

Climate change and malaria, dengue and cholera outbreaks in Africa: a call for concerted actions

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Climate is rapidly changing and bringing extensive direct and indirect adversities to public health globally, either by increasing the seriousness and frequency of public health emergencies or causing new, unanticipated problems. Nearly half (approximately 3.6 billion) of the global population is highly susceptible to the impacts of climate change as they live in regions with high vulnerability to climate change, including Africa.¹ Between 2030 and 2050, it is estimated that climate change will take the lives of an additional 250 000 people per year due to infectious diseases, undernutrition, diarrhoea and heat stress—of which the majority will be in low-income countries, including Africa. By the year 2030, climate change will cause direct damage to health systems—causing a loss of an estimated US\$2–4 billion.¹

With its population expected to double to 2.5 billion people by 2050, Africa has been disproportionately affected by the impacts of climate change. Africa contributes only 4% of the global carbon emissions; however, 7 out of the 10 countries most vulnerable to the impacts of climate change globally are located in Africa. High-income and upper middle-income countries contribute to 87% of global carbon emissions but are less vulnerable to the impacts of climate change.² High-income countries have better early warning systems for climate change, and their health systems are well prepared and resilient to the impacts of climate change. In contrast to the high-income countries, coupled with the suboptimal early warning systems, Africa has fragile health systems that cannot cope with the impacts of climate change. This has been reflected by multitudes of emerging and re-emerging outbreaks, whereby more than 166 outbreaks were registered in 2023 alone in Africa.³ Unless this clear gap is addressed with the global community's proactive

SUMMARY BOX

- ⇒ Climate change has direct and indirect effects on the public health.
- ⇒ Africa has been disproportionately affected by the impacts of climate change.
- ⇒ Climate change-related increased outbreaks of malaria, dengue and cholera have been recorded in African countries.
- ⇒ This commentary calls on the global health community to take concerted actions to build climate-resilient health systems and communities in Africa.

support, climate change's adversities remain unabated in Africa—risking global health security. Global communities, mainly developed nations, need to support building climate-resilient health systems and African communities.

Climate change has been posing enormous impacts in Africa, particularly among the most vulnerable women, children and those in poverty. Infectious diseases are increasing in their outbreak frequency and severity and expanding their geographical presence. Even as we write this commentary, outbreaks of dengue, cholera and malaria in different parts of Africa are posing challenges to the already fragile health system. More notably, extreme climate situations have been recognised even in a country among different regions—flooding in one part and drought (dry season) in the other parts—increasing the complexity of the outbreak response. These extreme climate situations are directly related to the increased frequency (severity) of emerging and re-emerging infectious diseases in Africa, including dengue, cholera and malaria.

Recently, several African countries such as Benin, Burkina Faso, Cabo Verde, Chad, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Mali, Mauritius, Niger, Nigeria, São Tomé and Príncipe, Senegal and Togo have reported outbreaks of dengue fever—the fastest



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contagious infectious disease. According to the WHO report, a ninefold increase in dengue infection in Africa has been reported in 2023 as compared with 2019.⁴ As the misdiagnosis of dengue is common in Africa due to limited laboratory capacities, the numbers reported from the countries might be even higher. It is not only the numbers that hold public health importance but also the geographical distribution of the outbreak that needs to be noticed. This is not good news for Africa and the global public health community, as Africa strives to restore the health systems affected by the COVID-19 pandemic. The emergence of such outbreaks in several parts of the continent demands concerted efforts of the global public health community and researchers to mitigate its further spread and impact, including acceleration of proven dengue vaccine development and integrated, well-designed interventions.⁵

Moreover, the WHO has recognised and warned that dengue fever is spreading beyond their known geographical areas,⁶ clearly indicating that ‘no one is safe until everyone is safe’. More importantly, as the globe is closely connected due to the effects of globalisation and international travel, an outbreak originating in one part of the globe could quickly spread to other countries, as seen during the COVID-19 pandemic. As climate change is worsening and increasing the likelihood of infectious diseases in Africa and beyond, ad hoc-based responses to the dengue outbreaks might not bring a sustainable solution. Thus, we strongly suggest countries make concerted efforts to proactively integrate the dengue outbreak preparedness and response activities into their public health surveillance systems and create an enabling environment and resources for the integration, including enhancing the diagnostic capacity.

