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COVID-19 puts health research to the test in Africa

Africa's health-research landscape has been steadily growing, but the COVID-19 pandemic might accelerate the continent's research-capacity building.

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There is a growing army of epidemic frontline researchers who have been in the trenches before [COVID-19]. There was great Ebola mobilization of researchers, medics, community leaders, etc. to combat Ebola [and they] have been on standby to address new challenges such as COVID-19," says Thomas Kariuki, Director of Programmes at the African Academy of Sciences.

When the Ebola outbreak ravaged African countries, especially those in West Africa, additional capacities were acquired in the areas of infectious-disease prevention, control and surveillance.

"Fast-forward to COVID-19, Nigeria is publishing SARS-CoV-2 genomic data in less than four days," Moses John Bockarie, Head of Africa Office for the European & Developing Countries Clinical Trials Partnership, tells *Nature Medicine*.

Countries like the Democratic Republic of the Congo (DRC) and Sierra Leone acquired virological testing capacity and gene sequencing that are now contributing to the global pool of knowledge on COVID-19. Contact-tracing structures put in place to identify people who have been in contact with someone who tested

positive for Ebola have been adapted for COVID-19 purposes.

"DRC is now able to sequence their COVID-19 genome within their country. DRC is not very strong in terms of research infrastructure but because of their experience with Ebola, they were able to establish capacity for that," says Bockarie.

Changing the research landscape in response to COVID-19

As of 31 July 2020, 4.6% of COVID-19 studies registered at ClinicalTrials.gov were based in Africa, with 77% of those (101 studies) emerging from Egypt.

The listed studies are focusing on a wide array of issues ranging from antibody responses in contacts of patients with COVID-19, to exchange transfusion versus plasma obtained from convalescent patients and treated with methylene blue, for patients with COVID-19, to the administration of chlorpromazine as a treatment for COVID-19, to surveys assessing attitudes toward and perceptions about the COVID-19 pandemic and social media's effect on knowledge dissemination during COVID-19.

Kariuki says that many research leaders in Africa are getting into the discovery, development and future delivery of COVID-19-control tools, vaccines and treatments. Accordingly, several studies are being conducted on the continent.

In Ibadan, Nigeria, a study sponsored by the London School of Hygiene and Tropical Medicine aims to evaluate the effects of aspirin, losartan and simvastatin in adults 40 years of age and older who have suspected or confirmed acute COVID-19 and require hospitalization. Christian Happi tells *Nature Medicine* that his team at the African Centre of Excellence for Genomics of Infectious Diseases in Nigeria has developed a point-of-care test for COVID-19. The Pasteur Institute in Senegal also has a low-cost COVID-19 test kit.

Scientists in a number of African countries are also testing herbal treatment options for COVID-19. In Kenya, the country's Medical Research Institute announced that it is testing the efficacy of Zedupex, an herbal medicine-based drug used for the treatment of herpes. In Nigeria, the country's drug-regulatory agency said it is processing 21 herbal medicinal products for 'safe to use' status. It disclosed that the candidates are immune-system boosters and anti-infectives useful for the relief of COVID-19-associated symptoms. A number of African countries are also engaging tech innovators to deploy new and already-existing solutions to aid the local response to COVID-19.

Africa Centres for Disease Control and Prevention Deputy Director Ahmed Ogwel Ouma tells *Nature Medicine* that candidate vaccines against COVID-19 could emerge from Africa by November 2020.

A growing research landscape

In 2019, the *Health Research and Innovation Strategy for Africa* found that internationally recognized health research is happening on the continent, although it is emanating mostly from a few countries. Even in countries in which most of the research is done, certain institutions dominate. The University of Cape Town, Stellenbosch

University, the University of KwaZulu Natal, the University of Pretoria and The University of the Witwatersrand account for most of the research activity in South Africa. In Kenya, Uganda and Tanzania, most of the research occurs in fewer than three institutions in each country.

