



## Short communication

## Short communication: The global health community needs to start planning for the impact of the climate crisis on maternal and newborn health



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## ABSTRACT

The climate crisis will worsen already high rates of maternal and newborn mortality and adverse birth outcomes, exacerbating existing inequities between and within countries. Governments should consider beginning plans for responses now, engaging with partners such as national and international non-governmental organizations, local civil society groups, the private sector and donors, and the wider global community, to commence implementation of relevant policy and health service delivery measures while accelerating ongoing efforts to better improve maternal and newborn health.

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The climate crisis threatens to worsen already unacceptably high and unequal levels of maternal and newborn mortality. The reduction in maternal and newborn infant deaths achieved globally over the past two decades is overshadowed by the disproportionate burden suffered in low-resource settings. Sub-Saharan Africa alone accounts for nearly two-thirds (196,000) of annual maternal deaths and Southern Asia represents roughly one-fifth (58,000) [1]. The fact that these two regions account for 86% of the estimated global maternal deaths highlights the deep disparities in maternal and newborn health outcomes that persist [2]. In addition, within most regions of the world, women living in rural areas suffer mortality rates at least double those in urban areas [3]. There are also large disparities seen between different groups (i.e., socioeconomic, ethnic and racial) on a sub-national level. For example, in the United States maternal mortality rates are two to three times higher for Black women than White women, and four times as high in the United Kingdom [4]. Moreover, a major cause of infant mortality is preterm birth, accounting for 1.1 million newborn infant deaths annually. Preterm birth rates are

highest in low and middle income countries [5]. In 2015, 20 million infants were born with a low birth weight, and three quarters of this sum occurred in sub-Saharan Africa and southeast Asia [6].

Impacts of climate change, such as extreme weather, threaten to further exacerbate the eroding maternal and newborn health gains, compounding existing gaps and amplifying global and national failures. Marginalized communities, already struggling with the highest rates of maternal and newborn morbidity and mortality, are most vulnerable to the effects of changing climate. This population often lacks housing that protects against extreme heat and other weather events, or they live in areas prone to flooding and changing environments, resulting in less arable land, droughts and decreasing water supplies.

The global community should recognize the devastating impact of climate change and resulting environmental shocks and stressors on the lives of pregnant women and newborns. Currently there is little consideration among policy makers about the impact of a rapidly changing climate on women during pregnancy or childbirth, or on their newborns. Support for development of programming and policies, and direct funding to protect pregnant women and newborns from the threat of the climate crisis is not widely available to

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ministries of health worldwide. Awareness and action among climate change actors regarding the profound effects on pregnant people and newborns are also low and, consequently, these vulnerable groups are often not prioritized in adaptation efforts. A July 2021 review by the United Nations Population Fund (UNFPA) found that only six out of fifty reviewed national determined contributions ("NDCs", country plans to address the climate crisis under the Paris Agreement) included "references to aspects of sexual and reproductive health" [7]. Even more concerning are the findings from a 2020 review by the NAP Global Network and Women Deliver which found that even in countries' national adaptation plans (NAPs), all of which identified health as a priority area, only seven out of the nineteen available for review mentioned pregnancy and infancy. When mentioned, it was most often only in the context section [8].

This is perhaps unsurprising: pregnancy and newborn health is often less prioritized compared to other health areas and environmental impacts on maternal and newborn health have rarely been able to draw the attention and resources of policy makers and implementers. Ministries or other government agencies responsible for climate action don't often interact with officials working on health. Climate denialism or wishful thinking that the climate crisis is a problem for the future, after a long list of competing demands, may also have played a part. There is limited practical guidance or case studies suggesting concrete approaches in response to a changing environment. Maternal health has suffered a historical lack of prioritization from multilaterals and the donor community. In addition, maternal and newborn programming has tended, in many countries, to focus on clinical approaches and largely ignored the more complex social determinants of health that make some people so vulnerable to environmental harms.

The biology of pregnancy creates specific vulnerability to climate change. The World Health Organization (WHO) and the International Federation of Obstetrics and Gynecology (FIGO) have each linked the climate crisis to poor maternal health outcomes [9,10]. A broad array of published and unpublished literature has reported associations between exposure to severe heat, wildfire smoke, flooding, and extreme weather events (e.g., hurricanes) to poor maternal health and birth outcomes [11].

One example is exposure to extreme heat. Due to physiological changes of pregnancy, such as body mass to skin surface ratio and hormonal changes, pregnant women can be more at risk of heat-related illness compared to non-pregnant women [12]. Newborns whose mothers were exposed to extreme heat during pregnancy are at increased risk of stillbirth, preterm birth, and low birth weight [13]. Increased risk of poor health outcomes poses a direct threat to women and their newborns. At a population level emergent threats increase the stress on already overburdened families, informal community support systems and health systems [14].

