Health Services during Extreme Weather Events: Findings from Accra and Tamale, Ghana

Background and overview of the VEWEC research project

Climate change as indicated by changes in weather patterns, including the predictability and reliability of seasonal rainfall and extreme events, threaten progress towards achieving the Sustainable Development Goals. The impacts of extreme weather events on infrastructure service delivery are more severe in high-density low-income urban settlements, where urban service providers find it more challenging, even during normal weather conditions, to extend services because of high population density, irregular and undefined land tenure and unplanned physical layout. This policy brief presents key findings from a research project entitled *Vulnerability to Extreme Weather Events in Cities: Implications for Infrastructure and Livelihoods* (VEWEC), supported by the British Academy. VEWEC, an interdisciplinary study, explored human vulnerability to extreme heat and urban flooding, and gathered evidence of coping strategies within low-income communities of Ghana (Gough et al., 2019).

Qualitative and quantitative data were collected on the impacts of extreme heat and urban flooding on water, electricity and health services. This brief focuses on the findings for health. Fieldwork was undertaken in four communities in Accra (Alajo, Agbogbloshie, Bortianor, Odawna) and four in the northern city of Tamale (Gumani, Kukuo, Lamashegu, Ward K). The work was facilitated by community champions. In all, 21 key informant interviews with representatives of service providers, 124 household interviews and 24 focus group discussions (older male, older female and youth groups) were conducted in the study areas. *Tinytag Transit 2* thermistors were installed in at least one health facility visited by residents of each area, as well as the local meteorological (met) site in each city for comparison purposes.

Temperatures recorded in health facilities

Table 1 Indoor temperatures for health facilities compared with ambient outdoor temperatures in Accra and Tamale (22 May 2018 - 3 July 2018)

City	Facility	Location	Mean (°C)	Maximum (°C)	Minimum (°C)
Accra	H4	Waiting room	28.8	31.4	26.2
	H5	Waiting room	28.9	32.2	25.4
	H6	Waiting room	27.5	30.6	24.5
	H7	Waiting room	28.7	30.8	26.9
	A2a	Children's ward	28.7	32.0	25.3
	A2c	Out patient department	28.6	31.3	25.6
	O4	Waiting room	28.6	30.4	25.8
	M1c	*Met site*	*27.3*	*32.6*	*20.8*
Tamale	H1a	Maternity ward	30.8	36.1	25.4
	H1b	Children's ward	30.2	35.9	26.1
	H2	Out patient department	30.7	38.2	24.9
	H3	Labour ward	29.2	35.9	23.7
	K5a	Laboratory	30.2	35.0	25.9
	M1a	*Met site*	*28.0*	*36.3*	*21.1*

Health facilities were on average ~5°C warmer at night than the met site due to a combination of greater thermal inertia of the buildings and the influence of the urban heat island. The highest temperature recorded in any health facility was 38.2°C and the lowest 23.7°C, both in Tamale (Table 1).

Vulnerabilities of health services during extreme weather events

Vulnerabilities during extreme temperatures	Vulnerabilities during flooding
• Facilities not purpose built and poor ventilation exacerbates heat • Staff sweat, which is a hygiene hazard • Water and electricity disruption common • Lack of water makes hygiene difficult • Drugs can be damaged by heat and lack of power for fridges • Using the generator during power outages increases cost of service provision • Extra demand for electricity can be a problem in facilities using pre-paid service • Lack of shade for waiting patients • Overcrowded wards reduce ventilation • Patients sleep outside increasing malaria risk • Extra demand for health services • Tired staff as they find it difficult to sleep	• Blocked drains near facilities • Extra pressure on resources to tidy up • Generators flooded and stop functioning • Power goes off as a precaution during floods • Bed mattresses cannot be on the floor • Equipment needs to be moved upstairs • Pharmacies can run out of supplies • Renovations needed after floods • Increased demand on services, especially mental health services • Poorer patients cannot afford longer transport costs if local facilities are full • Access to facilities can be blocked • Emergency response lacks mental health support • Traditional healers may be used more during floods as they are cheaper and closer

Coping strategies adopted by health services during extreme weather events

Extreme heat	Flooding
• Installing larger windows and doors to ventilate • Lobbying to have funds to run generators • Installing water pumps and polytanks for resilient water supply • Ensuring fuel ready for generator • Having torches available for light	• Building raised areas for equipment • Population clearing drains but improved draining systems needed • Greater local control of funds by health facilities necessary to mitigate flooding, e.g. install rain friendly outdoor surfaces

Implications for policy and practice

Design changes to reduce the impact of extreme weather events would improve the resilience of the health system in Ghana. To mitigate against flooding, building raised paths, improving drains and toilet facilities, and tiling mud floors are all necessary. Government health facilities require extra resources to implement these initiatives. Contingency planning is needed for power outages that accompany flood and extreme heat events. Power companies must give adequate notice of outages to ensure enough fuel can be stock-piled to run generators. High quality battery-operated torches should be provided as backups, especially for critical areas, such as emergency surgery procedures. The potential for solar powered air conditioners needs exploring. Better coordination is required to locate free beds in health facilities. Effective early warning systems for flood and extreme heat events are required, with guidance provided to health facility managers and communities regarding how to respond. Early warnings need to be reliable and embedded in existing communication structures for effective dissemination.

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Reference
Gough, K.V., Yankson, P.W.K., Wilby, R.L., Amankwaa, E., Abarike, M., Codjoe, S., Griffiths, P., Kaba, C., Kasei, R., and Kayaga, S. 2019. Vulnerability to extreme weather events in cities: implications for infrastructure and livelihoods. *Journal of the British Academy*, 7(s2): 155–181. DOI https://doi.org/10.5871/jba/007s2.155