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Environment and Health in Nigeria:
Capacity and Research Development

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In Africa, population growth, urbanization, and climate change are environmental health challenges of emerging concern. These challenges intersect in Nigeria, Africa's most populous country. Nigeria's coastal location makes it vulnerable to climate change–related weather extremes that may influence the health of its residents (Elias & Omojola, 2015; Serdeczny et al., 2016). However, there is a paucity of data on the health impacts of extreme weather in coastal Nigeria because of critical gaps in research capacity, data collection, and research funding.

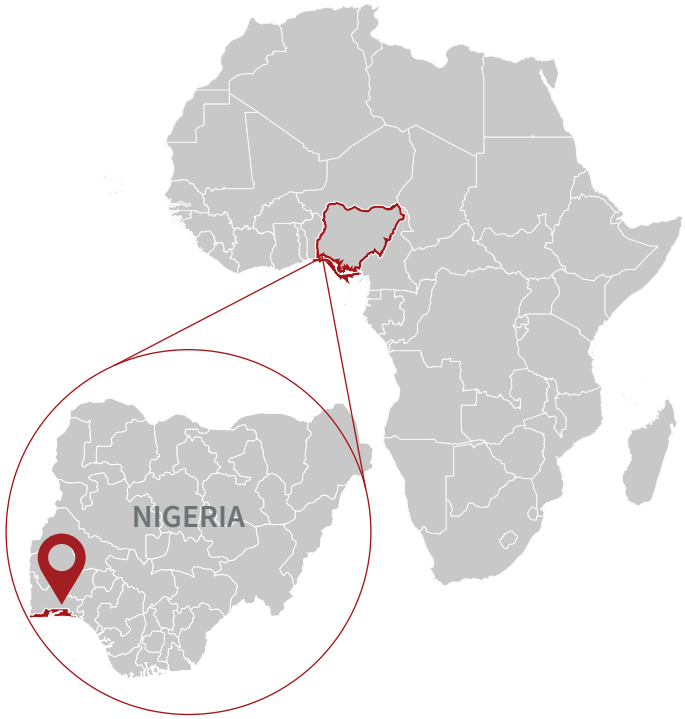
This brief describes a project to promote collaborative capacity and research development in environmental epidemiology in Nigeria. The project will develop and evaluate a short course on environmental epidemiology for Nigerian researchers. The effort will also produce new knowledge on the physical and mental-health impacts of weather extremes among residents of Nigeria's coastal cities, including Lagos, Africa's most populous city. The project is designed to improve public health by advancing knowledge about the nature and magnitude of environmental health hazards in Nigeria.

Environmental and Health Concerns

In Africa, environmental risks account for approximately 23% of the burden of disease (Pruss-Üstün et al., 2006). This environmental burden has been attributed to unsafe water, sanitation, and hygiene (WASH), air pollution from ambient particulate matter, and indoor air pollution from household use of solid fuels and traditional cooking methods (GBD 2019 Risk Factors Collaborators, 2020; Mustapha et al., 2011; Shaffer et al., 2019). While WASH and air pollution are well-established environmental hazards, 21st century hazards, such as population growth, urbanization, and climate change, interact to present new public health challenges (Koné et al., 2019; Nweke & Sanders, 2009).

Research in both low- and high-income settings has documented extreme weather's associations with adverse physical and mental health (Lane et al., 2013; Mason et al.,

LAGOS, NIGERIA



Population (2018 estimate)	23,437,435
Average high temperature	87.4° F
Average low temperature	73.0°F
Record high temperature	104.0°F
Record low temperature	52.0°F
Average precipitation (days/year)	104.3

Source: Wikipedia
Map by FreeVectorMaps.com

2020; O'Neill & Ebi, 2009), but evidence from Nigeria has been shaped by the noted gaps (Koné et al., 2019; Kula et al., 2013). Environmental monitoring is not robust, there are no central repositories of environment health data, and expertise in environmental epidemiology is limited. These gaps complicate environmental epidemiology research and the translation of findings to inform public health efforts (Koné et al., 2019). The work described here is designed to address the gaps through collaborative development of capacity and research.

Task 1: Develop and Evaluate an Environmental Epidemiology Short Course for Nigerian Researchers

In 2021, we developed a 3-day online short course in environmental epidemiology. The purpose of the course was to strengthen the ability of Nigerian researchers to conduct environmental health research and, thereby, to fill data gaps. The course consisted of weekly 2-hour synchronous sessions, with independent learning activities between sessions. The course was extensively advertised to all parts of Nigeria through social media and professional societies. Eligible applicants included Nigerian graduate students and scientists with degrees in environment, health, and related disciplines. We received over 200 applications and enrolled 30 participants.

Task 2: Explore the Health Impacts of Weather Extremes in Nigeria

With a protocol modified for Nigerian study participants, this task will involve collection of survey data from a sample of Nigerian residents of varying socioeconomic and environmental parameters. Participants will complete a self-administered questionnaire on health impacts encountered during extreme weather events. The questionnaire will also solicit information on respondents' demographic characteristics, socioeconomic status, household composition, health status, and adaptive behaviors, as well as health-related quality of life. This exploratory work will address research gaps through novel data collection that will allow the project's researchers to develop standards, protocols, and methodologies for future replication.