In the United States, recent studies suggest the impact of extreme heat has been especially detrimental to the health of low income and Black pregnant women, often in neighborhoods that already have worse maternal health outcomes [15]. Increases in extreme heat are predicted for Africa and southeast Asia, areas already bearing high rates of maternal illness and where many women and girls of reproductive age labor in hot conditions and have no cooling at home [16,17]. The question of how to protect pregnant women and girls from extreme heat and other climate-related hazards needs urgent consideration.

Pregnancy health will be negatively affected in a myriad of ways. Another concern is the shifting and expanding ranges of malaria, dengue, and Zika suitability as temperatures increase and precipitation patterns change. These diseases are more harmful to pregnant women than non-pregnant women and can be harmful to the fetus. Furthermore, maternal nutrition is impacted by reduced crop yields and the changing profiles of staple foods in certain regions due to

increased temperatures and carbon dioxide in the atmosphere, inundation of the land by the sea with subsequent increased soil salinity, as well as decreased availability of water. For example, in the Sindh province of Pakistan, evidence suggests that the effectiveness of nutrition sensitive interventions, such as improving food availability through kitchen gardening and community farm field schools, are being negatively affected by the climate crisis [18]. Another example of how climate change influences nutrition is how food insecurity in sub-Saharan Africa acts as a mediator of high-risk sexual behavior and migration, thus increasing risk of contracting HIV and susceptibility to infections that are common among people living with HIV

Governments and partners should consider early and strategic planning to respond to climate change derived maternal and newborn health impacts. Research is urgently needed on the impacts of climate change on maternal and newborn health and on options for adaptation. Research should be designed to help governments, health workers and others understand how best to take action to improve maternal and infant health outcomes

Despite the lack of detailed data, we can already anticipate that many populations that already face poor maternal health will be less able to adapt and respond. The following activities could be adopted immediately to serve as starting points for focused interventions and to create a momentum for further future initiatives:

1. National policies with multi-sectoral directives should be updated to draw attention to the needs of pregnant women and their newborns, prioritizing protection and adaptation to a changing climate. The clinical risks of extreme heat, for example, on pregnancy need to be codified and included in clinical guidelines for risk assessment and evaluation to improve early detection and management of related complications. In conjunction, regular environmental health assessments could be built directly into program design.
2. Maternal health workers should be prepared to provide basic guidance on the harms of extreme heat, and to teach critical prevention methods (e.g., staying out of the sun at peak day hours where possible and maintaining adequate hydration). This outreach should not just target the pregnant women themselves, but also the wider community, including those local informal opinion leaders, traditional birth attendants and relatives who can help share messages related to supporting both a safe pregnancy and help ensure swift referrals if complications occur. Pregnant women and girls, community birth workers and other community members, including women in formal and informal leadership roles, who have information about climate harms and useful interventions may then be empowered to help protect their own and others' pregnancy health.
3. A reimagining of service delivery models could be considered to better accommodate extreme temperatures. Developed in response to the local community context, such adaptations would seek to better support pregnant women, newborns and other vulnerable populations. For instance, changes could include shifting clinic appointments away from the hottest parts of the day to the evenings when the weather is cooler.
4. Other forms of innovation and adaptation could also be explored, particularly at the community level and potentially through the integration of climate smart technology. For example, in some countries access to cooling centers, cooling at home or cool roofs may prove feasible. Where heat increases wildfire frequency, access to affordable air filtration at home or in communal spaces may be important. Efforts to protect ecosystems or reforest land can aid in the provision of clean water, which is critical to a healthy pregnancy; reforestation or afforestation in urban areas can reduce the heat island effect and the temperatures pregnant people are exposed to.

In recent years an integrated approach that links maternal and neonatal health services from home through each level of the health system up to the hospital has been successfully introduced in several low- and middle-income countries, including the Philippines, Nepal, Tanzania, Madagascar and Nigeria. These 'Networks of Care' provide comprehensive, respectful, and people-centered care. They help ensure pregnant women living in even the most rural communities, are assessed, and rapidly referred in the case of emergencies [19]. Strengthening and spreading effective Networks of Care systems has the potential to serve as a foundation from which to address key drivers of maternal and neonatal mortality and better allow for organic, bottom-up movement towards establishing initiatives developed directly in response to changing climate conditions.

Successful experiences and learning should be shared across countries, with support from donors and partners, providing a roadmap for governments to adopt and adapt best practices for their local context.

Action is needed. Climate change is already having a detrimental impact on health, with an outsized impact on pregnancy and newborns. The effects threaten to exacerbate the stark inequities that already exist. Climate change appears overwhelming, but there are initiatives that can be launched rapidly to address immediate opportunities and focus attention. Governments should consider beginning plans for responses now, engaging with partners such as national and international non-governmental organizations, local civil society groups, the private sector and donors, and the wider global community. They should commence implementation of relevant policy and health service delivery measures while accelerating ongoing efforts to better improve maternal and newborn health.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

### Disclaimer

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