Beyond Boundaries: Addressing Climate Change, Violence, and Public Health

Krzysztof Goniewicz;[1] Amir Khorram-Manesh;[2,3,4] Frederick M. Burkle Jr.[5]

1. Department of Security Studies, Polish Air Force University, Poland
2. Department of Surgery, Institute of Clinical Sciences, Sahlgrenska Academy, Gothenburg University, Sweden
3. Learning and leadership for Healthcare Professional, Institute of Health and Care Sciences, Sahlgrenska Academy, Gothenburg University, Sweden
4. Gothenburg Emergency Medicine Research Group (GEMREG), Sahlgrenska Academy, Gothenburg University, Sweden
5. Global Fellow, Woodrow Wilson International Center for Scholars, Washington, DC USA

Correspondence:
Krzysztof Goniewicz
Department of Security Studies
Polish Air Force University, Poland
E-mail: k.goniewicz@law.mil.pl

The accelerating pace of climate change has far-reaching implications for the sustainability of our planet and the stability of human societies. As global temperatures rise, we are witnessing an unsettling trend: a surge in conflict and violence that correlates directly with these climatic shifts. This observation is not merely anecdotal; there is robust scientific evidence supporting this trend. A study conducted by Hsiang, Burke, and Miguel found that for each standard deviation change in climate toward warmer temperatures or extreme rainfall, there was a significant increase in the frequency of interpersonal violence and intergroup conflict.[1] More recently, a meta-analysis by Mach, et al reinforced these findings, indicating that climate changes significantly influence human conflict and violence across various regions and societies.[2] Furthermore, a report by the United Nations (Geneva, Switzerland/New York USA) highlighted the relationship between climate change and the risk of violent conflict, especially in regions with existing socio-political, economic, and environmental vulnerabilities.[3] This connection between climate change, societal unrest, and public health is the focus of this discussion. We must evolve our traditional approaches within Disaster Medicine and public health preparedness to meet these unique challenges, and design strategies that acknowledge and tackle climate-induced violence. This is not a task we can defer; the clock is ticking.

The current era presents a multitude of societal challenges that have long existed, but have been made more visible due to the events of recent times. The coronavirus disease 2019/COVID-19 pandemic, in particular, has exposed the frailties of our interconnected world. It has illuminated how civil rights restrictions, government failures, and disruptions in societal structures and world economics cannot just impact individual nations, but ripple across borders, leading to global unrest. In this sense, the pandemic served as a triggering factor, helping us understand the impacts of globalization more deeply. However, amidst these revelations, we must not overlook the looming threat of climate change that adds another layer of complexity to this situation. While it's true that the Earth's climate has changed throughout history, the current rate of change is unprecedented in human history. This makes it vital that our approach is grounded in an interdisciplinary and transdisciplinary understanding of the crisis, with a unified global response. As we grapple with immediate crises, the ticking clock of climate change synchronizes with the crescendo of societal unrest, potentially amplifying this unsettling symphony of our time. The overwhelming consensus among scientists is that human activities, particularly the burning of fossil fuels and deforestation, are driving this accelerated change.[4] This human-induced climate change is the issue we're addressing, which its societal and health impacts demand immediate action. Environmental alterations are not confined to just physical impacts like displacement from extreme weather events or resource scarcity, such as the extreme water stress facing 17 countries identified by the World Resources Institute (Washington, DC USA). They extend much further, deep into our societal structures. Climate change exacerbates social inequalities, creating a cycle of poverty and vulnerability in already marginalized communities. A report by the United Nations emphasizes that climate change impacts disproportionately affect developing countries and marginalized groups within all countries. From disrupting livelihoods based on agriculture and fishing due to unpredictable weather patterns to escalating conflict over dwindling resources, these environmental alterations deepen socio-economic disparities, leading to a more stratified society.[5] They permeate into sociopolitical realms and re-shape the landscape of public health significantly. Recognizing the immediate need for a multidisciplinary, globally coordinated response to this problem is not just paramount, it is urgent. As previously noted, the study by Hsiang, Burke, and

Miguel provides a quantifiable link between shifts in climate and increases in human conflict.[1] While the climate-conflict link is complex and requires further research, a significant body of evidence already shows a correlation between the two. Given the grave potential consequences, we can't afford to ignore these warning signs; indeed, preemptive action is far more prudent than reactive measures.[6]

