

EDITORIAL

Extreme heat and emergency department workload: Toward a climate-resilient health care system

Calor extremo y presión asistencial en urgencias: hacia un sistema sanitario resiliente al clima

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Climate change is no longer a future threat but a tangible reality that is already affecting health care delivery and the organization of health services. Extreme temperatures, which are becoming increasingly frequent and intense, are modifying patterns of health care demand and placing growing pressure on emergency departments during the hottest months. The results of the multicenter study conducted in Catalonia between 2020 and 2025 by Yuguero *et al.*¹ provide evidence of this impact and reaffirm the need to implement contingency plans capable of delivering an adequate response to this new situation.

In 2024, the global mean temperature exceeded 1.5 °C above preindustrial levels for the first time. The rise in extreme temperatures and the expansion of vulnerable populations have led to a 63% increase in heat-attributable mortality since the 1990s, reaching approximately 546 000 deaths per year between 2012 and 2021. Similarly, warming and environmental dryness have favored more intense and frequent wildfires, which in 2024 were responsible for a record 154 000 deaths attributable to fine particulate matter pollution from smoke. In addition, the risk of contracting vector-borne diseases such as dengue, leishmaniasis, and Crimean–Congo hemorrhagic fever has multiplied.²

The Mediterranean region is particularly vulnerable to climate change. It is characterized by warming above the global average, increased evapotranspiration, reduced precipitation, and more frequent droughts. Its urban and geographic configuration (coastal cities surrounded by mountains) favors flash flooding, coastal erosion, and aquifer salinization. This vulnerability is compounded by pronounced population aging, high urban density, limited green spaces, and a marked urban heat island effect. Furthermore, socioeconomic inequalities amplify the vulnerability of certain population groups.

In Spain, the MoMo monitoring system shows a very marked increase in heat-attributable mortality in recent years.³ The summers of 2022 and 2023 recorded the highest values since 2003, with an estimated 3009

heat-related deaths in 2023 and 2012 in 2024. Beyond its impact on mortality, several studies show that heat increases the risk of hospitalization for multiple conditions in Spain, associated both with heat waves and with isolated extreme temperature episodes.^{4,5}

Less severe heat-related morbidity, such as emergency department visits, may go undetected if only hospital admissions are analyzed. Since emergency departments are the main gateway to the health care system, they represent an ideal setting for assessing the real impact of heat and other environmental phenomena on health, such as air pollution.^{6,7} Indeed, the information provided by the study by Yuguero *et al.* is highly valuable for helping to define the impact of rising temperatures on human health and to establish the temperature threshold at which morbidity and mortality increase, because the definition of a heat wave differs when applied from a health perspective, with its potential impact on mortality, compared with a purely meteorological definition.

The study by Yuguero *et al.* confirms that extreme temperatures increase emergency department visits, particularly those of greater severity. Their work therefore highlights the role of emergency services in detecting the impact of climate change on the health system and reinforces the need for robust climate adaptation action plans within health care systems.

Emergency departments and hospitals must prepare for a substantial increase in demand during heat episodes, but also in response to other extreme events such as torrential rainfall, flooding, or sixth-generation wildfires with the spread or increased concentration of airborne particulate matter of 2.5 microns (PM_{2.5}). Progress toward climate-resilient health systems is imperative. The World Health Organization defines health resilience as the capacity of all system actors to “collectively mitigate, prepare for, respond to, and recover from disruptive events, while maintaining the delivery of essential services and learning from experience to improve the system”.⁸ Building climate resilience is based on reducing climate-related health risks (hazards,

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exposure, and vulnerability), as well as on planning and developing specific health system capacities. Preparing health systems—particularly emergency services—for climate-related emergencies must begin with a risk assessment that takes into account available capacities and resources. Based on this assessment, policies and procedures are designed and implemented to enable rapid and effective action. Robust communication plans are essential to ensure coordination among health care centers, different levels of care, public health authorities, and emergency services. Moreover, preparedness goes beyond written plans; it requires continuous training programs, drills, and practical exercises to test protocols, as well as participation in real incidents to learn and improve.⁹

Furthermore, health resilience entails ensuring that health care facilities can maintain operations during extreme events. This requires incorporating present and future climate risks into the location, design, and construction of facilities. It also requires ensuring that essential services such as water supply, sanitation, waste management, and electricity remain operational during floods, droughts, or severe storms, as well as guaranteeing access to health care facilities during such events.

In this context, it is important to note that, beyond adaptation, health professionals must contribute to dissemination and education regarding the effects of climate change on human health and to the implementation of mitigation measures.¹⁰ The health sector is responsible for a significant proportion of global greenhouse gas emissions. Therefore, emission reduction measures must also be integrated into health care facilities and specifically into emergency departments: energy efficiency, waste reduction, sustainable procurement, low-carbon accessibility and mobility, and transition to renewable energy sources. Emergency departments, due to their intense and continuous activity, play a key role in these decarbonization strategies, in monitoring the health effects of climate change, and in the health system's response to these threats, for which urgent action plans are required to transform our health system into a climate-resilient system.^{11,12}

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