



Invited Commentary | Global Health

Heavy Rainfall and HIV and Sexually Transmitted Infections in Sub-Saharan Africa—Potential New Risk

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A cross-sectional analysis of nationally representative survey data and annual rainfall data from 21 countries in sub-Saharan Africa during 12 years found that each year of heavy rainfall was associated with higher odds of HIV (1.14; 95% CI, 1.11-1.18) and sexually transmitted infections (STIs) (1.11; 95% CI, 1.07-1.15) and with higher numbers of sexual partners in the previous 12 months.¹ The odds of HIV and STI were highest among women and individuals residing in rural areas. The study included nearly 290 000 participants aged 15 to 59 years.

Increasing research into associations between weather patterns and health outcomes continues to identify new potential risks. Associations based on annual data are useful for generating hypotheses for further testing, with the aim to provide results to inform strengthening national and local health systems. If the results of Nagata et al¹ are verified at temporal and spatial scales relevant for decision-making, incorporating flooding risks into health system programs designed to reduce the risks of HIV and STIs may be useful. Furthermore, including HIV and STI information into climate change and health adaptation planning would ensure national and local adaptation plans include the full range of climate-sensitive health outcomes. Another consideration is that because extreme events, such as droughts, heatwaves, and floods, are increasing in frequency and intensity in sub-Saharan Africa and elsewhere, additional research would be useful to determine the extent to which concurrent or sequential events could compound the risks of HIV and STIs.

This research is particularly important when there is an array of evidence-based HIV prevention tools available, such as preexposure prophylaxis, postexposure prophylaxis, or treatment as prevention. It will be critical to implement interventions that address the gender and urban vs rural status inequalities identified by Nagata et al.¹ Strengthening health systems is key to address barriers that women face in uptake and retention of HIV services. Examples of strategies that may be targeted include use of female-controlled HIV prevention methods, such as the dapivirine ring, or those that offer better privacy, such as injectable preexposure prophylaxis. Beyond health systems strengthening, addressing challenges that affect whole communities, particularly rural communities, may require interventions that empower communities to take the lead, based on contemporary guidelines on self-care and community-led strategies.²

Nagata et al¹ indicate that younger people may be at lower risk and suggest that it is important to target older adults. However, it is important to caution against leaving younger people behind: there is evidence that adolescents and people younger than 25 years consistently have suboptimal uptake of HIV and sexual and reproductive health services. Although HIV prevalence may be lower in the younger population than in adults, the incidence is high, with young women in sub-Saharan Africa accounting for 25% of new infections despite making up only 10% of the population.³ Evaluating outcomes that predominantly affect younger people may have highlighted the need to focus energies on this key group. For example, demographic health survey data from 18 countries show that more than 80% of sexually active adolescents in sub-Saharan Africa do not use contraception,⁴ which represents millions of younger people facing unintended pregnancy, unsafe abortions, and school dropout. It is important to determine whether these challenges are exacerbated by flooding.

Increasing skill in forecasting meteorologic conditions and events offers the opportunity to capitalize on current flooding early warning and response systems by including components to protect and promote health and well-being. Doing so requires strengthening partnerships between

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ministries and departments of health and meteorologic services, building on country expertise. Ideally, such early warning systems will be codesigned and coproduced with vulnerable populations to increase uptake and effectiveness.

Increases in the frequency and intensity of flooding and other extreme weather and climate events with additional climate change⁵ increase the urgency of understanding associations between weather pattern and health outcomes beyond those well reported.⁶ Continual shifts in weather patterns will exacerbate current and create new health risks. Proactive and timely health system and health care planning (eg, adaptation) can reduce, but not eliminate, many risks. Strengthening health systems to be climate resilient and environmentally sustainable will be central in preparing for a future that will be very different from today.⁷

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REFERENCES

1. Nagata JM, Hampshire K, Epstein A, et al. Analysis of heavy rainfall in sub-Saharan Africa and HIV transmission risk, HIV prevalence, and sexually transmitted infections, 2005-2017. *JAMA Netw Open*. 2022;5(9):e2230282. doi:10.1001/jamanetworkopen.2022.30282
2. World Health Organization. *WHO Consolidated Guideline on Self-care Interventions for Health*. World Health Organization; 2021.
3. UNAIDS. Global AIDS update—confronting inequities—lessons for pandemic responses from 40 years of AIDS. 2021. Accessed July 26, 2022. <https://www.unaids.org/en/resources/documents/2021/2021-global-aids-update>
4. McCurdy RJ, Jiang X, Schnatz PF. Long-acting reversible contraception in adolescents in Sub-Saharan Africa: evidence from demographic and health surveys. *Eur J Contracept Reprod Health Care*. 2018;23(5):357-364. doi:10.1080/13625187.2018.1519535
5. Allan RP, Aruias S, Berger JG, et al. Summary for policymakers. In: Masson-Delmotte V, Zhai P, Pirani A, et al, eds. *Climate Change 2021: The Physical Science Basis: Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press; 2021.
6. Cisse G, McLeman R, Adams H, et al. Health, wellbeing, and the changing structure of communities. 2022. Accessed July 26, 2022. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_Chapter07.pdf
7. World Health Organization. *Guidance for Climate-Resilient and Environmentally Sustainable Health Care*. World Health Organization; 2020.