



Cooking stoves that burn biomass are a significant source of air pollution in sub-Saharan Africa.

## PUBLIC HEALTH

# Africa study seeks to fill pollution data gap

*Low-income countries in sub-Saharan Africa are nearly unrepresented in the research on air quality and health.*

BY NICOLE WETSMAN

At ten elementary schools on the outskirts of Kampala, the capital city of Uganda, newly installed air-quality monitors are quietly collecting data on the amount of particulate matter in the atmosphere. The schools are part of a project launched in February to study how air pollution affects children's health, in an effort to address a major public-health gap in sub-Saharan Africa.

Globally, air pollution causes more deaths than any other environmental hazard (P. J. Landrigan *et al. Lancet* 391, 462–512; 2018). But there are few data on its health effects in sub-Saharan Africa. And it's hard to draw any lessons from similar studies in Europe or North America, because much of the air pollution in sub-Saharan Africa comes from a different source — indoor stoves that burn biomass such as charcoal and firewood. The resulting emissions of particulate matter, carbon monoxide and sooty 'black carbon' "can be hazardous indoors and can also go

outside to mix with other sources of pollution", says Eric Coker, who studies global-health equity in Uganda at the University of California, Berkeley.

Lack of access to health care, low nutrition and the high prevalence of infectious diseases such as tuberculosis and HIV leave the region's population susceptible to the effects of environmental pollutants, Coker adds.

The paucity of data was clear to Kiros Berhane, a biostatistician and a principal investigator with the Eastern African GEO-

**"This was the place we could make the biggest contribution."**

Health hub, the group running the child-health study in Kampala. The hub, which began conducting research in 2016, is a collaboration between the University of Southern California in Los Angeles and Addis Ababa University in Ethiopia. It chose to focus on air pollution after examining gaps in public-health research in the region. "This was the place we could make the biggest contribution," he says.

South Africa is the only country in sub-Saharan Africa with an air-quality monitoring programme, says Coker. Yet the sparse data available for the rest of the region suggest that in some areas, average levels of one type of pollution — particulate matter — are an order of magnitude higher than those in North American and European cities, Coker and a colleague reported last month (E. Coker and S. Kizito *Int. J. Environ. Res. Public Health* 15, 427; 2018).

## ACTION ACROSS AFRICA

The Eastern Africa GEOHealth hub aims to begin filling the sub-Saharan Africa data gap. The project is one of seven GEOHealth programmes centred in low-income countries across the world, and is funded in part by the US National Institutes of Health and Canada's International Development Research Centre.

The programme's child-health study stationed its air-quality monitors at ten schools outside Addis Ababa for a year, before moving them to Uganda in February and March. The devices will stay there for about a year, measuring levels of fine particulate matter.

Researchers are also tracking the lung function of children in the schools, using questionnaires and breathing tests. Once they finish collecting data in Uganda, they'll move the air monitors to schools in Kenya and Rwanda. Ultimately, the study plans to gather data from 40 sites across the 4 countries, and track thousands of schoolchildren, Berhane says. It's modelled on similar research conducted in southern California. "The idea is to see if lung function is actually associated with high versus low particulate matter," he says.

The GEOHealth hub is also installing air-quality monitors in the capital cities of each of the four countries included in the school study. Project researchers plan to compare pollution levels to morbidity and mortality in each city's major hospitals.

Air pollution hasn't been a priority for governments in eastern Africa until the past few years, Berhane says. With only limited resources available, governments have given more attention to concerns such as infectious disease and food insecurity. But attitudes have started to shift, and there is now more recognition of the damage that environmental exposures can cause.

The GEOHealth hub involves local stakeholders and government officials, and invites representatives to its training sessions and meetings. "They've been part of the process from the get-go," Berhane says. "It's translated into increased interest in the issue."

When the air-quality monitors in the children's health study were about to be moved from Ethiopia to Uganda, Berhane says, officials from Addis Ababa indicated that they were interested in replacing the monitors, and in continuing to track air quality. "I'm very optimistic that the work will continue," he says. ■