreasing trend till January 2021.

Conclusions: The quantity and composition of covid-19 waste were found consistent with the trend of covid-19 cases and evolving guidelines (sequential revisions) of the Central Pollution Control Board, India.

Keywords: Biomedical waste, COVID Waste, Waste management, ,

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Abstract ID: ABR072

Title: Gis-Aided Mapping and Assessment of Noise Pollution in Urban Puducherry, South India

Authors: Debajyoti Bhattacharya*, James Devasis, Mahalakshmy Thulasingam, Subitha Lakshminarayanan

**Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry*

Background: The World Health Organization (WHO) highlights noise pollution as the third most harmful contaminant, causing 45,000 disability-adjusted life-years in European countries. There is paucity of literature on the magnitude and dynamics of the extent of noise pollution in South India.

Objectives: This study aims to create a noise spatial profile of urban Puducherry, assess population impact for LAeq, and evaluate changes in noise levels from 2015 to 2021.

Methods: A cross-sectional study was conducted across 36 sites in Urban Puducherry (Puducherry & Oulgaret Municipality) covering 41.92 sq. km, including industrial, commercial, residential, and silence zones, as well as traffic junctions, using a Cygnet Datalogging Sound Level Meter (SLM) 2511.
Noise Mapping: Inverse Distance Weightage
Assessment of Population Affected: Zonal statistics
Map comparison: Compute Change Raster
(Using ArcGIS Pro 2.7)

Results: The interpolated surface showed the highest pollution in silence zones, with decibel levels of 82.00 dB to 83.10 dB during three-time slots. The study found that noise levels in T1 and T3 time slots affected 87.2% of the population (5.2 lakh) in 36 Sq. Km of the study area. Residential zones in T1, T2, and T3 experienced a 6.00 dB-8.00 dB increase in decibels, while silence and traffic zones experienced an average of 3.00 dB.

Conclusions: The Inverse Distance Weighted interpolation shows noise levels and their dynamics in the study area. The affected population map highlights the impact at various decibel levels, while the comparison map reveals increasing noise in residential areas of urban Puducherry.

Keywords: Noise Pollution, Spatial Analysis, ArcGIS, Interpolation

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Abstract ID: ABR073

Title: Solid Waste and its Role in Achieving Un-Sdgs

Authors: Anuj Dave*, Bhavya Pushkarna, Ekta Ram, Ankit Sheth

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: The solid waste management (SWM) has emerged as a critical factor in achieving the United Nations Sustainable Development Goals (UN-SDGs). Understanding this relationship is crucial for policymakers and stakeholders working towards sustainable development.

Objectives: To conduct a comprehensive review that maps and synthesizes existing research on the impacts of solid waste on each of the 17 Sustainable Development Goals (SDGs).

Methods: A review was conducted using systematic search strategies across Scopus and PubMed databases. Articles focusing on solid waste management and its connection to UN-SDGs were analyzed. Using the PRISMA checklist, we included 13 relevant studies for the review out of a total of 4505 published articles between 2015 and 2024, encompassing both developed and developing nations.

Results: This study revealed that Solid Waste adversely affects all of the SDGs. The findings indicated that, SDGs 3 (Good Health and Well-being), 7 (Affordable and Clean Energy), 12 (Responsible Consumption and Production), and 13 (Climate Action) emerged as the most frequently impacted goals. The key pathways through which SWM contributes to SDGs targets include, reduced environmental impact through improved collection systems (11.6), enhanced resource efficiency through recycling and recovery (12.5), and improved public health through better waste handling practices (3.9).

Conclusions: The evidence suggests that effective SWM is fundamental to achieving multiple UN-SDGs, particularly in urban environments. The review highlights the need for integrated approaches that consider waste management's multifaceted impact on sustainable development.

Keywords: Waste, Solid Waste Management, Sustainable Development Goals, UNSDGs, Review

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Abstract ID: ABR100

Title: Sustainable Care or Compromised Health? the Risks of Telemedicine for Healthcare Professionals

Authors: Padmashree Ganapathyraman*, Nandita Chaurasia, Pallavi Joshi

**Amity University, Noida*

Background: The healthcare sector contributes 4.6% of greenhouse gas emissions, primarily from patient travel. While telework provides various advantages, it also poses serious health concerns. Remote work can result in musculoskeletal disorders stemming from poor ergonomics, sedentary behaviour and psychosocial factors.

Objectives: To study the health risks among telemedicine workers due to sedentary work, poor ergonomics and psychosocial factors. To highlight the importance of promoting worker health and wellbeing amongst telemedicine workers.

Methods: An online cross-sectional survey was conducted on ~384 telemedicine workers aged 25 years and above, assessing demographics, musculoskeletal injuries, pain perception, and mental health using the Modified Nordic Musculoskeletal Disorder Questionnaire, McGill Pain Questionnaire, and General Health Questionnaire-28. Descriptive and inferential statistics were used to analyse relationships between injuries, mental health, and working hours/ conditions.

Results: In our study about 89.6% teleworkers reported musculoskeletal disorders (MSDs) particularly in the neck, back, and upper limbs. Teleworkers reporting chronic pain were found to be at higher risk of mental health issues, such as anxiety and depression. (OR: 3.96, $p < 0.05$). Our results highlight that health of telemedicine workers should remain a priority amidst environmental advocacy efforts.

