

Safeguarding medically high-risk patients from compounding disasters

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Medically high-risk patients (MHRPs)—persons living with health conditions that require readily available, dependable, and sometimes uninterrupted access to health services and supplies—face escalating risks when exposed to disasters.^{1,2} MHRPs include persons with cognitive and functional impairments³; health conditions requiring access to essential services, such as cancer therapies⁴ or psychiatric treatment; or transient health conditions that temporarily increase vulnerability, such as pregnancy or post-surgical recovery.⁵

Disasters are events that disrupt societal functioning, causing widespread human, material, or environmental harm while exceeding the coping capacity of the affected communities. With increasing frequency, the overlapping and amplifying impacts of compounding disasters—diverse co-occurring or rapidly-sequential disruptive events, ranging from global (climate change, pandemic diseases) to local—are exacerbating harm and complicating recovery.

MHRPs experience disproportionate risks across a broad spectrum of disasters. Throughout 2023, the hottest year on record (Fig. 1), climate change-fuelled extreme weather events (EWEs) featured prominently. Deadly heat domes formed over vast areas of the Americas—in the global North and South—previously assumed to be sheltered from extreme weather. Dense Canadian wildfire smoke reached US population centres unaccustomed to this environmental hazard and ill prepared to respond. Within 19 days, warm Atlantic waters generated nine named tropical storms. Climate-driven drought magnified the severity of wildfires in Chile. Brazil experienced unprecedented precipitation

and deadly flooding from an extratropical cyclone. Yet strategies to protect the health of MHRPs from these hazards and harms remain poorly conceived and rarely implemented.

MHRPs experience unique vulnerabilities during disasters depending on their medical diagnosis, stage and severity of illness, treatment regimens and side-effects, current health and functional status, and reliance on healthcare and social support systems. In a disaster context, MHRPs frequently experience elevated risks while evacuating and sheltering, increased healthcare needs, aggravation of symptoms, interruption of vital healthcare services, increased susceptibility to injury or disease outbreaks, increased risk of cardio-respiratory events, and elevated stress levels.^{1–6} Higher mortality rates were documented following hurricane-related disruptions of radiotherapy treatments for patients with lung cancer⁷ and haemodialysis treatments for patients with end stage kidney disease (ESKD).⁸

Because the physical, psychological, and socioeconomic challenges associated with chronic medical and psychiatric conditions make it harder for MHRPs to cope with added stressors when a disaster strikes,⁹ medical, sociopolitical, and environmental factors need to be considered while developing strategies to safeguard MHRPs from disasters. For example, in addition to well-established emergency preparedness strategies developed to protect the general population, including guidelines for developing a household plan for sheltering in place or evacuating, MHRPs require additional strategies customized for the specific needs and vulnerabilities of their medical conditions and tailored to different hazard scenarios.

Importantly, sociopolitical contexts have profound implications for disaster preparedness strategies because structural factors, such as exposure to systemic racism, patriarchy, and ableism, shape the hazard profile and limit access to emergency resources when disaster strikes.¹⁰ Throughout the Americas, healthcare



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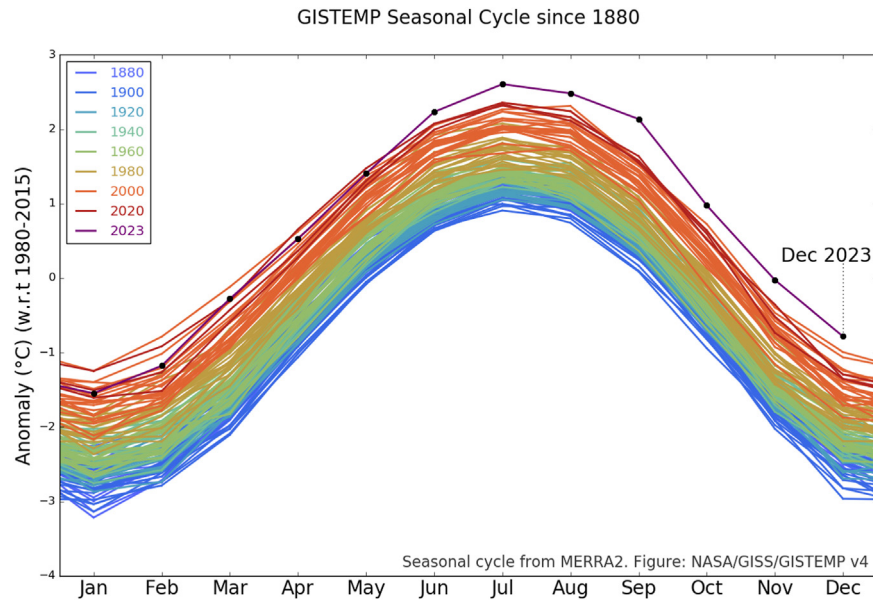


Fig. 1: Global seasonal temperature anomaly cycles, relative to pre-industrial times, for all years 1880–2023, displaying record-setting global temperature elevations throughout multiple months in 2023, the confirmed hottest year on record.

settings serving individuals facing the greatest barriers to vital resources differ from the healthcare settings serving those who benefit from privilege.

