

Written evidence submitted by the Institution of Occupational Safety and Health (IOSH)

The UK Parliament Environmental Audit Committee - Heat resilience and sustainable cooling inquiry.

About IOSH

The Institution of Occupational Safety and Health (IOSH), the Chartered body for occupational safety and health professionals, with approximately 49,000 members in more than 130 countries, has a vision of 'A *safe and healthy world of work*'. As an international non-profit organisation, IOSH ethically influences important decisions that affect the safety, health and wellbeing of people at work worldwide. We responsibly collaborate with governments, advise policymakers, commission research, set standards, engage with global, regional and local organisations and run high-profile campaigns to promote awareness of occupational safety and health (OSH) issues. The IOSH Policy and Regulatory Engagement function provides a strong foundation for key policy responses and public policy initiatives that focus on the crucial role of OSH.

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Introduction

The effects of rising heat levels driven by climate change events are already affecting many people in the world who continue to be subjected to alarming temperatures and humidity. In recent years, the UK has experienced significant regional increases in mortality in response to high temperatures during summer heatwaves^{1 2}. Projected future warming is expected to increase the occurrence of heat hazards across the world the UK^{3 4}.

Heat exposure is an important but underappreciated risk factor contributing to manifold adverse health outcomes due to the physiological impacts of heat on the human body. Researchers have noted these negative impacts will be confounded by climate change^{5 6 7}.

¹ Public Health England 2019a Heatwave Plan for England (PHE Publications)

² Kovats S and Brisley R 2021 The Third UK Climate Change Risk Assessment Technical Report ed R A Betts, A B Haward and K V Pearson (London: Climate Change Committee) Health, communities and the built environment pp 1–284

³ Slingo J 2021 The Third UK Climate Change Risk Assessment Technical Report ed R A Betts, A B Haward and K V Pearson (London: Climate Change Committee) Latest scientific evidence for observed and projected climate change pp 1–107

⁴ Christidis N, Mccarthy M and Stott P A 2020 The increasing likelihood of temperatures above 30 to 40 °C in the United Kingdom Nat. Commun. 11 3093

Increased heat stress is already having a negative impact on workers' health and labour productivity⁸.

Question 1— What evidence exists on the relationship between heat and human health (mortality and morbidity), and which communities are worst affected?

While anyone can be affected by heat-related illness, some populations are at increased risk. Heat exposure leads to elevated risk of morbidity and mortality for women^{9 10 11}, people 65 years and older, those with underlying medical conditions and taking certain medications, those in countries of lower-middle income, and those working in conditions that are more likely to expose them to extremes of heat (e.g. outdoors). Young workers may be at risk because of their physiological vulnerability and their lack of experience. Migrant workers can also be highly impacted and vulnerable to the health impacts of prolonged exposure to extreme heat as the All-Party Parliamentary Group (APPG) on Sport, Modern Slavery, and Human Rights reflected on as part of their session on Extreme Heat, Migrant Workers, and the Qatar World Cup.

When it comes to professional sectors, workers involved in labour-intensive physical activity working in the agriculture, forestry, public spaces and road repair and maintenance, fisheries, construction, mining and quarrying, transport, postal services, waste collection, and maintenance and utilities supplies¹² need to be provided with enhanced protections.

Indoor workers¹³ are also at risk of heat stress that may increase during heatwaves, especially those who work in poorly cooled buildings, in cabin-operated machinery without cooling (e.g., cranes) and in settings with high industrial heat production, and those who carry out heavy physical work or must use personal protective equipment (PPE) in hot conditions. This includes workers employed in the food service, cleaners and warehouse workers. Climate-induced risks like extreme heat are a significant issue for gig workers. Transport and delivery platform workers can be particularly vulnerable to rising temperatures as they spend long hours exposed to the heat.

Question 2 – How can sustainable cooling solutions and adaptation strategies be implemented in such a way as to minimise overheating, reduce energy

⁵ World Health Organization and World Meteorological Organization, Global heat health information network; Key messages. 2022.

⁶ Calleja-Agius, J., K. England, and N. Calleja, The effect of global warming on mortality. *Early Hum Dev*, 2021. 155: p. 105222.

⁷ Huang, C., et al., Projecting Future Heat-Related Mortality under Climate Change Scenarios: A Systematic Review. *Environmental Health Perspectives*, 2011. 119(12): p. 1681-1690.