In order to formulate effective mitigation strategies, our understanding of climate change as a trigger for violence is crucial. Changes in climate patterns, including extreme temperatures and intensified weather events, impact societies profoundly. Economies based on agriculture, for instance, can be destabilized by events such as droughts and flooding, which often decimate crop yields, spur large-scale migration, and spark competition for dwindling resources. Farming practices must also adapt to our changing climate. The promotion of climate-smart agriculture, including the use of drought-tolerant crops, rainwater harvesting, and sustainable irrigation systems, can bolster food security and decrease the likelihood of conflict over dwindling resources.[4] These are the ingredients for conflict, and they are stirred up by the same recurring disasters that induce psychological stress and societal tension.

Traditionally, Disaster Medicine and public health preparedness have primarily focused on immediate responses to emergencies, be they pandemics or disasters. However, in the face of the current global climate challenge, these fields must evolve. Their missions need to expand beyond the traditional confines to embrace a broader framework addressing the health, societal, and political ramifications of climate change, including the potential for climate-induced violence.[7] Specifically, this evolution might involve incorporating strategic planning and preventive measures against climate change-induced threats into emergency management. Proactive policy making, including legislation that promotes the use of renewable energy sources, the development of climate-resilient crops, and regulation of industries contributing to climate change, is crucial. Building the capacity of health care systems to cope with climate-related diseases must include investing in training for health care workers to recognize and treat such diseases, improving infrastructure to withstand extreme weather events, and developing emergency plans that account for climate-induced displacement and violence.[8] This underlines the pressing need to evolve our traditional approaches and integrate proactive strategies in Disaster Medicine and public health preparedness.[9]

By embracing these strategies, Disaster Medicine and public health preparedness can transform to effectively tackle the manifold challenges posed by climate change, such as increasing disease prevalence, resource scarcity, displacement, and the rise in climate-induced violence.

A more proactive approach to crisis prevention could have been implemented earlier. We might have developed early-warning systems that combine meteorological data with geopolitical analytics to forecast potential areas of climate-induced conflict.[10] Such a system could enable the pre-emptive deployment of Disaster Medicine and public health resources to at-risk regions, potentially minimizing the emergence and escalation of violence. Specifically, this would involve deploying disaster relief resources to areas projected to extreme weather events, thereby alleviating suffering and reducing tensions that could lead to conflict. Mental health support would be provided to communities experiencing repeated extreme weather events to help mitigate the psychological stress that can fuel violence. Public health initiatives must aim to maintain the health infrastructure and prevent disease outbreaks that could further destabilize these communities. Programs focused on building community resilience and social cohesion would be initiated, with the aim of fostering local capacities to manage conflict.[11] Furthermore, conflict mediation resources would be employed to address emerging disputes over resources, thereby preventing their escalation.

Thus, strategically deploying a range of resources can significantly mitigate conditions that incite climate-induced violence, emphasizing the crucial role Disaster Medicine and public health play in addressing this multifaceted issue.

Moreover, it is essential to bolster unprecedented international collaboration, sharing resources, knowledge, and cutting-edge technology. Transitioning to renewable energy is another critical strategy. By encouraging the adoption of renewable energy sources, we can reduce dependency on resources that can become points of conflict. This transition also presents an opportunity for job creation and economic growth, contributing to societal stability. Climate change and its aftermath know no borders, affecting all regions and demographics, it demands a unified global response. Public health initiatives should prioritize resilience building and conflict resolution in communities, with an emphasis on strengthening local capabilities. Investing in community-based conflict resolution and peacebuilding strategies is crucial.[12] Special focus should be placed on regions most vulnerable to climate-induced conflict. By training local leaders in mediation and negotiation, communities can better navigate the disputes that may arise from resource scarcity or displacement. For instance, communities in Bangladesh have successfully reduced the impact of flooding through community-based disaster preparedness and climate adaptation strategies, serving as an example of the power of local resilience.[13] "Supporting community-led initiatives and local climate change is no longer some far-off problem, it is happening here and now;"[14] these words of the former United States president Barack Obama still ring true today, urging us to not just recognize the reality of climate change but also to understand its impact on violence and public health. It's time for us to collectively take the bold and immediate steps necessary to mitigate these consequences and ensure the continued existence of not just our species, but of all life on Earth. As we navigate the ever-evolving landscape of climate change, we must remain nimble, forward-thinking, and unafraid to re-define traditional boundaries.