To avoid widening disparities, strategies that prioritise equity such as reducing out-of-pocket expenses when developing MHRP-specific disaster preparedness and response strategies; promoting intersectional approaches that address social determinants of health; improving diversity among health and disaster professionals; co-creating knowledge in settings where disenfranchised communities interact with healthcare; and developing contextually relevant strategies, are crucial for protecting the health and safety of all MHRPs and ensuring availability and continuity of care during disasters.

Environmental factors and associated risks must also be considered during impact (e.g., infection risks during flooding events, cardiorespiratory risks during wildfires, thermoregulatory risks during extreme temperatures), and in the aftermath (e.g., food and water insecurity, displacement). Prolonged periods without power are especially concerning for MHRPs who rely on electricity-dependent assistive equipment, refrigeration for essential medications, or heating/cooling systems for ambient temperature control. Creating customized disaster preparedness strategies is complicated by climate change, which alters the frequency, predictability, and behaviour of extreme weather events.

We recommend a three-pronged approach to develop disaster preparedness and response strategies that protect the health and safety of MHRPs from rapidly evolving environmental hazard scenarios propelled by climate change.

First, facilitate information sharing among medical specialties so that best practices for safeguarding one MHRP population can be adapted for others.⁹ For example, during Hurricane Ian in 2022, haemodialysis services providers used centralised databases to track their patients with ESKD and direct them to nearby dialysis centres that had reopened after the storm to rapidly resume their treatments. Similar protocols could be devised to minimise disaster-triggered disruptions to life-sustaining treatments for other MHRP populations.^{1,2}

Second, stimulate multi-disciplinary research to address distinct hazards, specific vulnerabilities, and unique challenges that MHRPs and their health and psychosocial support systems face during compounding disaster scenarios. For example, interventions that address risks for MHRPs exposed to extreme temperatures could integrate climate monitoring, active patient tracking, individualized disaster preparedness communications delivered during patient encounters or using digital messaging technologies, and contextual strategies centering on community expertise and cultural norms.

Research is urgently needed to develop strategies to optimize mental health and well-being for MHRPs grappling with the layered psychosocial stressors of surviving and recovering from a disaster while living with a challenging medical condition.

Finally, research will facilitate the development of preparedness strategies adapted to the complexities of the compounding risk landscape that leverage technology and infuse local knowledge to circumvent disaster-related care disruptions.

Third, equitably prioritise the roles and expertise of persons from communities targeted for marginalisation and professionals from underrepresented backgrounds in every step of the process.¹⁰ Failure to integrate the wisdom and lived experience of diverse individuals—including MHRPs themselves and their caregivers, support networks, and providers—limits the knowledge and sensitized perspectives available to tackle growing challenges in this era of climate-driven compounding disasters.

The expanding constellation of disruptive events unfolding around the globe in this era of compounding disasters provides powerful impetus for healthcare and emergency management professionals to devise strategies to safeguard MHRPs during disasters, an effort that can be accelerated through collaborative partnerships that incorporate diverse expertise and backgrounds.

Contributors

James M. Shultz conceptualized the paper, selected authors, led the writing, and serves as corresponding author.

Sandro Galea contributed instrumentally to the review and editing of the manuscript and the recommendations for safeguarding high-risk patients and he encouraged contributions from MHRP representatives.

Zelde Espinel provided key input on mental health, psychosocial support, and compounding disasters.

Amruta Nori-Sarma contributed to the focus on environmental hazards, particularly extreme heat, review, and editing.

Lauren T. Shapiro brought the perspective of a practicing physiatrist who treats a range of medically high-risk patients, particularly those with mobility impairment.

Karen Dimentstein contributed the essential perspective of an individual who is a medically high-risk person and added to the review and editing throughout.

J. Marshall Shepherd contributed the atmospheric science viewpoint and added to the focus on compounding disasters.

Leticia M. Nogueira contributed instrumentally to conceptualization, integration of climate change and health equity issues, review, and editing, and she serves as senior author.

Declaration of interests

None. The authors declared no conflicts of interest.

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