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EDITORIAL

Impact of climate change on clinical medicine

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1. Introduction

Climate change poses profound and multifaceted health challenges that are reshaping all aspects of our lives, including clinical practice. This unprecedented global crisis extends far beyond environmental degradation, fundamentally altering the landscape of human health, disease patterns, and healthcare delivery systems worldwide. This editorial seeks to outline these emerging health threats and evaluate our current level of preparedness to address them.

2. Direct heat-related illness

Extreme heatwaves are increasing in frequency, duration, and intensity. This can cause heat exhaustion, heat stroke, and exacerbate cardiovascular and respiratory conditions. Vulnerable populations include the elderly, outdoor workers, and individuals without access to air conditioning. The rising global temperatures are directly affecting human physiology and survival. Extreme heat events strain the body's thermoregulatory mechanisms, leading to dehydration, electrolyte imbalances, and multi-organ failure in severe cases. The 2024 Lancet Countdown on Health and Climate Change documented record-breaking temperatures, with 2023 reaching 1.45°C above the pre-industrial baseline, presenting unprecedented health threats from climate inaction.[1] Clinicians are confronted with more emergency presentations during heat events. Therefore, the healthcare systems face surges in emergency department visits during heatwaves, requiring new protocols for triage, treatment, and prevention. This phenomenon is already widely recognized, both within the clinical community and beyond it.

3. Shifting disease patterns

Climate change is dramatically altering the geographic distribution and seasonality of infectious diseases. Vector-borne diseases such as malaria, dengue fever, Zika virus, and Lyme disease are expanding into previously unaffected regions as warming temperatures allow disease-carrying mosquitoes, ticks, and other vectors to survive and reproduce in new areas.[2,3] This geographic shift means that clinicians must now consider tropical diseases in their differential diagnoses even in temperate regions, a shift in practice that requires enhanced surveillance systems, diagnostic capabilities, and treatment protocols. Waterborne diseases are also increasing due to flooding events and compromised water infrastructure, while changing precipitation patterns affect the prevalence of diseases such as cholera and leptospirosis.

4. Air quality and respiratory disease

Increased wildfires, longer pollen seasons, and higher ground-level ozone concentrations worsen asthma, chronic obstructive pulmonary disease (COPD), and allergies.

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Particulate matter from fires is linked to cardiovascular events and premature mortality. Air quality deterioration represents one of the most immediate health threats posed by climate change. Increased wildfire frequency and intensity, exacerbated by drought and rising temperatures, release massive quantities of particulate matter and toxic compounds into the atmosphere. Extended pollen seasons and higher pollen concentrations are intensifying allergic diseases.[4] The resulting air pollution contributes to asthma exacerbations, COPD progression, respiratory infections, and cardiovascular events, including heart attacks and strokes. Thus, clinicians are witnessing a constant increase in both acute presentations and chronic disease burden related to poor air quality.

5. Food and water security

Changing precipitation patterns, droughts, and floods affect food production and water safety. This impacts nutrition and increases waterborne disease risks, particularly gastroenteritis and cholera in vulnerable regions. Climate change also threatens the global food systems through altered growing conditions, extreme weather events, and degraded soil quality. Crop failures and reduced nutritional content in staple foods lead to malnutrition, micronutrient deficiencies, and food insecurity, particularly in vulnerable populations. In addition, rising food prices and supply chain disruptions disproportionately affect low-income communities.[5] Clinicians are increasingly encountering malnutrition-related conditions, calling for exploration of social determinants of health and implementation of community-level interventions.

Global major events, such as glacier melting and rising sea levels, are affecting both water quantity and quality. Droughts reduce access to clean water for drinking and sanitation, increasing the risk of dehydration and waterborne diseases in areas that have never experienced such disasters. Conversely, flooding contaminates water supplies and overwhelms sewage systems. Saltwater intrusion into coastal freshwater sources threatens drinking water security for millions. These changes require clinicians to consider water access and quality in patient assessments and public health planning.

6. Mental health impacts

"Climate anxiety" or eco-anxiety is emerging, particularly among young people suffering from depression, anxiety, and increased rates of substance abuse and suicide. In addition, natural disasters cause post-traumatic stress disorder (PTSD), depression, and community trauma.[6] According to the World Health Organization (WHO), climate change poses a rising threat to mental health and psychosocial well-being, from emotional distress to anxiety, depression, grief, and suicidal behavior. Communities experiencing climate disasters suffer from PTSD, depression, anxiety, and increased rates of substance abuse and suicide.[7] Loss of homes, livelihoods, and community ties has lasting psychological effects. Thus, the psychological toll of climate change is emerging as a significant public health concern. Climate anxiety and eco-distress affect millions who face an uncertain future. Healthcare providers must now integrate climate-related mental health screening and support into routine practice.

7. Climate migration health needs

Population displacement due to environmental degradation creates healthcare challenges, including infectious disease spread, interrupted chronic disease management, and increased trauma care needs.[8] Climate change disproportionately affects certain populations, exacerbating existing health inequities. Children face developmental risks from heat exposure, malnutrition, and infectious diseases. The elderly have reduced adaptive capacity to temperature extremes. Pregnant women experience increased risks of adverse outcomes. Low-income communities and marginalized groups often live in areas most vulnerable to climate impacts while having the least resources for adaptation. Due to climate change, indigenous populations also face growing threats to their traditional livelihoods and food sources. Clinicians must recognize and address these disparities through targeted interventions and advocacy.

8. Healthcare infrastructure strain

These challenges are fundamentally reshaping clinical practice. Healthcare providers must develop new competencies in climate-related health risks, incorporate environmental assessments into patient evaluations, and participate in preventive public health initiatives.[9] Medical education curricula are evolving to include climate health content. Clinical guidelines are being updated to address climate-related considerations. The concept of "planetary health" is emerging, recognizing the inseparable connection between human health and the health of natural systems.

Thus, climate-related disasters are directly impacting healthcare facilities and operations. Hurricanes, floods, wildfires, and extreme heat events can damage hospitals, disrupt power supplies, compromise pharmaceutical storage, and prevent patients from accessing care. Healthcare systems must invest in climate resilience, such as emergency preparedness, infrastructure strengthening, heat action plans, backup power systems, and telemedicine capabilities. The increasing frequency of mass casualty

events requires enhanced surge capacity and disaster response protocols, while physicians are required to counsel patients on climate health risks and advocate for policy changes. Together, these efforts underscore the urgent need for clinical healthcare system adaptation.

9. Conclusion

Addressing climate-related health challenges requires action at multiple levels. Individual clinicians can educate patients about climate health risks, prescribe climate-resilient care plans, and advocate for environmental health policies. Healthcare institutions must reduce their own carbon footprints while building resilience to climate impacts. The healthcare sector, which contributes significantly to greenhouse gas emissions, has both a responsibility and an opportunity to lead by example in climate change mitigation.

Ultimately, the health implications of climate change demand an integrated response that combines clinical adaptation with urgent climate action. Healthcare professionals are uniquely positioned to communicate the human health consequences of climate change and advocate for the systemic changes necessary to protect both current and future generations. The transformation of clinical practice in response to climate change is not optional—it is an essential evolution to meet the defining health challenge of our time.

Conflict of interest

Jacek Z. Kubiak is the Editor-in-Chief of this journal. The author declares that he has no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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