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Editorial

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Special Issue

Healthy and Safe Environments across Occupational and Environmental Contexts



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Healthy and Safe Environments Across Occupational and Environmental Contexts: A Holistic Perspective

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Introduction

According to the World Health Organization (WHO), “good health depends on clean air, a stable climate, and a preserved natural environment, as well as access to adequate water, sanitation, and hygiene. It also requires protection from harmful radiation, unsafe chemical management, and unhealthy working conditions. A healthy environment could prevent nearly a quarter of the global disease burden” [1]. In line with this, environmental health is defined as the science that “addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviors. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments” [2].

Complementing this perspective, occupational health is defined as “an area of work in public health to promote and maintain the highest degree of physical, mental, and social well-being of workers in all occupations” [3]. Achieving safe and healthy workplaces requires sustained interaction between scientific evidence and policymaking. To illustrate this, the International Labour Organization (ILO) and the WHO outline five major categories of occupational risks: biological; physical; ergonomics and work design; psychosocial factors and job-related stress; and chemical hazards [4].

In recent years, however, shifts in the nature of work have generated new risks that impact both physical and mental health, while also deepening health inequalities within and between nations [5]. Although occupational health historically developed as a separate domain from environmental health, growing evidence highlights their convergence. In many cases, hazards in the workplace and in the general environment stem from the same sources, making common approaches to risk control both feasible and effective [6,7]. Indeed, environmental and occupational health hazards—whether biological, chemical, physical (including radiological), biomechanical, or psychosocial—share the potential to cause severe consequences, from injuries and acute toxic exposures to chronic conditions such as cancer, respiratory, and cardiovascular diseases [6,7].

The convergence of these challenges has never been more evident. Climate change, industrial development, and urbanization have intensified exposures that affect not only workers but also entire communities, underscoring the urgency of integrated approaches



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to environmental and occupational health [8]. This Special Issue, “Healthy and Safe Environments across Occupational and Environmental Contexts”, was conceived as a timely response to these challenges—aiming to promote a cross-sectoral dialogue and evidence-based strategies for protecting human health in a wide variety of settings.

This Special Issue is a valuable opportunity to reflect on the overarching theme and to share our perspective as Guest Editors. Our primary intention was to provide a platform for advancing research that bridges the boundaries between occupational safety and environmental health. We encouraged submissions that embraced innovation, explored interconnections across disciplines, and addressed real-world complexities in exposure assessment, risk communication, health promotion, and policy design.

We are pleased to present eight high-quality contributions that illustrate the thematic richness and relevance of this Special Issue.

Several papers deepen our understanding of the subtle, long-term health effects of environmental pollutants. In their umbrella review, Fiore et al. examine the link between air pollution and breast cancer, revealing consistent associations with NO₂ and particulate matter exposures and reinforcing the urgency of integrating cancer prevention strategies into environmental health policy. Similarly, Badanta et al. focus on sustainability in healthcare systems, highlighting hospitals not only as care providers but also as potential sources of environmental degradation. Their review proposes pathways toward greener, more resilient healthcare infrastructure.

Two other studies explore the implications of endocrine-disrupting chemicals (EDCs) on women’s health. Moon et al. present a prospective cohort study linking EDC exposure to perinatal depression, while Caporossi et al. provide case–control evidence of associations between phthalates, bisphenol A, and infertility, particularly in relation to endocrine dysfunction and recurrent pregnancy loss. These studies remind us that environmental exposures are intimately connected to reproductive and mental health, and that vulnerable populations—especially women—require targeted protection.

The occupational dimension of this Special Issue is equally compelling. In an industrial context, Carvalhais et al. identify stress vulnerability and perceived occupational noise as significant predictors of burnout, calling for integrated psychosocial and physical risk management approaches. Worker safety in highly specialized environments is addressed by Flori et al., who examine the unique exposure risks in high-field nuclear magnetic resonance spectroscopy laboratories—a less studied but growing concern in scientific and research institutions.

Health promotion is also explored from an organizational and cultural perspective. Garzillo et al. assesses the adherence to healthy lifestyles among young workers in a Mediterranean context and underscores the need for differentiated interventions, particularly addressing nutritional education and gender-sensitive approaches to physical activity, to improve long-term well-being and reduce health risks. Meanwhile, Saccardo et al. presents a retrospective study examining the relationship between air quality and Ear, Nose, and Throat (ENT) emergencies during the COVID-19 pandemic, revealing the persistent impact of environmental factors even amid heightened public health protections.

Altogether, the studies featured in this Special Issue illustrate the diversity of environmental and occupational contexts, the variety of health outcomes they affect, and the range of scientific methodologies being applied to study them. What binds them together is a shared recognition: that ensuring healthy and safe environments requires interdisciplinary collaboration, systems thinking, and a proactive approach to both research and intervention.

Looking forward, we recommend that future research continue to explore synergistic effects across occupational and environmental exposures, particularly in underrepresented populations and emerging sectors. It is also essential to strengthen surveillance systems

and harmonize exposure assessment methodologies to enable comparability and to support effective policy implementation. Bridging the gap between scientific evidence and actionable policy must remain a key priority. We hope this Special Issue will serve as a reference and stimulus for both established and early-career researchers committed to advancing health, equity, and sustainability across disciplines.