Conclusions: While telemedicine promotes sustainability, addressing musculoskeletal injuries and mental health through ergonomic improvements is essential to ensure a healthy workforce in this growing sector.

Keywords: telemedicine, ergonomics, sustainable care, musculoskeletal disorders, mental health

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Abstract ID: ABR104

Title: Detecting Structural Changes in Lungs with Rib Boundary Segmentation

Authors: Agraj Abhishek*, Manika Sharma, Manjula Singh

**Institute for Plasma Research, Gandhinagar*

Background: At the Chest X-Ray image pixel level, rib boundaries variation acts as key anatomical landmarks for detecting structural changes in the lungs, such as nodules or small opacities, often associated with Silicosis diseases.

Objectives: This study focuses on rib boundary/diaphragm region detection in chest X-rays (CXRs) as a foundational method for analyzing respiratory health abnormalities.

Methods: We developed an automated AI-driven framework for precise rib boundary segmentation in CXRs. The model has been trained on more than 2000 CXR image dataset with at least 5000 individual data points. Each individual datapoints contains posterior rib structure/diaph. in left/right lung field. AI models are trained for atleast 100,000 epochs to correctly identify the rib structure on new images.

Results: Mean Precision Accuracy(mAP) of more than 0.4 has been obtained on the test dataset to correctly identify and count the number of ribs in X-Rays under different exposure criteria. The AI model correctly identifies ribs and diaphragm variants on test X-Rays with more than 96 % accuracy. Additionally, the feature variations between the rib and intercostal region is used to detect & quantify the abnormality in the lung field.

Conclusions: By linking anatomical findings to broader health assessments, this study underscores the potential of rib boundary detection in advancing interdisciplinary research detection of silicosis disease.

Keywords: Artificial Intelligence, Rib Boundary Detection, Silicosis

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Abstract ID: ABR128

Title: Leveraging Eco-Schools to Address Environmental Health Challenges in Rajkot

Authors: Ekta Vyas*, Ashok Raisinghani, Azharuddin Saiyed, Neha Hathiari, Vipul Parmar, Sreyas Sajeevan

**John Snow India Private Limited, Rajkot*

Background: The USAID-funded Asia Resilient Cities (ARC) Project promotes sustainable growth and climate-conscious solutions to tackle urban challenges in select Asian cities. In Rajkot, addressing poor air quality, waste management, and public health through sustainable education solutions is essential.

Objectives: To integrate sustainability in schools, raise health awareness, and empower students and communities to mitigate environmental health risks.

Methods: The Resilient Eco-School initiative under the ARC Project fosters the "Changing Minds, Changing Practices, Changing Systems" approach, transforming school spaces with climate-resilient initiatives like solar electrification, green buffers, and promoting sustainable practices. Collaborations with RBSK and UPHC facilitate health camps for students. A mixed-methods approach assesses outcomes through quantitative health data and qualitative observations.

Results: This initiative guided eight targeted Eco-schools through fostering improved health, well-being, and sustainable behavior change among students and the wider community. Health camps and eco-practices strengthened student resilience, environmental awareness, and long-term positive behavioral changes. This ensures a long-lasting positive ripple effect of reduced ecological footprints and enhanced community health.

Conclusions: This initiative fosters sustainable urban development by promoting healthier, more eco-conscious futures through active community engagement and environmental education. Its impact reaches beyond the classroom, driving awareness and action from the school community to the wider urban environment.

Keywords: EcoSchools, Urban Health, Environmental Health, Community Engagement, Sustainability

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Abstract ID: ABR143

Title: Biochanin-A attenuates cadmium-induced oxidative damage by modulating Nrf2/HO-1 signaling in Swiss albino mice

Authors: Dharati Parmar*, Swapnil Tripathi, Gyanendra Singh

**ICMR National Institute of Occupational Health, Ahmedabad*

Background: Cadmium (Cd) is a heavy metal pollutant that adversely effects the kidney. Oxidative stress, mediated by reactive oxygen species, is a hallmark of major mechanisms of Cd-induced kidney injury. Biochanin-A (BCA) is a phytoestrogen possessing antioxidant and free radical-scavenging abilities.

Objectives: The goal of the current investigation is to explore the therapeutic potential of BCA in Swiss albino mice exposed to Cd for mitigating renal toxicity effects.

Methods: Cadmium chloride (75 ppm) was given in drinking water to induce renal toxicity, conjugated with BCA (50 mg/kg each) intraperitoneally for 2 weeks as per the body weight of each mouse. After the treatment period, mice were sacrificed and kidney tissues were harvested to analyze the kidney somatic index, oxidative stress indices, and relative mRNA expression of Nrf2 and HO-1.

Results: Statistical analysis revealed the slight decrease in the body weight along with the concomitant increase in the kidney somatic index (KSI), protein carbonylation, and renal malondialdehyde in the Cd-treated group. Also, multiple antioxidant indicators (catalase, superoxide dismutase, glutathione-S-transferase, reduced glutathione, and total thiol) were found to decrease concurrently. Moreover, there was a downregulation observed in the Nrf2/HO-1 relative expressions. On the contrary, treatment with BCA mitigated the renal ROS and upregulated the Nrf2/HO-1 mRNA relative expressions.

