II. Natural Hazards and Climate Change Conference

Session 3 Climate-Health Nexus

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Eco-Anxiety and Beyond: Understanding the Mental Health Dimensions of Climate Change

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As climate change continues to reshape our world, its effects extend beyond environmental shifts, influencing public health in profound ways. One critical yet often overlooked aspect is the impact of climate change on mental health. Extreme weather events, displacement, and ecological disruption create a cascade of psychological challenges, from increased anxiety and depression to post-traumatic stress disorder (PTSD) in affected communities. The mental health consequences of climate change are particularly pronounced among vulnerable populations (children, the elderly, health care workers, etc.), who face disproportionate exposure to environmental stressors. There is increasing evidence that the climate crisis negatively affects mental health, leading to worse outcomes for individuals with pre-existing mental health conditions during climate-related disasters. This includes higher suicide rates and a general decline in mental well-being. People with conditions like schizophrenia and depression are at greater risk of dying during heatwaves. Additionally, some communities are facing ongoing grief and a heightened risk of disorders like post-traumatic stress disorder due to the frequency of extreme weather events. It is also of high importance shedding light on the rise in eco-anxiety—a growing phenomenon where individuals experience distress due to the uncertainty of the planet's future. There is a need for a multi-disciplinary approach in addressing these issues, with a focus on integrating mental health support into climate change adaptation and mitigation strategies. By prioritizing mental health in the climate change dialogue, we can foster more sustainable, adaptive societies that are better equipped to face the challenges of an increasingly unpredictable world.

TÉR-EPI: a specialised spatial epidemiology system for monitoring population health at high resolution

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Background: Systematic and ongoing collection, analysis, and interpretation of data on the population health status and its determinants is essential for the planning and evaluation of public health services and for health policy planning.
Results: Within the framework of the National Laboratory for Health Security, the Epidemiology and Surveillance Centre of Semmelweis University has developed and implemented the TÉR-EPI system to characterise and map the health status of the population, together with some determinants, by sex, age and study period, in a dynamic, interactive format. The spatial distribution of the selected indicators can be rapidly visualised at the county, district or municipality level, according to the user's needs (limited by data availability and statistical methodology).
The indicators are currently available in three modules: mortality; vital statistics, socio-economic status.
The map application shows the spatial distribution of indicators. It is complemented by a range of additional functions that allow users to examine the indicators for a given area and to track changes over time.
The profile function provides a quick summary of the health status of the population in a specified area for a selected group of indicators compared with the national average. In the case of mortality, the indicators have been aggregated over the last five years (by age group, sex, at the county, district, and municipality level), while in the case of vital statistics, indicators can be obtained for the last year available.
Summary: The TÉR-EPI has been developed to utilise the most recent geographic information systems and spatial epidemiological methods to describe and analyse the morbidity and mortality of the population at high resolution, with certain risk factors. TÉR-EPI can be used to develop local health plans and to monitor the effectiveness of interventions, including the evaluation of the medium- and long-term health impacts of the COVID-19 pandemic.

Waterborne, water washed, water based and water-related diseases

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Water is necessary for hygiene Water shortage and poor water quality cause waterborne diseases and water washed diseases. Floods and high humidity increase the risk for water-based diseases and water-related diseases. The aim of the presentation is to characterize the four groups of diseases. Waterborne diseases are transmitted through the direct drinking of water contaminated with pathogenic microorganisms. They are characterized by diarrhoea, often resulting to dehydration and possibly death. Water washed or water scarce diseases are those diseases which thrive in conditions with freshwater scarcity and poor sanitation. Control of water-washed diseases depends more on the quantity of water than the quality. Water washed diseases are: scabies, typhus, yaws, relapsing fever, impetigo, trachoma, conjunctivitis and skin ulcers. Four types of water-washed diseases are considered here: soil-transmitted helminthes, acute respiratory infections (ARI), skin and eye diseases, and diseases caused by fleas, lice, mites or ticks. Water-based diseases are infections caused by parasitic pathogens found in aquatic host organisms. These host organisms are: snails, fish, or other aquatic animal. Humans become infected by ingesting the infective forms or through skin penetration. Examples of water based diseases includes Schistosomiasis (cercariae released from snail, penetrate skin), Dracunculiasis (larvae ingested in crustacean), Paragonimiasis (metacercariae ingested in crab or crayfish) and Clonorchiasis (metacercariae ingested in fish). These diseases can be prevented through avoiding contact with contaminated water, or use of protective clothing or barrier creams. Insect vector-based diseases or water related diseases are caused by insect vectors which breed in or around water bodies. Humans become infected by being bitten by these insect vectors. However, consideration of vector control during the design, construction and operation of surface water reservoirs and canals can reduce the potential for water related disease transmission.