Conflicts of Interest: The authors declare no conflict of interest.

List of Contributions:

1. Badanta, B.; Porcar Sierra, A.; Fernández, S.T.; Rodríguez Muñoz, F.J.; Pérez-Jiménez, J.M.; Gonzalez-Cano-Caballero, M.; Ruiz-Adame, M.; de-Diego-Cordero, R. Advancing Environmental Sustainability in Healthcare: Review on Perspectives from Health Institutions. *Environments* **2025**, *12*, 9. <https://doi.org/10.3390/environments12010009>.
2. Fiore, M.; Palella, M.; Ferroni, E.; Miligi, L.; Portaluri, M.; Marchese, C.A.; Mensi, C.; Civitelli, S.; Tanturri, G.; Mangia, C. Air Pollution and Breast Cancer Risk: An Umbrella Review. *Environments* **2025**, *12*, 153. <https://doi.org/10.3390/environments12050153>.
3. Moon, N.; Heo, S.J.; Kim, J.H. Associations of Exposure to 24 Endocrine-Disrupting Chemicals with Perinatal Depression and Lifestyle Factors: A Prospective Cohort Study in Korea. *Environments* **2025**, *12*, 15. <https://doi.org/10.3390/environments12010015>.
4. Caporossi, L.; Viganò, P.; Paci, E.; Capanna, S.; Alteri, A.; De Rosa, M.; Pigni, D.; Partenzi, E.; Papaleo, B. Evidence About the Possible Role of Phthalates and Bisphenol A in Recurrent Pregnancy Loss and Endocrine Dysfunctions: A Case–Control Study. *Environments* **2025**, *12*, 38. <https://doi.org/10.3390/environments12020038>.
5. Flori, A.; Acri, G.; D’Avanzo, M.A.; Mattozzi, M.; Hartwig, V. Worker Safety in High-Field NMR Spectroscopy Laboratories: Challenges and Risk Assessment. *Environments* **2025**, *12*, 113. <https://doi.org/10.3390/environments12040113>.
6. Garzillo, E.M.; Corvino, A.R.; Porciello, G.; Guida, D.; Spasiano, M.; Miraglia, N.; Lamberti, M. Young Workers and Lifestyles in a Mediterranean Cultural Context: What Is the Contribution of Occupational Health Promotion? *Environments* **2025**, *12*, 147. <https://doi.org/10.3390/environments12050147>.
7. Saccardo, T.; Masetto, E.; Biancoli, E.; Colombo, A.R.; Daloiso, A.; Deretti, A.; Benvegnù, F.; Crivellaro, M.A.; Marani, M.; Nicolai, P.; et al. Impact of Environmental Pollutants on Otorhinolaryngological Emergencies in the COVID-19 Era. *Environments* **2025**, *12*, 115. <https://doi.org/10.3390/environments12040115>.
8. Carvalhais, C.; Ribeiro, L.A.; Pereira, C.C. Unveiling Stress Vulnerability and Occupational Noise Perception as Burnout Predictors: Results of an Exploratory Study in Industrial Environments. *Environments* **2025**, *12*, 208. <https://doi.org/10.3390/environments12060208>.

References

1. World Health Organization. Health Topics: Environmental Health. 2025. Available online: https://www.who.int/health-topics/environmental-health#tab=tab_1 (accessed on 28 July 2025).
2. Bircher, J.; Kuruvilla, S. Defining health by addressing individual, social, and environmental determinants: New opportunities for health care and public health. *J. Public Health Policy* **2014**, *35*, 363–386. [CrossRef]
3. World Health Organization. Health Topics: Occupational Health. 2025. Available online: <https://www.who.int/health-topics/occupational-health> (accessed on 28 July 2025).
4. Xu, H.; Zhang, M.; Hudson, A. Occupational Health Protection for Health Workers in China with Lessons Learned from the UK: Qualitative Interview and Policy Analysis. *Saf. Health Work* **2021**, *12*, 304–310. [CrossRef]
5. Pega, F.; Momen, N.C.; Abubakar, A.H.A.; Al-Emam, R.; Hassan, M.N.; Howard, J.; Hussein, S.H.; Iavicoli, S.; Kevi, S.K.; Kgalamono, S.M.; et al. Monitoring Workers’ Health: Focus on Rights, Determinants, and Equity. *Lancet* **2023**, *402*, 1306–1308. [CrossRef]
6. Tulchinsky, T.H.; Varavikova, E.A. Environmental and Occupational Health. In *The New Public Health*, 3rd ed.; Academic Press: San Diego, CA, USA, 2014; pp. 471–533. [CrossRef]

7. Yassi, A.; Kjellström, T. Linkages Between Environmental and Occupational Health. In *Environmental Health Hazards (Part VII)*; International Labour Organization ILO Encyclopaedia of Occupational Health and Safety: Geneva, Switzerland, 2011; Section “Linkages Between Environmental and Occupational Health”.
8. Costello, A.; Abbas, M.; Allen, A.; Ball, S.; Bell, S.; Bellamy, R.; Friel, S.; Groce, N.; Johnson, A.; Kett, M.; et al. Managing the Health Effects of Climate Change. *Lancet* **2009**, *373*, 1693–1733. [[CrossRef](#)] [[PubMed](#)]

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