Conclusions: The findings show that BCA can effectively scavenge ROS and minimize Cd-induced renal damage by combating oxidative stress and upregulating the Nrf2/HO-1 signaling. Hence, BCA can be a promising therapeutic agent against Cd-induced chronic kidney diseases.

Keywords: Cadmium, Reactive oxygen species, Oxidative stress, Renal toxicity, Biochanin A

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Abstract ID: ABR158

Title: Increase in discard of wired earphones during summer in higher education learners – A possibility of repurposing them

Authors: Cipra Sahu, Dharaneesh K*, Sayanth Sunil, Jayakumar Rajamani, Wagdevi Pakki

**Kalinga University, Raipur*

Background: We started an e-waste project at our university, surveyed students, discovered a widespread use of earphones, and identified a lack of proper disposal knowledge. We analyzed the data and developed a solution for the proper disposal of e-waste.

Objectives: Reduce environmental and health threats from e-waste by promoting sustainable disposal, particularly for earphones, to minimize metal waste impact and raise awareness among youth.

Methods: We used a recycled plastic basket, 15-30 obsolete earphones, a strong cardboard sheet, and glue to create a bin for waste separation. By placing various wastes like leaves, paper, plastic, and metal pins in the bin and flipping it, we found that only the metal items stayed stuck, effectively separating metal waste from regular waste.

Results: we inferred that the use of earphones is popular among higher education learning systems, but they are not aware of the proper disposal of the discarded earphones. Many of the e-waste have become obsolete. So, we have analyzed and came up with the solution, also this creates a great impact in climate, and these are mostly getting dysfunctional during summer seasons, so they e-waste pool is filled quicker during summer.

Conclusions: E-waste, particularly earphones, poses environmental and human threats. Our thesis found earphones rank highest in e-waste among youth, mainly disposed in summer due to damage. We propose a sustainable model to repurpose earphones and reduce metal waste impact.

Keywords: Wired earphones, Magnetic dustbin, Health risk management, Environment sustainability

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Abstract ID: ABR159

Title: An Assessment of the Guideline on Biomedical Waste Management in a Clinical Laboratory: A Study from a Tertiary Care Hospital

Authors: Tushar Sehgal*

**All India Institute Of Medical Sciences, New Delhi*

Background: "Bio-medical waste (BMW)" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining
thereto or in the production or testing of biological or in health camps.

Objectives: 1. To assess whether the BMW generated in a clinical laboratory is disposed as per guidelines.
2. To educate the technical staff handling the BMW.

Methods: 25 technical staff members were included in this cross-sectional study over a period of 1 month. The color- coded bins for BMW disposal were provided by the hospital stores. The staff members were monitored by a technical officer (expert) on the disposal of the BMW. The observations were recorded in an excel based on BMW disposal guidelines as follows https://cpcb.nic.in/uploads/projects/bio-medical-waste/guidelines_healthcare_june_2018.pdf.

Results: The male: female ratio was 6:1. The nature of the BMW generated in the clinical laboratory in one shift was as follows- blood sample vacutainers, gloves, cuvettes, paper waste, food waste, blood-stained glass slides, staining solution. On analyzing the results, we found that 20/25 (80%) technical staff were compliant towards the BMW disposal, rest were not. The reasons provided by the non-compliant staff were non-awareness of the BMW guidelines and lack of certainty regarding the disposal of some waste products.

Conclusions: We observed that 20% of the staff didn't adhered to the policy.They were educated about its correct disposal and grave implications it may have on the environment,injuries to sanitation workers and spread of infectious diseases, if not done properly.

Keywords: Biomedical waste, Clinical Laboratory, Disposal, Environment, Sanitation workers

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Abstract ID: ABR160

Title: Waste Education is Not a Waste!

Authors: Bhoj Raj Verma*, Tushar Sehgal

**All India Institute Of Medical Sciences, New Delhi*

Background: Health care facilities workday in and day out to help people recover from illness, but the medical waste produced through these activities can pose a problem if an appropriate medical waste management system is not available or followed strictly.

Objectives: To understand the key medical waste problems to develop an effective health care waste management plan for testing laboratories, generating medical waste.

Methods: This was a cross-sectional study conducted over 1 month. A NABL accredited 24X7 emergency laboratory handling blood and fluid samples located in the premises of the hospital was selected. An online questionnaire was circulated to all the staff members. This questionnaire consisted of 44 selfconstructed questions regarding the type, quantity, bins, segregation,decontamination of the medical waste generated in the lab.

Results: Twenty staff members including lab attendants, technologists and technical officers participated in the study. Male to female ratio was 5.5:1. The mean age was 42 years. The scores of each respondent were calculated and ranged from 25-37. To obtain the usability score, System Usability Scale (SUS) score was applied. With mean score of 66.86 (SD 16.5), the responses were considered nearly good based on the SUS.

Conclusions: This study demonstrates that the staff's knowledge about the biomedical waste is close to good. It was determined that more importance needs to be given to waste disposal to eliminate the health hazards related to medical waste disposal.