Countries that were heavily affected by Ebola outbreaks in 2014–2016, such as Sierra Leone, Liberia and Guinea, had not garnered much attention from the international community because of a weak health-research infrastructure, notably because they lack national institutions that can perform functional PCR assays. But in the midst of the COVID-19 pandemic, these countries have now become crucial providers of scientific knowledge on the continent.

"Although we just had university ranking out and Cape Town University is really ahead of other universities in Africa, Gambia, Ghana, Senegal and Nigeria are ahead of COVID-19 science, and a small country like DRC, which is not really known for research infrastructure, [is] also coming on board," Bockarie says.

Systematic barriers

Despite such successes, Oyewale Tomori, professor of virology and World Health Organization (WHO) consultant on infectious diseases, thinks that COVID-19 has exposed the true ability of most of the continent's research ecosystems to adjust to a pandemic.

Beyond COVID-19, only about 2% of the world's clinical trials are led in Africa. Although South Africa and countries in North Africa have the capacity for clinical trials, countries in West Africa do not.

Lack of prioritization of research in responding to COVID-19 is also limiting the body of knowledge available to delineate the spread of, fatality of and host response to SARS-CoV-2 in many countries in Africa. Genome sequences have been emerging from leading research institutes in Africa, such as the African Centre of Excellence for Genomics of Infectious Diseases in Nigeria, and the National Institute for Biomedical Research in DRC. However, when asked why genomic sequence data are not being published as frequently in Africa as in countries in other parts of the world, despite of the existence of capacity for such analyses, Chikwe Ihekweazu, Director General of the Nigeria Centre for Disease Control, and Jean-Jacques Muyembe Tamfun, head of the DRC's COVID-19 response, tell *Nature Medicine* that understandably the primary focus is to expand testing capacity and slow down the community spread of COVID-19.

Falling behind in vaccine access

Shabir Madhi, a professor of vaccinology at Wits University, notes that Africa's lack of contribution to COVID-19 vaccine research could mean that a successful vaccine might take longer to become available for Africans, as only a few countries on the continent have standard clinical-trial centers and vaccine-production facilities.

"If the vaccine that is found to be effective against COVID-19 is a gene-based vaccine, there is no facility in Africa that can mass produce it," Madhi says.

In early July 2020, the Consortium for COVID-19 Vaccine Clinical Trial was launched to support the contribution of African scientists and healthcare professionals to the development and provision of safe vaccines.

"Our intention is to ensure that Africa has local research and development, local field testing, clinical trials and production — not only vaccines but also therapies and any other supplies we may need, including equipment. It's time for Africa to take its rightful position. A continent of 1.3 billion people must look after itself. This is our intention," Ouma tells *Nature Medicine*.

"At the end of the day, if we want drugs and vaccines, we want these things to go into clinical trials. We should have adequate clinical trial sites," Bockarie says.

A potential turning point

Bockarie says that the peculiar odds presented by the COVID-19 pandemic may be in favor of Africa's developing vibrant research infrastructures across the continent.

For instance, "a bane of Africa has been the un-equitable North/South collaborations, so-called helicopter scientific adventures, which make a sweep of a site/center/institution in Africa, collect the samples, and dash out to their bases, with little attribution to local researchers, communities, local policymakers, etc.," Kariuki tells *Nature Medicine*.

But with no clear path yet for the resumption of international travel, 'helicopter science' is made trickier, which clears the path for local researchers to fill the gap. Kariuki says that the African Academy of Science is working with partners, including the UK Collaborative on Development Research, "to attain collaborations that are truly equitable across the globe."

Bockarie also notes that research capacity will not be strengthened substantially without meaningful prioritization by policymakers. Stakeholders who are deciding and leading Africa's response to

COVID-19 are officially supporting the involvement of the continent's research ecosystem in their response plans, but research is not accepted across the board as a top priority.