Climate change has also triggered cholera outbreaks in several countries in Africa. From January 2023 to January 2024, 19 African countries have reported cholera outbreaks that caused 252934 cases and 4187 deaths, with a case fatality rate (CFR) of 1.6%.⁷ As we write this commentary, five African countries (Ethiopia, Mozambique, Tanzania, Zambia and Zimbabwe) had an acute cholera crisis claiming thousands of lives—the southern Africa region reported a peak number of cases and deaths due to the cholera outbreak (CFR of 3.7% in Zambia and 3.4% in South Africa).⁷ Notably, the heads of state, ministers of the Ministry of Foreign Affairs and Ministry of Health of the southern Africa region, under the umbrella of the Southern Africa Development Community (SADC), with the coordination of Africa Centres for Disease Control and Prevention (CDC), convened a meeting to discuss and decide on the response measures to address the current and emerging cholera outbreak crisis in the region. Accordingly, to effectively control the spread of cholera, the SADC recommended that the member states develop and implement a multisectoral response plan incorporating climatic effects on cholera re-emergence.⁷ Other African countries have also made several efforts to mitigate the spread and impacts of

cholera in their countries, including cholera as one of their priority diseases, requiring public health surveillance and response and developing guidelines to support the implementation of multisectoral cholera prevention and control plans and strategies. However, the hard-fought gains and progress remain uncontained due to the continued adversities of climate change, the limited capacities of the health systems and the lack of resilience to climate effects. The global public health community has the responsibility to support the efforts of African governments in the establishment of climate-resilient health systems to address the continued high burden of cholera cases and deaths in Africa.

As the globe strives for malaria eradication, new variants of malaria-transmitting mosquitoes have been identified in different parts of Africa—endangering the efforts of malaria eradication.^{8,9} Africa is known for its high burden of malaria, resulting in the premature death of nearly half a million population every year. The attribution of climate change to the malaria burden is enormous. Notably, the most pressing challenge to attaining global malaria eradication is climate change—creating a favourable environment for mosquitoes and limiting the response capacities of countries. Building a climate-resilient health system that can adapt and cope with the ever-changing climatic conditions needs to be the priority in Africa. Global public health communities, partners and donors need to exert concerted efforts to support Africa’s health system.

Climate change is recognised as one of the most critical threats to attaining the ‘Agenda 2063: The Africa We Want’—the blueprint for the transformation of Africa. Thus, to mitigate and adapt to climate change impacts in Africa, the Africa Union developed a strategic plan (2022–2032) aiming at strengthening the adaptive capacity of affected communities and managing the risks related to climate change, pursuing equitable and transformative low emission, climate-resilient development pathways—enhancing Africa’s capacity to mobilise resources and improve access to and development of technology for ambitious climate action, and enhancing inclusion, alignment, cooperation, and ownership of climate strategies, policies, programmes and plans across all spheres of government and stakeholder groupings.¹⁰ As a leading and coordinating Pan-African Agency, Africa CDC has prioritised the One Health approach in its strategic plan (2023–2027) to prevent and control high-burden diseases adequately.¹¹ However, translating these plans into practice is resource-intensive and requires concerted efforts and collaboration of national and international stakeholders.

At this critical point, the African health system requires urgent, high-scale and comprehensive support and funding from the global communities, funders, donors, philanthropies and private sectors, including domestic resource mobilisation, to establish climate-resilient health systems and communities. Mainstreaming the One Health approach into the health systems and other

sectors has never been more critical.¹² In Africa, early warning systems, digitalisation and artificial intelligence systems are critically required to assess, predict and forecast climate change impacts on infectious diseases. African researchers and innovators need to be supported and capacitated to track and generate data on the impacts of climate change, explore contextual mitigation and adaptation strategies, and develop innovative solutions to address the burdens. Creating awareness in the general public on climate change impacts is also critical. Thus, we call on all stakeholders to exert concerted actions by extending funding and support to African public health institutions and researchers to design, lead and coordinate innovative initiatives that address the critical needs of the African continent to alleviate climate change impacts and establish climate-resilient health systems.

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