Keywords: Laboratory waste, Waste education, medical waste problem

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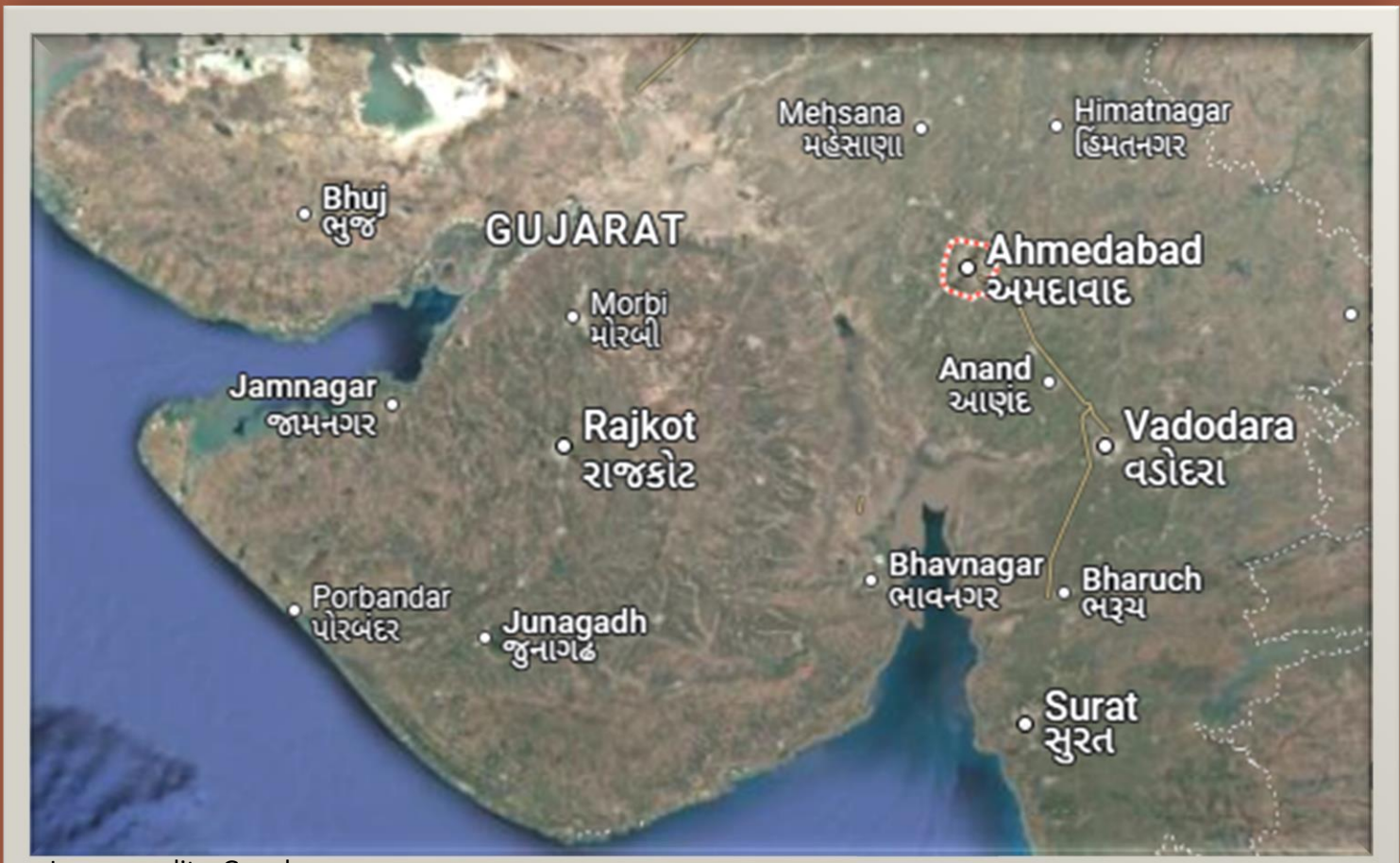

Image credits: Google maps

Ahmedabad

A City & Its Flavors

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Ahmedabad: A Cultural & Culinary Delight

Ahmedabad, one of India's most vibrant cities, is known for its rich history, stunning architecture, and, most importantly, its incredible food culture. Whether you are a history enthusiast or a food lover, Ahmedabad offers an experience unlike any other. The city boasts a perfect blend of tradition and modernity, from its bustling markets to its peaceful Sabarmati Riverfront.

Image credits: Dr. Soundarya

Ahmedabad – an aerial view in the night

Ahmedabad: A Cultural & Culinary Delight

Places to Explore

Sabarmati Ashram – Experience the legacy of Mahatma Gandhi.

Walk through his humble abode, explore the museum, and witness artifacts that shaped India's freedom movement.

Image credits: Tripadvisor.com

Kankaria Lake – A scenic recreational area perfect for a relaxed evening.

Enjoy a leisurely stroll, a toy train ride, or the vibrant atmosphere with food stalls and entertainment.