Significance and Impact

This work will advance new knowledge about the nature and magnitude of environmental health risks in Nigeria. As climate change–related weather extremes become more frequent and severe, research and capacity development of the sort undertaken in this project will be vital for improving environmental public health there. The research in this work will innovate by gathering data on everyday health impacts, including understudied mental-health impacts.

Plans for Next-Stage Funding

The project has fostered meaningful collaborations between scholars at Emory University, the University of Denver, the Nigerian Institute of Medical Research, and Washington University in St. Louis. This partnership will provide a strong foundation for the research enterprise and scholarly endeavors within Nigeria. The project supports the strategic plan of the National Institute of Environmental Health Sciences (2018) in the National Institutes of Health by promoting improvement in global environmental health. As such, the work will inform the development of large-scale studies to fill data gaps and ultimately inform interventions to reduce the health burden of environmental health hazards in Nigeria.

References

Elias, P., & Omojola, A. (2015). Case study: The challenges of climate change for Lagos, Nigeria. *Current Opinion in Environmental Sustainability, 13*, 74–78. https://doi.org/10.1016/j.cosust.2015.02.008

GBD 2019 Risk Factors Collaborators. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet, 396*(10258), 1223–1249. https://doi.org/10.1016/S0140-6736(20)30752-2

Koné B., Oulhote Y., Mustapha, A., Olaniyan, T., Kouame, K., Benmarhnia, T., Munyinda, N., Basu, N., Fobil, J., Etajak, S., Annesi-Maesano, I., Chevrier, J., & Ebi, K. L. (2019). Environmental health research challenges in Africa: Insights from symposia organized by the ISEE Africa Chapter at ISES-ISEE 2018. *Environmental Epidemiology, 3*(6), Article e074. https://doi.org/10.1097/EE9.0000000000000074

Kula, N., Haines, A., & Fryatt, R. (2013). Reducing vulnerability to climate change in sub-Saharan Africa: The need for better evidence. *PLoS Medicine, 10*(1), Article e1001374. https://doi.org/10.1371/journal.pmed.1001374

Lane, K., Charles-Guzman, K., Wheeler, K., Abid, Z., Graber, N., & Matte, T. (2013). Health effects of coastal storms and flooding in urban areas: A review and vulnerability assessment. *Journal of Environmental and Public Health,* Article 913064. https://doi.org/10.1155/2013/913064

Mason, L. R., Sharma, B. B., Walters, J. E., & Ekenga, C. C. (2020). Mental health and weather extremes in a southeastern US city: Exploring group differences by race. *International Journal of Environmental Research and Public Health, 17*(10), Article 3411. https://doi.org/10.3390/ijerph17103411

Mustapha, B. A., Blangiardo, M., Briggs, D. J., & Hansell, A. L. (2011). Traffic air pollution and other risk factors for respiratory illness in schoolchildren in the Niger-delta region of Nigeria. *Environmental Health Perspectives, 119*(10), 1478–1482. https://doi.org/10.1289/ehp.1003099

National Institute of Environmental Health Sciences. (2018). *2018-2023 strategic plan — Advancing environmental health sciences: Improving health* (NIH Publication No. 18-ES-7935). U.S. Department of Health and Human Services, National Institutes of Health. https://www.niehs.nih.gov/about/strategicplan/strategicplan20182023_508.pdf

Nweke, O. C., & Sanders, W. H., III. (2009). Modern environmental health hazards: A public health issue of increasing significance in Africa. *Environmental Health Perspectives, 117*(6), 863–870. https://doi.org/10.1289/ehp.0800126

O'Neill, M. S., & Ebi, K. L. (2009). Temperature extremes and health: Impacts of climate variability and change in the United States. *Journal of Occupational and Environmental Medicine, 51*(1), 13–25. https://doi.org/10.1097/JOM.0b013e318173e122

Pruss-Üstün, A., Corvalán, C. F., & World Health Organization. (2006). *Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease*. World Health Organization. https://apps.who.int/iris/handle/10665/43457

Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., Schaeffer, M., Perrette, M., & Reinhardt, J. (2016). Climate change impacts in sub-Saharan Africa: From physical changes to their social repercussions. *Regional Environmental Change, 17*(6), 1585–1600. https://doi.org/10.1007/s10113-015-0910-2

Shaffer, R. M., Sellers, S. P., Baker, M. G., De Buen Kalman, R., Frostad, J., Suter, M. K., Anenberg, S. C., Balbus, J., Basu, N., Bellinger, D. C., Birnbaum, L., Brauer, M., Cohen, A., Ebi, K. L., Fuller, R., Grandjean, P., Hess, L. L., Kogevinas, M., Kumar, P., … Hu, H. (2019). Improving and expanding estimates of the global burden of disease due to environmental health risk factors. *Environmental Health Perspectives, 127*(10), Article 105001. https://doi.org/10.1289/EHP5496

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