Climate change is a lived experience for many, often fraught with conflict and violence. Each temperature rise, each increment in sea level, and each extreme weather event brings human lives into the balance. These stories of human resilience and suffering must be the anchors of our discourse, adding urgency to our actions and reminding us of the scale of human consequences involved.

Reframing climate change as more than an environmental issue is a pivotal step. It is a complex crisis intertwined with human health, safety, and societal stability. To proactively meet this crisis, Disaster Medicine and public health preparedness must evolve, incorporating strategies for conflict resolution and predictive risk modeling into their operational frameworks. Gregory Ciottone, in his 2023 retirement speech as President of the World Association for Disaster and Emergency Medicine (WADEM; Madison, Wisconsin USA), quoted Professor Frederick Burkle's advice to him in 2021 on advancing climate change management, emphasizing: "I don't need to remind you that WADEM is facing many more challenges than my generation … it must become more multidisciplinary and transdisciplinary reflecting the entire disaster

cycle: preparedness, preparation, response, recovery, and rehabilitation."[15] Organizations such as WADEM need to accelerate leadership across multiple disciplines to assume the necessary leadership role this crisis requires, all of which fit within the original disaster cycle. No single specialty area currently possesses the means or the talent required. We must strive to ensure that our narratives and actions center on the human element of this global crisis, emphasizing the necessity for rapid and effective response. The battle against climate change is not merely a quest to save our planet - it is an endeavor to ensure our continued existence. It is time for us to reshape the landscape of Disaster Medicine and public health preparedness and integrate strategies for managing climate-induced violence. Only then will we stand a better chance at safeguarding our collective future. It's true that some of the proposed strategies may require substantial investment upfront. However, the long-term economic, societal, and environmental benefits far outweigh these initial costs. Moreover, international collaborations and funding mechanisms can help ensure that these solutions are accessible to all countries, regardless of their economic status. Inaction, in the long run, will prove much more costly.

For instance, policies must be enacted to support climate-vulnerable communities through the provision of social safety nets or alternative livelihood options. Interdisciplinary collaboration also involves the integration of climate science and data analytics. By creating models that account for different climatic variables, we can predict potential conflict zones and mobilize resources in a timely manner.[16,17] The power of predictive modeling and data visualization in highlighting areas of potential conflict cannot be under-estimated. Early warning systems for climate-induced conflicts could be developed using advanced data analytics and machine learning. Psychological support could be prioritized for populations repeatedly subjected to extreme weather events to reduce the likelihood of violence. Moreover, the contribution of public policy and social sciences in this interdisciplinary collaboration is invaluable. Collaboration with psychology and mental health experts is also critical. Their understanding of human behavior, stress responses, and coping mechanisms can help build more resilient communities, better equipped to handle the mental and emotional strain of extreme weather events and the conflicts they may incite. Climate policy needs to be embedded in all aspects of public policy, not treated as a separate issue. Policymakers and social scientists can aid in understanding the societal dynamics that could exacerbate climate-induced violence and help design policies to mitigate these.

In conclusion, as members of the global community, we bear a collective responsibility to act. Economists also play a vital key role in this interdisciplinary effort. They are necessary in assessing the financial feasibility of proposed strategies and also highlight the economic benefits of climate change mitigation, including job creation in renewable energy sectors and cost savings from decreased resource competition and conflict.[18] The powerful global economic communities were major contributors in accelerating the globalization of travel and communications in record time, but they have ignored similar demands for a global public health system.[19,20] They must now participate with the emerging global public health professional community to show equal support and interest.

Our task is to advocate for strategic investment in disaster preparedness, champion proactive public health policies, and foster awareness about the human implications of climate change. We need to recognize the interconnectedness of climate change, societal unrest, and public health to work towards a future where our response to climate change is not reactive, but instead, is characterized by foresight, interdisciplinary collaboration, and a deep understanding of the human aspect of this global crisis. By doing so, we could transform our warming planet from a hotbed of violence into a beacon of resilience and cooperation.

This journey starts with individual action. Stay informed. Support organizations and policies that work towards these goals. Participate in dialogues that bring these issues to the forefront. Demand climate justice from your leaders.

The ticking clock of climate change synchronizes with the crescendo of societal unrest. Let's not just stand by and watch the symphony unfold. It's time for us to conduct a harmonious and sustainable future.

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