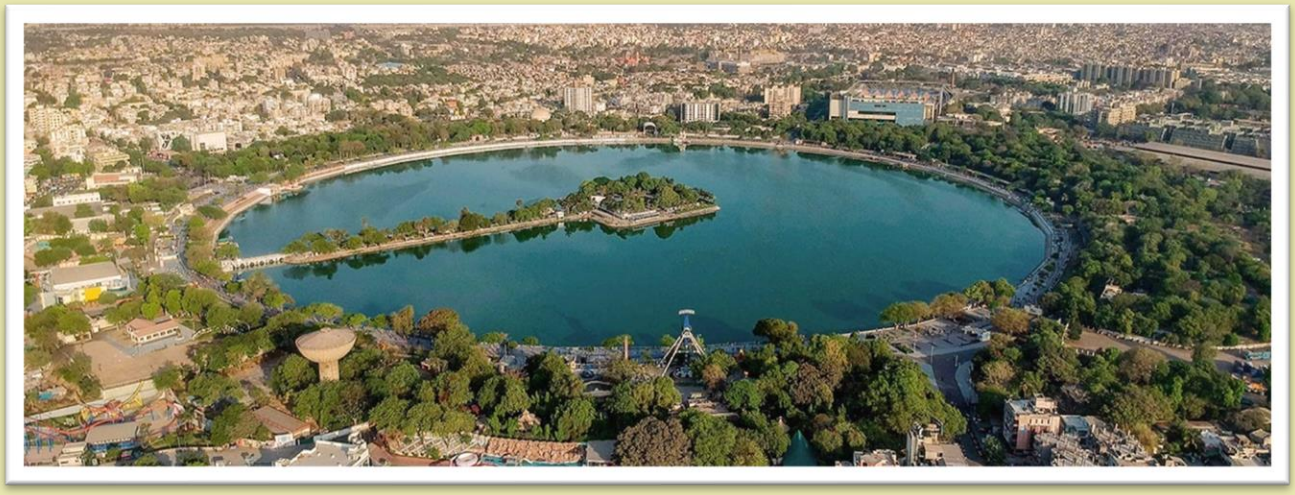


Image credits: Tripadvisor.com

Ahmedabad: A Cultural & Culinary Delight

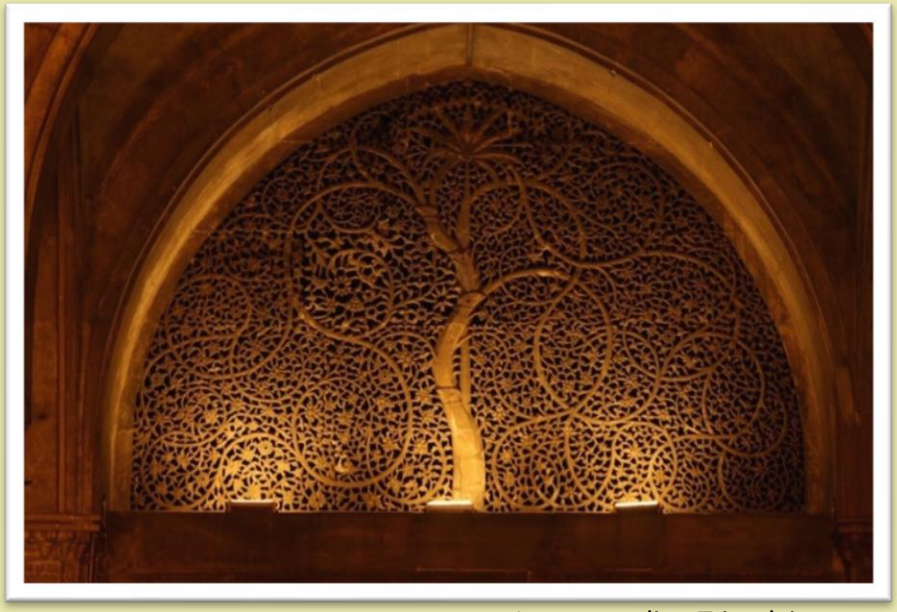
Adalaj Stepwell – An architectural marvel with intricate carvings.

This centuries-old stepwell showcases Indo-Islamic craftsmanship and served as a resting place for travellers.

Image credits: Tripadvisor.com

Sidi Saiyyed Mosque – Known for its magnificent stone latticework.

The mesmerizing 'Tree of Life' jali windows are a fine example of intricate Mughal-era artistry.



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Ahmedabad: A Cultural & Culinary Delight

Law Garden Night Market – Ideal for shopping traditional handicrafts.

Discover exquisite Gujarati embroidery, vibrant textiles, and handcrafted jewellery in this lively bazaar.

Image credits: Tripadvisor.com

Atal Bridge - A stunning pedestrian bridge offering breath taking views of the Sabarmati River. The colourful, illuminated bridge provides a picturesque spot for an evening walk.

Image credits: Tripadvisor.com

Ahmedabad: A Cultural & Culinary Delight

Adalaj Trimandir - A serene temple complex blending traditions. This spiritual retreat features grand idols, a peaceful ambiance, and lush green surroundings.

Image credits: Tripadvisor.com

Sabarmati Riverfront – A scenic waterfront promenade in the heart of Ahmedabad.

Take a refreshing walk along the beautifully landscaped promenade, enjoy a boat ride, or simply relax while soaking in the serene views of the Sabarmati River.

Image credits: Tripadvisor.com

Ahmedabad: A Cultural & Culinary Delight

Culinary Heritage: What to Eat?