"African researchers are yet to become indispensable to the daily lives of the people, and that is why almost no one is listening to scientists, and the leaders are also not prioritizing getting things back to normal, and it is understandable. We have people publishing papers on, and becoming professors for, their works on malaria — yet cases of malaria continue to increase annually in Africa," Tomori says.

However, Bockarie adds that COVID-19 has drawn attention to health research and it has now become easier for scientists to explain and convince African governments of the need to invest in science. "It has demonstrated to the government the need for investment in research. If someone now goes and says 'I need \$1 million to set up a BSL3 lab', the government can now understand why they need to invest in that lab. Before now, they would say 'we get bed nets for free, why will I give you \$1 million to try and set up a thing for malaria vaccine?' Now everybody can understand," he says.

Accordingly, Ihekwa tells *Nature Medicine* that the current pandemic "is a warning for all of us to invest in research to understand diseases and how they spread in communities," noting that it could potentially inspire more Nigerians to venture into the science of diseases.

Ambrose Dlamini, Prime Minister of the Kingdom of Eswatini, agrees. Dlamini tells *Nature Medicine* that African governments are now seeing the science of pandemics differently and will now be more proactive in expanding capacities for future outbreaks.

"We've developed some capacity that we think we are going to leverage going forward. We are going to use the national response framework, which has really done well, providing us with capacity over the years; we want to develop it to equip the

country to deal with future pandemics," he tells *Nature Medicine*.

Moreover, several Africans are leading international health agencies, including the WHO and The Joint United Nations Programme on HIV/AIDS, setting research high on policymakers' agendas.

South Africa's President Cyril Ramaphosa recently ascended to lead the African Union, the body that notably coordinates the continent's response to COVID-19. Ramaphosa sees the value in research and has been investing in health research in South Africa. According to Bockarie, Ramaphosa will be in a good position to educate fellow African heads of state, and this may bode well for research funding in Africa going forward.

Research on hiatus

In West Africa, plans are in various stages in member countries to reopen schools to enable high-school students in their final year to take the regional examination. But with no clear guidance yet on plans for reopening universities and research institutions, students, parents, teachers, researchers and institution heads are at a crossroads over what should be done.

In mid-July, the Academic Staff Union of Universities, which is the umbrella body of university lecturers in Nigeria, urged the Nigerian government to [keep schools closed until 2021](#). Privately owned institutions, on the other hand, are striving to continue with their institutions' academic calendars by organizing online lectures and examinations.

For those that are still managing to forge ahead, policies by regulatory councils are also limiting options for students' research projects. Supervisors and their supervisees in African universities that are training students in laboratory-based courses cannot quickly or easily change projects to meta-analyses or web-based surveys, because the regulatory authorities require that students' projects be based on hands-on laboratory practicals.

This implies that students studying medical laboratory science and other courses have to work in medical laboratories and collect samples from patients who may be infected with COVID-19, which would potentially expose the students to the virus at a time when social distancing is encouraged, personal protective equipment is [in short supply](#) and over 10,000 healthcare workers [have already tested positive for COVID-19](#), with several deaths recorded already.

On the other hand, with COVID-19 gaining more attention, researchers working on non-COVID-19 issues are struggling to attract attention to and funding for their research. One such research area is neglected tropical diseases (NTDs).

According to the WHO, NTDs prevail in tropical and subtropical conditions in 149 countries, affect more than one billion people and cost developing economies billions of US dollars annually. But as the COVID-19 pandemic persisted, NTDs were initially sidelined, which potentially threatened the gains made in the control of these diseases — a major concern of key players in the sector, including [END Fund](#), a private philanthropic initiative dedicated to ending the five most common NTDs.

"As the pandemic grew, and the WHO issued guidance that NTD programs should pause, we were unsure how we would help the NTD sector sustain the gains made towards combating NTDs....The NTD sector won't look the same for the near future.... Some NTD sector resources have been diverted to urgent COVID-19 response efforts," Joy Ruwodo, Director of Public Affairs (Africa Region) at END Fund, tells *Nature Medicine*. □

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