

# How African scientists are working to pool data that decodes diseases

May 11 2023, by Alan Christoffels and Sofonias Kifle Tessema

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Infectious disease outbreaks in African countries are, unfortunately, all too common. Ebola in the Democratic Republic of the Congo or Uganda; Marburg virus in Guinea or Equatorial Guinea; cholera in

Malawi; malaria and tuberculosis are among them.

These diseases do not respect human-made or porous borders. So it's essential that scientists in Africa are able to generate and share critical data on the pathogens in time to inform public-health decisions.

Genomic sequencing technologies are powerful tools in this kind of work. They enable scientists to decode the genetic material of diseases and create biological "fingerprints" to investigate and track the pathogens that cause those diseases. This information aids in developing diagnostics, treatments and vaccines. It also helps public health authorities to guide and prepare their public health systems for effective outbreak detection and response.

Tackling infectious diseases across countries and continents requires many complex, overlapping and broad interventions. One of those is a common repository where countries, public health authorities and their scientists can share information about diseases and the pathogens that cause them. They can then collaborate around the shared data. These [kinds of platforms](#) exist in many high-income countries. But the African region lags behind.

This is set to change. In a new publication in *Nature Medicine* we outline the work that's being done to create such a repository for the African continent.

## **Human and economic costs**

Africa accounts for [most of the estimated 10 million deaths](#) caused globally every year by infectious diseases.

Those diseases also stomp the brakes on the continent's development ambitions: according to a World Health Organization (WHO) report they

account for an [annual estimated productivity loss](#) of US\$800 billion.

These figures highlight the urgency of improving the scientific response to [infectious diseases](#).

There are some green shoots. The COVID pandemic showed what African institutions are capable of. The Africa Centers for Disease Control (Africa CDC), through the [Africa Pathogen Genomics Initiative](#), oversaw the [training](#) of hundreds of laboratory staff.

DNA sequencing machines and essential laboratory consumables—like reagents, the chemical cocktails that make testing possible—have been [put in place](#). Today, public health laboratories in many African countries, with varying levels of capacity, can generate their own genomic sequences of pathogens.

So, the data is not the problem. The questions are: what is going to happen to and with it? How and where is it going to be secured, and by whom? Will it be, as has been the custom up to now, "exported" and the intellectual property moved offshore?

Global data sharing platforms have played a significant role in sharing of data. However, [transparency and governance issues](#) are currently being raised by the global community.

Since 2020, the Africa CDC in collaboration with the [African Society for Laboratory Medicine](#), the [South African National Bioinformatics Institute](#) and several public health institutions across Africa are working to develop a continental platform for pathogen genomic data management and sharing. The technology innovation and development involves [industry](#) and other [partners](#).

The development of such a platform is not merely a technical exercise,

though. An ecosystem must be created for its adoption. So it is being built in parallel with a consultation led by the Africa CDC with its member states, to refine data sharing agreements between countries and support national data governance frameworks.

The platform rests on six pillars.

## **Collaboration and consistency**

The first pillar is adoption and change management. Regional organizations—those that drove training and [infrastructure investment](#) during the COVID-19 pandemic—must drive the development of the necessary policies, processes and system changes across the continent.

Second, the platform must offer a good user experience that will allow for seamless, cost-effective data collection and the timely sharing and use of data across Africa.

Third, we need data services and products to facilitate the sharing of data and information with decision-makers who are not scientists or geneticists.

Fourth, standardized and consistent data management processes, practices, tools and controls for how data is processed, stored, shared and deployed are needed across countries and contexts.

Core infrastructure is the fifth pillar: the technical side of the platform must be composed of application and infrastructure components that can be rapidly reconfigured for contexts and diseases.

And, finally, good program management and sustainable resources will be key.

## A global imperative

As we argue in [our journal article](#), data management and analytics to support data-driven decision making in public health is a global imperative. It requires continuous engagement with international disease surveillance stakeholders and technology platform developers.

The human and resource costs of unchecked diseases in Africa have been pointed out. If there is going to be a collective response to Africa's burden of diseases—and it is a massive task—a shared pathogen genomics data platform would be a crucial step in underpinning those efforts.

An African owned and African led data sharing platform will be critical for timely sharing of locally produced data to inform rapid response to outbreaks. It will also be a critical step towards an equitable mechanism to maximize the value and utility of pathogen genetic data for national, regional and global health security.

**More information:** Alan Christoffels et al, A pan-African pathogen genomics data sharing platform to support disease outbreaks, *Nature Medicine* (2023). [DOI: 10.1038/s41591-023-02266-y](https://doi.org/10.1038/s41591-023-02266-y)

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