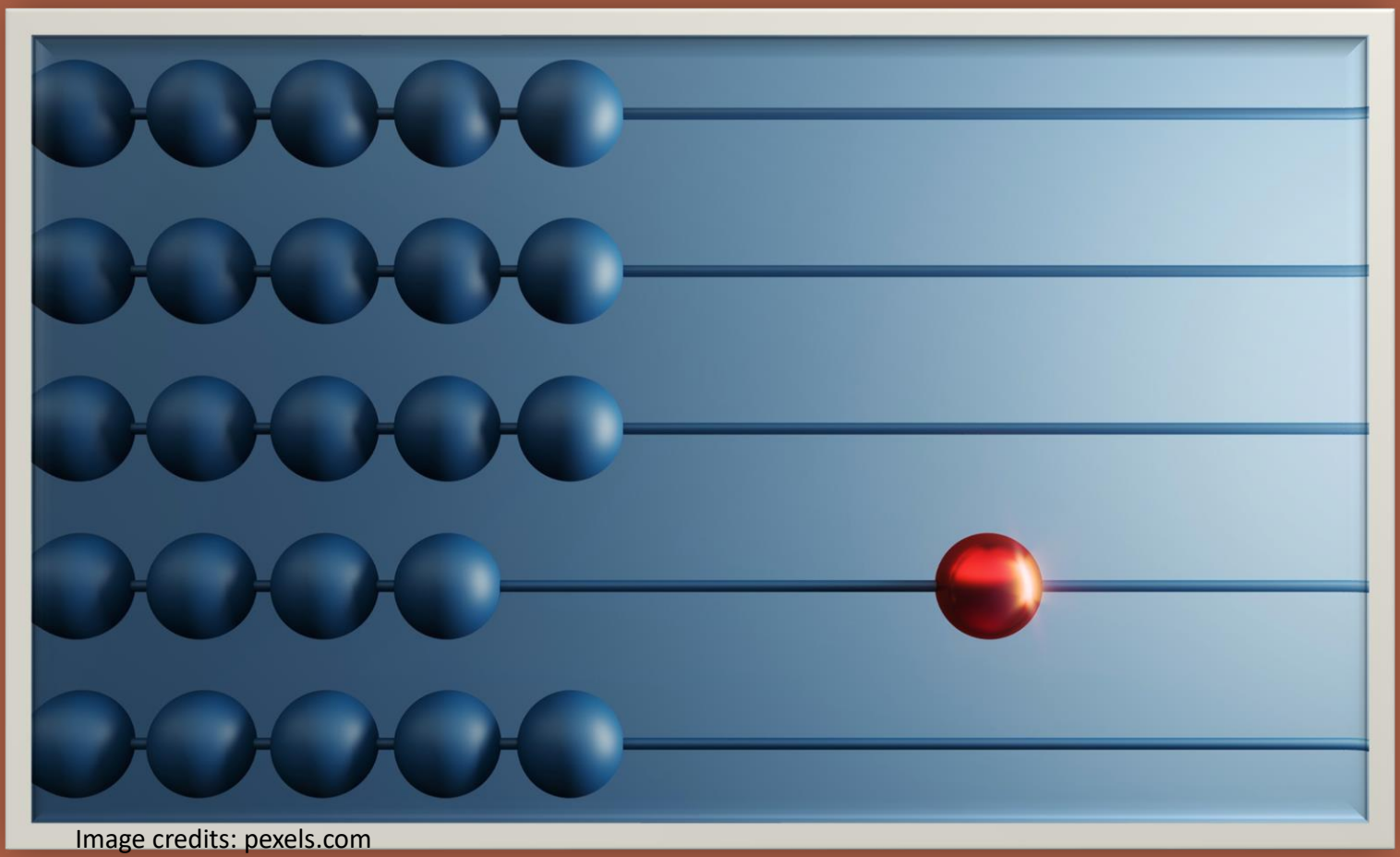
Ahmedabad's food scene is a paradise for foodies, offering a mix of street food and traditional Gujarati cuisine. Some must-try dishes include:

- **Dhokla & Khaman** – Soft, spongy, and lightly spiced, perfect for breakfast or snacks.
- **Fafda & Jalebi** – A crunchy and sweet combination best enjoyed on Sunday mornings.
- **Sev Usal & Locho** – Lesser-known but absolute delights for spice lovers.
- **Gujarati Thali** – A wholesome meal with dal, kadhi, rotis, shaak (vegetables), and sweets.

Souvenir Tip: Take Home a Taste of Ahmedabad!

Before you leave, don't forget to pack a few goodies. A trip to Ahmedabad is incomplete without taking home a packet of **Khakhras** – the perfect crunchy, healthy snack that embodies the flavors of Gujarat. Visit local stores or try fresh ones from the city's many street vendors.

Enjoy your time in Ahmedabad, and let the flavors and culture leave you with unforgettable memories!



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First-time attendee guide

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Welcome, First-Time Attendees!

If this is your first conference ever—welcome! Taking this leap is a big step, and we applaud you for it. Every one of us was once in your shoes, and there's always a first time.

The most important thing to remember? **You belong here**. No matter where you're from or what you study or do, this space is for you.

Feel free to ask questions, start conversations, and connect with others. Our organizing team is here to support you—don't hesitate to reach out if you need anything.