Climate change impacts on tourism in the 21st century: projections for Hungary and Szeged

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Climate change and associated natural hazards significantly impact the tourism and recreation sector, altering the suitability of locations and periods for various tourism activities. This study explores the future suitability of climate for outdoor tourism activities throughout the 21st century. The research focuses on analysing the impacts both at national (Hungary) and urban (Szeged) scale. Climatic conditions are assessed using two climate metrics that are relevant to tourism, and the spatial distribution of these indices is mapped on a monthly basis. For the analysis, outputs from various regional climate models, driven by different climate change scenarios, are utilized. Additionally, a high-resolution land surface model is employed for the urban-scale assessment. Future climatic conditions are described for the periods 2041–2070 and 2071–2100, with a reference period of 1971–2000.
The findings clearly show that climate change will significantly affect tourism potential in the studied regions. Specifically, from May to September, climatic conditions are expected to worsen, although the remaining months may offer more favourable conditions for tourism. A major contributing factor to the summer decline is the increasing occurrence of extreme daytime heat stress. Consequently, tourism strategies must account for this climatic hazard to a significant degree, independent of the scale under consideration.

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Consideration of climate change-related factors in vulnerability assessment frameworks for migrant health

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The negative impacts of global climate change are playing an increasingly important role in the global increase in refugee numbers. Complex environmental, economic and social impacts are increasing the propensity to migrate in many regions.
Climate refugees form a specific group of forced migrants. Although climate refugees are a non-existent legal category, but climate change has the potential to trigger or exacerbate the conflict situations responsible for displacement. Evidence-based action plans through international, multi-sectoral cooperation would be needed to mitigate the negative impacts.
The health and disease impacts of climate change have a multiple and excess burden on migrants. Migrants are the most vulnerable population, not only because of the increased disease burden due to climate change, but also because of the increased risk of diseases that already characterises certain phases of migration.
According to international recommendations, health and disease problems should be assessed on an individual basis before, during and after migration. For instance, different background may require different screening tests and vaccinations.
Although climate change does not provide a legal basis for climate refugees, a comprehensive picture requires the integration of climate-related factors into the vulnerability assessment frameworks for migrant health, since access to health and healthcare is a fundamental human right.
Our recommendations would be shared how the IOM's Determinants of Migrant Vulnerability Model, the UNHCR Screening Tool and the WHO Social Determinants of Health (SDH) Framework could be used to integrate climate change-related considerations and aspects.

Artificial Intelligence and Machine Learning for Multi-Risk Assessment

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The increasing complexity of global risks spanning environmental hazards, healthcare uncertainties, financial instabilities, and cybersecurity threats requires innovative assessment methodologies. Artificial Intelligence (AI) and Machine Learning (ML) have emerged as transformative tools in multi-risk assessment, offering enhanced capabilities for predictive modeling, real-time monitoring, and automated decision-making. This paper explores the integration of AI and ML in risk assessment across various domains, including environmental management, healthcare systems, financial risk, and supply chain optimization. Using a systematic literature review approach, it evaluates the effectiveness of AI-driven solutions in improving risk prediction and management while addressing ethical considerations and challenges such as data bias, model interpretability, and regulatory compliance. Future recommendations emphasize advancements in explainable AI, improved data governance, and interdisciplinary collaborations to ensure the responsible and impactful application of AI and ML technologies.