II. Natural Hazards and Climate Change Conference

Session 6 Health, Hazards and Awareness

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Role of public health in addressing emerging natural hazards

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Environmental health is a multidisciplinary field addressing the health impact of physical, chemical and biological environmental stressors and the means of risk mitigation. Looking back to the past decades, the fundamental role of environmental health in improving health conditions of the population, increasing life expectancy is obvious. Drinking waterborne outbreaks have practically disappeared, toxic compounds, such as lead and other heavy metals or carcinogenic substances in retail products are strictly controlled and regulated and the quality of urban environments have also improved. In spite of stronger and wider environmental protection regulation, monitoring and large-scale environmental protection and remediation programs, the environmental burden of disease remains significant (approx. 12-20%). Among children (age group 0-18 years), one-third of the total disease burden is attributable to unsafe or unhealthy environment. The mandate of environmental health is unchanged, but the approach needs to change to address emerging challenges from the multifaced impacts of climate change to the geological hazards of water quality. Adequate response strategies to climate change include reducing excess morbidity and mortality of heatwaves through early warning and corresponding adaptation plans or reducing biological risk associated with ragweed pollen dispersion and other allergens. Combatting infectious diseases associated with climate change (e.g. vector-borne diseases) and the drinking water quality improvement programs targeting geological arsenic in many drinking water sources were and still are important means of health protection. Protection against natural hazards became an integrated part of public health action. The National Center for Public Health and Pharmacy has a coordinative role in this action, through providing guidance and support. The internationally recognized outstanding achievements of NCPHP lead to the establishment of the WHO Collaborating Centre on Environmental Health Risk Management under its auspices. The Collaborating Centre offers health protection strategies towards continuously changing and emerging challenges.

Impact of Urban Green Spaces on Heatwave Mitigation in a Medium-Sized City

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In response to increasing urban populations and climate change, this study examines the role of urban green spaces in mitigating human heat stress during heatwaves in Szeged, Hungary. Utilizing the MUKLIMO_3 micro-scale climate model and the Klima-Michel model's perceived temperature (PT) result, the research evaluates the impact of diverse vegetation types, densities, and placements on thermal comfort. The analysis, grounded in the Local Climate Zone (LCZ) system, explores the effects of added vegetation and protective forests on daytime and nighttime thermal load. Findings reveal that strategically implemented dense urban greenery can significantly reduce PT, achieving cooling effects of 2-3 °C in localized areas during daytime heatwaves. However, the study also highlights the potential for dense vegetation to obstruct airflow, resulting in localized warming of 1-3 °C in downwind regions. Furthermore, the impact of green spaces on nighttime temperatures is complex, certain patterns may increase heat trapping. This research represents city-wide human comfort simulations, demonstrating the nuanced relationship between urban vegetation and thermal comfort. The findings underscore the importance of considering microclimatic factors, including regional wind patterns, during urban green space development. Strategic planning, coupled with appropriate access to green spaces, is crucial for enhancing city resilience to climate change and optimizing green infrastructure for maximum cooling benefits. This study contributes to a deeper understanding of urban greenery's microclimatic benefits, particularly in medium-sized cities, and provides a framework for future urban climate modeling using the LCZ system for thermal comfort optimization.

Enhancing Climate Change Awareness in Medical Education: Assessing the Impact of CLIMATEMED Workshops in Serbia

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Climate change presents a significant challenge in Serbia, particularly in the healthcare sector, where there is a notable gap in formal education about its impacts. This study aimed to enhance awareness and capacity regarding climate change through workshops across project partner countries, including Serbia. Methods: The study employed a mixed-methods approach, gathering qualitative data through World Café workshops with medical students, and academic staff from the University of Novi Sad, and practicing physicians from the Health Center of Novi Sad and quantitative data via online questionnaires from 150 participants (36 students, 23 academics, and 91 physicians). We assessed their awareness, existing knowledge, and attitudes towards integrating climate change into medical curricula. Results: Analysis revealed a significant awareness gap: 50% of medical students, 34.8% of academics, and 39.6% of physicians reported no formal education on climate change impacts. Students strongly advocated including climate-related topics in pre-clinical courses, favoring interactive workshops and fieldwork. Furthermore, academics and physicians emphasized the necessity for multidisciplinary collaboration and resource availability for effective curriculum reform. Discussion: These findings underscore the urgent need for comprehensive curriculum reform in medical education. The goal is to equip healthcare professionals with essential knowledge about climate change. Collaborative efforts between medical schools and climate experts are vital for developing high-quality educational resources. Conclusions: Integrating climate change education within medical curricula is crucial for preparing healthcare professionals to address emerging public health challenges. The CLIMATEMED initiative demonstrates effective collaborative learning and offers a promising pathway to enhance climate-related education in Serbia's healthcare system.