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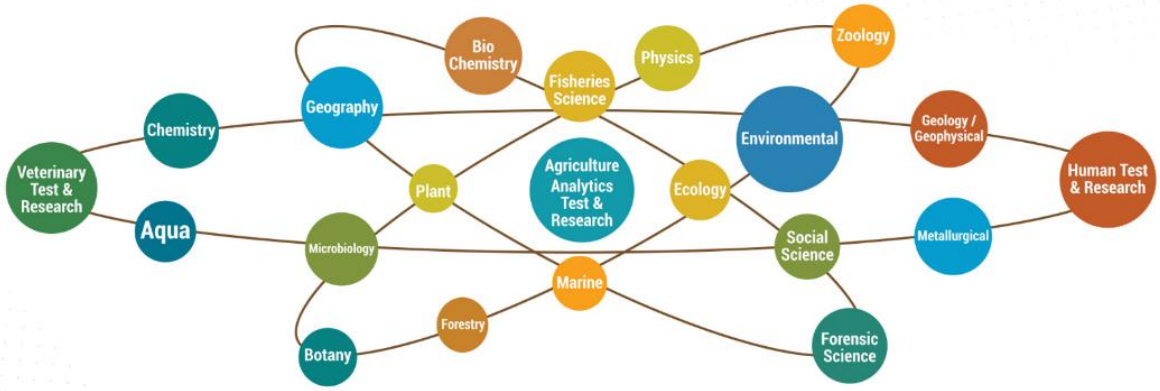

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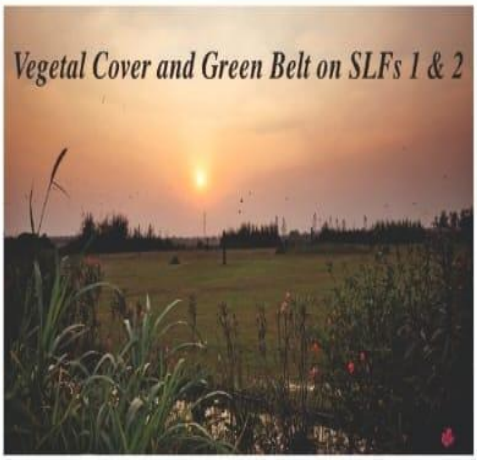

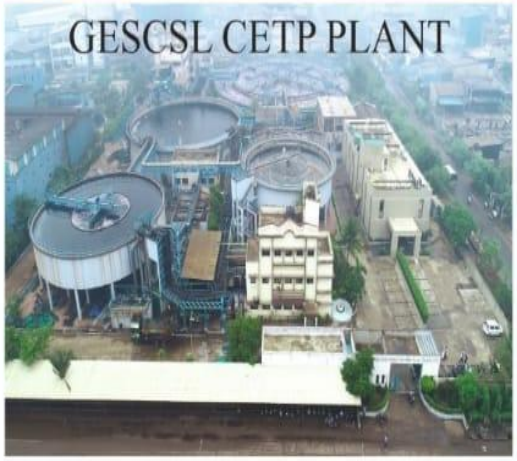

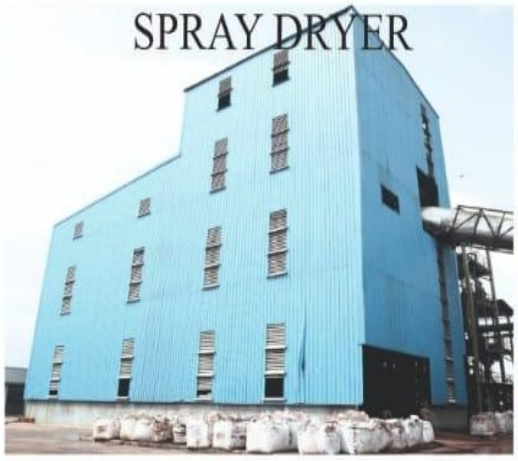

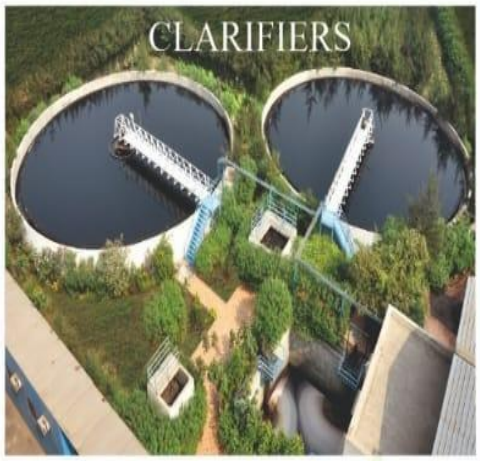

ABOUT GESCSL

➔ The Vatva Industrial Estate was established by GIDC in the year 1968.
➔ The Green Environment Services co-op. Society Ltd. (GESCSL) was formed in 1992 under the society act to establish Common Facilities to cater the issues of Treatment of Industrial Waste water and Safe disposal of Haz. Solid Waste Generated by its Members.

UNIQUENESS

➔ Only estate in the country which has all pollution control common facilities viz. CETP, TSDF, FCR, and Spray Drier , under Co-operative body.
➔ The cheapest and most efficient internal effluent collection system which envisage 100% control over quality and quantity of the effluent discharged by the member unit.
➔ CETP does not have any flow diversion arrangement.
➔ Online TOC at the CETP outlet is monitored on hourly basis and data transferred to GPCB.
➔ Billing and monitoring visit of member unit is being done based on software.
➔ The treated effluent in conventional treatment go for further treatment in one of the world's most advanced oxidation technology called Fenton Catalytic Reactors (FCR) to reduce non-biodegradable matters from the effluent in order to achieve the GPCB discharge norms.This is the first installation in india.TheFCR plant is in operation since December - 2021.