⁸ Dasgupta S, van Maanen N, Gosling SN, Piontek F, Otto C, Schleussner CF (2021) Effects of climate change on combined labour productivity and supply: an empirical, multi-model study. *The Lancet Planetary Health*, 5(7), e455–e465. [DOI: 10.1016/S2542-5196(21)00170-4]

⁹ Liu, J., et al., Heat exposure and cardiovascular health outcomes: a systematic review and meta-analysis. *The Lancet Planetary Health*, 2022. 6(6): p. e484-e495.

¹⁰ El Khayat, M., et al., Impacts of Climate Change and Heat Stress on Farmworkers' Health: A Scoping Review. *Frontiers in Public Health*, 2022. 10.

¹¹ Strathearn, M., N.J. Osborne, and L.A. Selvey, Impact of low-intensity heat events on mortality and morbidity in regions with hot, humid summers: a scoping literature review. *Int J Biometeorol*, 2022. 66(5): p. 1013-1029.

¹² European Agency for Safety and Health at Work. Heat at work guidance for workplaces. <https://oshwiki.osha.europa.eu/en/themes/heat-work-guidance-workplaces>

¹³ European Agency for Safety and Health at Work. Heat at work guidance for workplaces. <https://oshwiki.osha.europa.eu/en/themes/heat-work-guidance-workplaces>

consumption and prevent overloading of the electricity grid during peak demand?

Temperatures in urban locations are higher than in surrounding locations due to phenomenon of Urban Heat Islands, which are created by surfaces that absorb heat during the day and slowly re-radiate high temperatures at night¹⁴. Because of this phenomenon, urban populations are traditionally considered the most susceptible to adverse heat-related health outcomes.¹⁵ In other countries more exposed to heat waves and extreme weather events, there are accounts of workers reporting high levels of exhaustion and heat stress due to constant power outages during climate change-related events.

The increasing demand for space cooling will place a considerable strain on electricity systems in many countries, as well as driving up emissions. In countries such as the UK it is expected that the demand for space cooling and the energy needed to provide it will continue to grow for decades to come. In this context, green policies and investments in public infrastructure need to be prioritised to allow equitable access to cooling. Promoting sustainable energy policies that spur economic growth and environmental protection – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change must be developed with air-conditioner manufacturers, building operators, and other stakeholders to ensure workers are comfortable and their health and safety protected. According to latest evidence¹⁶, energy-efficient air conditioning with improved building design and system management can keep cooling electricity use stable, while also providing economic, health, and environmental benefits.

Question 3 – What actions can be taken to protect those most vulnerable to the impacts of extreme heat?

A preventative approach to heat-related extremes calls for capacity building in occupational health and safety, occupational health programmes, and occupational health surveillance. Good practice in pre-exposure screening and pre-employment assessments have the potential to identify people with permanent or long-standing medical conditions that might mean that they're not suited for physically demanding work in hot conditions. As part of this process occupational health monitoring and self-assessment¹⁷ becomes critical.

Adaptation and mitigation strategies can include changing working conditions, re-engineering work processes, adjusting building and infrastructure design, conducting assessments of OSH risks resulting from climate change and setting thermal conditions in the workplace. It is worth noting that adaptations to reduce the risk associated with one hazard could benefit or exacerbate another: for example, increased insulation in housing to reduce winter cold risk can lead to increased overheating risk in summer^{18 19}

Some more specific examples can be found below:

¹⁴ Desai, Y., H. Khraishah, and B. Alahmad, Heat and the Heart. *Yale J Biol Med*, 2023. 96(2): p. 197-203.

¹⁵ Sugg, M.K., Heat Exposure and Health Impacts in North Carolina. *N C Med J*, 2018. 79(5): p. 320-321.

¹⁶ Rest of World. Bangladesh's historic heat wave is making work "living hell" for IT workers. <https://restofworld.org/2023/bangladesh-electricity-crisis-bpo-workers/>

¹⁷ Institution of Occupational Safety and Health. Measuring heat stress in industry. <https://iosh.com/media/1539/reliable-industrial-measurement-of-body-temperature-summary-report.pdf>

¹⁸ Jones R V, Goodhew S and De Wilde P 2016 Measured indoor temperatures, thermal comfort and overheating risk: post-occupancy evaluation of low energy houses in the UK *Energy Proc.* 88 714–20

¹⁹ Ozarisoy B and Elsharkawy H 2019 Assessing overheating risk and thermal comfort in state-of-the-art prototype houses that combat exacerbated climate change in UK *Energy Build.* 187 201–17

