



OPEN ACCESS

EDITED AND REVIEWED BY
Eleonora Nicolai,
Saint Camillus International University of
Health and Medical Sciences, Italy

*CORRESPONDENCE
Alberto Modenese
✉ alberto.modenese@unimore.it

RECEIVED 17 February 2026
ACCEPTED 05 March 2026
PUBLISHED 25 March 2026

CITATION
Modenese A (2026) Editorial:
Environmental or occupational exposure
to optical radiation: risk evaluation,
health effects and prevention - tangible
innovation for public and occupational
health? volume II.
Front. Public Health 14:1812676.
doi: 10.3389/fpubh.2026.1812676

COPYRIGHT
© 2026 Modenese. This is an
open-access article distributed under the
terms of the [Creative Commons
Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use,
distribution or reproduction in other
forums is permitted, provided the
original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which does
not comply with these terms.

Editorial: Environmental or occupational exposure to optical radiation: risk evaluation, health effects and prevention - tangible innovation for public and occupational health? volume II

Alberto Modenese*

Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy

KEYWORDS

eye protection, occupational exposure, optical radiation, skin cancer, welding

Editorial on the Research Topic

[Environmental or occupational exposure to optical radiation: risk evaluation, health effects and prevention - tangible innovation for public and occupational health? volume II](#)

Optical radiation (OR), encompassing wavelengths from ultraviolet (UV) to infrared (IR), represents a pervasive environmental and occupational exposure that has profound implications for human health. Excessive or poorly managed exposure, especially to solar UV radiation, substantially contributes to adverse health outcomes such as skin cancers and ocular damage and remains a leading concern for public health, occupational safety, and preventive medicine (1, 2).

This second volume of the Research Topic on *Environmental or occupational exposure to optical radiation: risk evaluation, health effects and prevention—Tangible innovation for public and occupational health?* seeks to advance scientific knowledge, methodological innovation, and translational impact for researchers, practitioners, and policymakers worldwide. A central aim is to highlight methodological progress in exposure assessment (3) and to frame actionable insights into disease burden, preventive strategies, and health surveillance systems in a changing, post-pandemic, climate-altered world (4). This Research Topic includes four high-impact contributions that together illustrate the breadth of current research challenges and opportunities in optical radiation exposure.

In the first original research article, Paulo et al. quantify the increased risk of squamous cell carcinoma (SCC) among outdoor workers in Lisbon based on real-world solar UV radiation measurements. Using personal UV dosimetry and occupational categorization, the authors demonstrate substantially elevated excess risks of SCC across multiple outdoor occupations, underscoring that chronic solar UV exposure remains an urgent occupational carcinogenic hazard. This study bridges exposure assessment with epidemiological risk quantification and highlights the need for improved occupational surveillance and prevention policies.

Complementing this epidemiological perspective, Aktas et al. propose a Human Sentinel Surveillance Platform designed to overcome the limitations of conventional exposure monitoring. Their perspective article outlines a scalable digital infrastructure that integrates biomarker-based monitoring, standardized questionnaires, and harmonized data systems to capture dynamic occupational and environmental exposures in real time. By emphasizing multidisciplinary data integration and adaptive surveillance frameworks, this work reflects a forward-looking approach to exposome research and population health monitoring that can support early warning systems and evidence-based interventions.

The third contribution—a systematic review and meta-analysis by Atalay et al.—focuses on ocular protection practices among welders in sub-Saharan Africa. Welders experience intense OR from artificial sources, and this article synthesizes the prevalence, patterns, and determinants of protective behaviors. The article identifies critical gaps in the adoption of effective eye protection and emphasizes the interplay between occupational practices, resource constraints, and health education. The findings point to the importance of context-specific interventions that bridge occupational safety standards with on-the-ground realities in low-resource settings.

Rounding out the Research Topic, the fourth article by Sun et al. investigates the relationship between exposure to outdoor artificial light at night and the risk of gestational diabetes mellitus, extending the concept of optical radiation beyond UV to examine non-solar, artificial exposures and broader public health outcomes. This case-control study provides evidence that environmental light pollution, which is a growing concern in urbanized settings, may influence metabolic health during pregnancy, thus broadening the scope of optical radiation research to include circadian and non-visual health pathways.

Taken together, these contributions illustrate a continuum of research, from quantifying cancer risk and improving occupational exposure assessment to enhancing surveillance infrastructure, understanding protective behaviors, and exploring novel health endpoints associated with OR. They highlight the necessity of interdisciplinary approaches that unite exposure science, epidemiology, occupational health, and digital health innovations. Continued collaboration across these domains is crucial for

developing evidence-based guidelines, effective prevention strategies, and policies that protect workers and the general public from the diverse health impacts of OR.

Author contributions

AM: Conceptualization, Writing – review & editing, Validation, Investigation, Supervision, Project administration, Writing – original draft.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Bjæger J, Flachs EM, Hermann MN, Bonde JPE, Mehlum IS, Skaaby S. Occupational exposure to metal welding and cataract: a systematic review and meta-analysis. *Acta Ophthalmol.* (2026). doi: 10.1111/aos.70066. [Epub ahead of print].
- Parkhouse T, Spiga F, Rhodes LE, Dawson S, Webster KE, Caldwell DM, et al. The effects of sunlight exposure on mortality: a systematic review of epidemiological studies. *NIHR Open Res.* (2025) 5:51. doi: 10.3310/nihropenres.13980.2
- Würtz ET, Pugdahl K, Fenger-Grøn M, Berglind IA, Cherrie MPC, Dahlman-Höglund A, et al. Quantitative solar ultraviolet radiation job-exposure matrix for Europe. *Ann Work Expo Health.* (2025) 69:415–28. doi: 10.1093/annweh/wxaf011
- Modenese A, Chou BR, Adam B, Loney T, Silva Paulo M, Tenkate T, et al. Occupational exposure to solar radiation and the eye: a call to implement health surveillance of outdoor workers. *Med Lav.* (2023) 114:e2023032. doi: 10.23749/mdll.v114i4.14657