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underground gas leak detector

Indoor Air Quality (IAQ)

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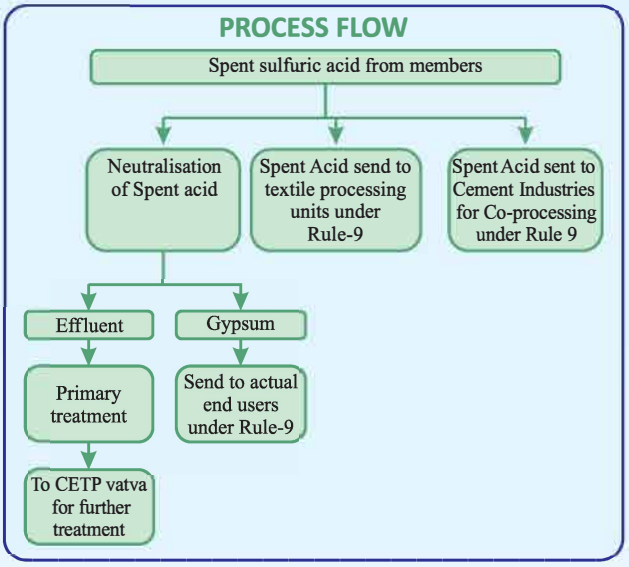
NOVEL
SPENT ACID MANAGEMENT
SPENT ACID BANK & GYPSUM WASHERY PROJECT
COMMON ENVIRONMENTAL TREATMENT FACILITY

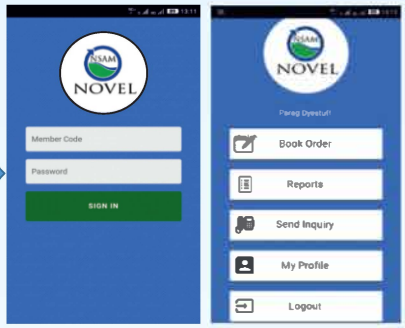
SPENT ACID MANGEMENT
A unique facility for managing the spent sulfuric acid

- Novel Spent Acid Management was formed in 2009 by a consortium of the Naroda, Odhav, and Vatva Industrial Associations.
- It is India's first and unique Common Spent Acid Management Plant, located at GIDC Vatva, Ahmedabad.
- An investment of Rs. 30 crores was made, with financial aid from both the Central and State Governments.
- It is authorized by the Gujarat Pollution Control Board (GPCB) to collect spent sulfuric acid from across Gujarat.
- Novel plant is responsible for treating the acid and dispatching it to actual users under Rule 9 of the Hazardous Waste Rules 2016, for co-processing and neutralization.
- The concentration of sulfuric acid in the spent acid typically ranges from 5% to 50%, with some units more than 50%.
- Novel Spent Acid Management handles 1,000 metric tons per day of spent sulfuric acid at a 30% acidity level.
- To date, 2.6 million tons of acid have been treated, resulting in the production of 1 million tons of chemical gypsum, which is supplied to the cement industry for co-processing.
- The segregation and collection of the spent acid is carried out on-site in separate tanks, based on the concentration and other properties of the acid.
- The colorless and concentrated spent acid is also directly supplied as a neutralizing agent for wastewater treatment.
- A portion of the spent acid is supplied to manufacturers of ferrous sulfate, alum, single super phosphate, and cement for co-processing under Rule 9.
- The relatively dilute and colorless spent acid is neutralized using limestone powder and hydrated lime to produce gypsum, which is then supplied to cement industries as an alternative fuel and raw material (AFR).
- The wastewater generated at the facility is treated in situ through an Effluent Treatment Plant (ETP), which consists of primary and secondary treatment processes.
- The treated water is then sent to CETP in Vatva for further treatment and disposal.
- This facility serves as a prime example of waste reuse and recycling.

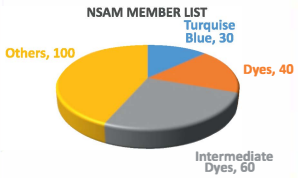
PROCESS FLOW



Mobile Application launched for the Members for Registering the Tankers, Bill Payment, Raising Quarries and view the results



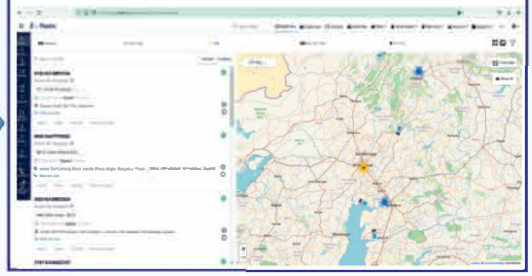
MEMBER COMPANIES



NSAM Member List	
Products	No. of Members
Turquise Blue	30
Dyes	40
Intermediate Dyes	60
Others	115
Total Members	245

For the Transportation of Spent Sulfuric Acid Novel Spent Acid Management has followed bye GPCB (Gujarat Pollution Control Board) guideline. All Tankers have latest AIS-140 GPS Tracking System.

TANKER TRACKING SOFTWARE



With Best Regards From :

Bhupendra C. Patel
Chairman
& Board of Director

NOVEL
SPENT ACID MANAGEMENT

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