Keywords: Climate change, health, medical education, Serbia, curriculum, healthcare professionals, knowledge gap, educational interventions.

Impact of Seasonal Heating and the COVID-19 Pandemic on PM_{10} Levels in European Cities

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The COVID-19 pandemic significantly altered human activities, leading to substantial changes in air pollution levels worldwide. This study examines temporary variations in PM_{10} concentrations across three distinct periods: pre-COVID (2018–2019), Pandemic (2020–2021), and post-COVID (2022–2023), within different Heating Degree Day (HDD) groups (Cold, Mild, and Temperate). Utilizing the Kruskal-Wallis test, we identified statistically significant differences in PM_{10} levels across these periods for all HDD groups. Pairwise comparisons confirmed notable period-to-period variations, particularly in the Temperate HDD group, where air quality fluctuations were most pronounced. PM_{10} concentrations were analyzed by season, dividing the year into Heating and Non-Heating periods based on the heating (HDD)and Cooling (CDD) degree days. Cold countries, mainly developed countries such as Norway, Sweden, Finland, and Iceland, exhibited the lowest mean PM_{10} concentrations during Heating periods. This is likely due to advanced heating technologies, stricter environmental regulations, and the widespread use of cleaner energy sources. The Temperate HDD group, including countries such as Germany, Hungary, Poland, Romania, etc, exhibited the most pronounced fluctuations in PM_{10} levels, with a notably high effect size (η^2 = 1104), suggesting a heightened sensitivity to pandemic-induced activity shifts, including changes in industrial activities and mobility restrictions. These findings underscore the critical importance of robust air quality control, particularly in regions with higher heating demands.

Keywords: PM; Heating Degree Days, COVID-19, Air Quality, Seasonal Variations

The Occupational Health and Safety of Climate Migrants through Accelerating Co-Innovation Capacity Building: A Conceptual Paper

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The Occupational Health and Safety of Climate Induced Labor Migrants has been recognized as a main pillar of resiliency policy planning, underlining the need for newer ways of stakeholder collaboration. In line with same „research and academia" have contributed to the development of tools for assisting the „employers" and in many incidences the Migrant Workforce.

The current conceptual paper is an attempt to contribute to the on-going research through proposing newer methods of accelerating co-innovation across sectors in order to achieve resilience at the level of the labor, the employers and the community. The study has used methods of Appreciative Inquiry, Circular Economy and the Quintuple Helix 6.0 for building Co-Innovation Platforms contributing to multi-task development using prediction tools.

Conclusions of the mentioned models show relevance in this field.

Non-Expert Understanding of Hazard Maps: An Eye-Tracking Study

Solmaz Mohadjer, Gökce Ergün, Max Schneider, Tom Schürmann, Michael Pelzer, and Peter Dietrich

We investigate how well hazard maps are understood and interpreted by non-expert audiences. We tested two earthquake hazard maps of Germany that differ in color palettes (rainbow vs. colorblind-friendly and perception-optimized yellow-orange-red-brown color palettes) and data classification schemes (algorithmic Fisher vs. quasi-logarithmic classification schemes). We showed both maps to 18 non-expert participants during the 2024 Science & Innovation Days (a public engagement event) in Tübingen, Germany. Participants answered map-reading and hazard perception questions while their eye movements were monitored with eye-tracking software.

The results indicate the following tendencies in the data: (1) the map reading accuracy appears to be higher for the redesigned map, (2) the redesigned map focuses the users' eye movements more on the high hazard zones and the corresponding values on map legend, and (3) both maps are indistinguishable in how they improve users' hazard perceptions. These tendencies encourage the repetition of the study with a larger sample size.