- Adaptation of working conditions (e.g., providing cooling and hydration breaks, changing working hours, and providing access to cooling indoors), adjusting building design, climate smart urban planning, and increasing mechanisation of some tasks. Other engineering controls rely on adequate mechanical aids, provision of shades or area cooling
- Insulating or enclosing processes, machinery or plants that generate heat (or separating them from workers)
- Insulating hot surfaces or covering them with sheets of low-emissivity material such as aluminium or paint that reduces the amount of heat radiated from the hot surface into the workplace
- Reducing radiant heat, for example, by allowing the plant to cool down before use
- Providing vehicles with air-conditioned closed cabins (e.g., on tractors, trucks, loaders, cranes)
- Reducing humidity, avoiding wet floors, eliminating open hot water baths, drains, and leaky steam valves
- Removing heated air or steam from hot processes using local exhaust ventilation
- Using automated equipment or processes to access hot locations – for example, using a drone to inspect a fire ground
- Providing air cooling or air conditioning and adequate ventilation, dehumidification; sustainable cooling systems
- Providing air-conditioned, shaded or cool break areas as close as possible to the work site
- Providing fans, such as desk, pedestal or ceiling-mounted ones
- Increasing air velocity, making sure the workspace has good air flow – installing fans or generating air movement, for example, via windows and vents, particularly in humid conditions
- Ensuring windows can be opened to keep air circulating, but without compromising technical ventilation, such as local exhaust ventilation installed on machinery
- Positioning workstations away from direct sunlight or sources of heat; and
- Building public infrastructure to support the entire gig economy (rest points for drivers and delivery workers to provide them with water, access to washrooms, first aid...)

Question 4 — To what extent do the Government’s Climate Change Risk Assessment and National Adaptation Programme (as well as other related strategies such as the Net Zero Strategy and Heat and Buildings Strategy) identify and address the risks from extreme heat? Does the UK need a dedicated Heat Resilience Strategy? What lessons can be learned from other nations when it comes to national strategies for heat resilience?

Current and future heat protection standards and guidelines have to ensure that they address local environmental conditions²⁰. It is for that reason that the UK Government should consider taking a proactive approach and integrate climate change issues into existing occupational safety and health legislation. National policies and programmes for safety and health also need to adopt a preventive approach and integrate ideas of climate change and the potential for extreme weather events²¹. There is a need for the existing Net Zero Strategy or the National Adaptation Programme to place a stronger emphasis in developing and enforcing regulations that protects vulnerable workers.

²⁰ El Khayat, M., et al., Impacts of Climate Change and Heat Stress on Farmworkers' Health: A Scoping Review. *Frontiers in Public Health*, 2022. 10.

²¹ Graczyk, H. The great climate change disruption. *IOSH Magazine*. <https://www.ioshmagazine.com/2023/07/03/great-climate-change-disruption>

Countries such as the US are tackling the risk of heat-related illnesses to better protect exposed workers. The Biden administration is in the process of developing a new federal system to track heat-related illness nationwide to better understand which populations are most at-risk for heat-related illness or death.

Question 5 — Does the current planning framework do enough to encourage heat resilience measures such as cooling shelters, water bodies, green infrastructure and shading to be integrated into urban planning? Where such measures are incorporated, how accessible and successful are they?

Urban development - developed countries are designing urban areas to include more vegetation in a move to reduce heat-related mortality associated with the Urban Heat Island effect.²² Options for future extreme heat risks include heat action plans that incorporate early warning and response systems for urban and non-urban settings; these response strategies target both the general population and vulnerable groups such as older adults or outside workers. Long term urban planning and design can complement short-term responses to heat health risks. A multi-sectoral approach, including the engagement of a range of stakeholders, will likely benefit the response to longer term heat risks through the implementation of measures such as climate sensitive urban design and planning to mitigate urban heat island effects.²³

Question 8—Other comments.

IOSH recognises that, as climate-related issues and risks can threaten business operations, supply chains, workers, communities and wider society, sound OSH will be a pivotal element in achieving socially and environmentally responsible business. OSH professionals can be instrumental in promoting adaptation strategies, preparedness planning, evaluation, and control strategies of climate change-related occupational hazards.

We also hope that policy-related developments help educating employers through a shift in their thinking by debunking the myth that occupational heat protections and improvements to infrastructures and buildings can constitute a burden for business.

For further information, please contact:

- Ruth Wilkinson
Head of Policy
- Dr Karen Michell
Research Programme Lead (Occupational Health)
- Dr Ivan Williams Jimenez
Senior Policy and Public Affairs Manager

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²² Calleja-Agius, J., K. England, and N. Calleja, The effect of global warming on mortality. *Early Hum Dev*, 2021. 155: p. 105222.

²³ World Health Organization and World Meteorological Organization, Global heat health information network; Key messages. 2022.