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Tackling the effect of climate change on diarrheal diseases

Thanks to a Horizon Europe grant, Amsterdam UMC is set to lead a global consortium to improve policies and interventions

Diarrhoea is, globally, the third largest cause of death for children under 5. Contributing to more than 500,000 deaths, only pneumonia kills more children each year. Climate change, driving increased flooding and droughts, threatens the fragile progress made in reducing diarrheal disease burden over the past decades. Together with the Amsterdam Institute of Global Health and Development, Amsterdam UMC is set to lead a global consortium in the hunt for improved interventions.

"We see that the impact of climate change on diseases transmission depends on the constantly changing interaction between climate events, local vulnerabilities and exposure to disease," says Vanessa Harris, Assistant Professor of Global Health at Amsterdam UMC. "For example, sudden heavy rain can cause sewers to overflow and contaminate water supplies or increasing temperatures can cause some pathogens to live longer outside the body," Harris adds.

Mapping the terrain

To facilitate effective policy responses in countries that are the most vulnerable to the impacts of climate change, more knowledge is necessary. The initial aim of the project is to understand how climate change's impact on water supplies and the environment will affect the spread of key pathogens and, thus, increase the risk of contracting diarrheal disease. "By bridging this knowledge gap, we can map which areas are more at risk and why, allowing communities and policy makers to prepare and adapt locally," says Harris. "We'll do this by bringing together a broad range of experts – from climate experts and engineers to anthropologists, health economists, and public health experts – and then using broad-scale modelling and community-based case studies to describe the consequences of climate change on diarrheal burden and identify which local interventions will be most effective into the future."

First-hand experience

Dr. Dzidzo Yirenya-Tawiah and Dr. Adelina Mensah, both environmental scientists at the University of Ghana, have conducted multiple community-based studies and seen the effects of climate change on health first hand.

Funded by the European Union

"Many of our fishing communities are exposed to frequent flooding events from storm surges and erratic heavy rainfall events, which sometimes occur at the same time and have devastating consequences on homes and water supplies. The quality of surface and groundwater is especially compromised through unknown pathways of disease transmission; and with limited alternative resources during these events, health risks to entire families are exponentially increased," says Mensah.

Horizon Grant

Ghana is not the only country where case studies will be performed, the consortium will also carry out research in Tanzania, Romania and Italy. In all four countries, case study sites are chosen due to their susceptibility to both flooding and drought. However, there are also individual characteristics that will provide the consortium with unique insights. For example, in Naples, proximity to farming and agriculture, coupled with an aging urban water infrastructure provide added risks. Haydom, Tanzania is an extremely rural setting with high rates of malnutrition and poverty and increased exposures to food insecurity. The impacts of climate change on diarrheal disease burden will likely be magnified and cost-effective evidence-based adaptations and interventions are sorely needed.

Dr. Estomih Mduma is a Public Health researcher at Haydom Lutheran Hospital and sees how diarrhoeal diseases are a major cause of hospital admissions and child morbidity and mortality in the hospital. Inconsistent access to water significantly compromises the effort to reduce the burden of diarrhoea in this vulnerable population. These vulnerabilities are part of what the SPRINGS consortium plans to tackle and, thanks to a Horizon grant worth 6.5m euros, the project will draft concrete policies that are ready to be implemented.

"We want to get to stage where we can predict local and national risks and use this evidence to shape policy. This means understanding where water quality and pathogen surveillance needs to be performed to support communities and governments in prioritizing their limited resources across health and environmental sectors. Ultimately, the combination of better mapping and more surveillance coupled with targeted interventions should reduce illnesses and deaths," concludes Harris.

SPRINGS - Supporting Policy Regulations and Interventions to Negate aggravated Global diarrheal disease due to future climate Shocks - officially started on 1 January 2024, is a €6.5 million project that spans five years. The project is funded by the European Commission under the Horizon Europe programme with Grant Agreement number 101057554.

The SPRINGS consortium consists of Amsterdam UMC, AIGHD, the Norwegian Meteorological Institute, the University of Virginia, the University of Ghana, the London School of Hygiene and Tropical Medicine, Three o'clock, Aarhus University, the IHE Delft Institute for Water Education, The Abdus Salam International Centre for Theoretical Physics, the Vrije Universiteit Amsterdam, the University of Naples, the Haydom Lutheran Hospital, AQUATIM, the University of Bucharest and the Dutch National Institute for Public Health and the Environment.

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