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EDITORIAL

Launch of the Laboratory for Major Tropical Epidemics (LAGET) in Chad: strengthening the capacity for epidemiological surveillance, monitoring and diagnosis of endemic or emerging infectious diseases in Central Africa

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Abstract

In an increasingly interconnected world, with the devastating effects of climate changes and humanitarian crises, pandemics and emerging infectious diseases are more likely to become our daily reality.
When it comes to health care, sub-Saharan Africa faces more challenges than most other regions of the world, including lack of funds, precarity and poor infrastructures. Yet, these areas are most often on the front lines of infectious threats.

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INTRODUCTION

In SSA, the West African Ebola outbreak and the COVID-19 pandemic have clearly challenged and revealed the limitations of local public health systems (1). Health infrastructures were over-used and other current acute or chronic diseases were misdiagnosed or neglected finally exacerbating social inequalities (2). These tragic events have highlighted the need to strengthen health systems, but also to reinforce the collaborations between neighboring countries to prevent, detect and implement strategic responses to contain the risks of emerging epidemic diseases (3).

To varying degrees, monkeypox (4), measles (5), arbovirus infections (6), viral hepatitis (7,8) or deadly fungal or hemorrhagic fever infections (9) are serious threats in sub-Saharan Africa. Their relative disease burden has increased, but the actual situation is often not well reported due to the lack of well-established epidemiological survey systems. Many other endemic or neglected infectious agents are emerging or re-emerging in sub-Saharan Africa areas for similar reasons (10), but little is known about the related underlying microbiological, epidemiological, climatic or socio-economic causes.

Consequently, African governments must invest in developing effective epidemiological survey systems and in strengthening the preparedness to prevent the rapid spread of emerging infectious diseases (11).

The main barriers to the effective implementation of emerging disease surveillance by laboratories in the Central African sub-region are the absence and inadequacy of existing infrastructures, qualified technicians or microbiologists, reagents supply and storage capacities. Three countries (Cameroon, The Democratic Republic of the Congo and Central African Republic) developed epidemiological capacity surveys in Central Africa through the SURVAC project (Project to Strengthen Epidemiological Surveillance in Central Africa). These countries were chosen because of their epidemiological vulnerability, as well as the significant gaps in the production and use of epidemiological data to guide decision-making for disease control (12).

In this context of changing paradigm within the Central African sub-region, The Republic of Chad is experiencing similar challenges in the fight against infectious diseases or future outbreaks (13). With the COVID-19 pandemic and the support from the WHO, African Centre for Disease Control and Prevention (Africa CDC), the World Bank and the Global Health Fund, efforts have however been made in recent years in Chad to strengthen the capacity to control infectious diseases. Also, the government of the Republic of Chad passed a law during the first wave of the COVID-19 pandemic creating the National Institute of Public Health (INPS). In this vein, in order to support African countries in the development of INSPs, Africa CDC organized an International Conference on Public Health in Africa (ICPHA) in Kigali (Rwanda) on the theme "Future Pandemic Preparedness and Recovery: Africa at the Crossroads". For instance, in August 2022, the WHO handed over a sequencing laboratory to the Chadian Minister of Public Health and Prevention to strengthen the capacity for pathogen genomic surveillance (14).

Through this editorial, we inform the medical and research communities at large on the implementation and launch of a newly created laboratory aiming to fight major tropical epidemics (LAGET), which is located at the CHU-Bon Samaritain of Walia, N'Djamena, Chad. This laboratory was officially inaugurated on December 12, 2020, initially to strengthen efforts to fight COVID-19 in the country. Today, its scientific and medical facilities aim to reinforce the Chadian government's efforts to provide an effective and rapid response to major health threats.

The LAGET is also committed to training the next generation of health professionals with modern skills

Supplementary information The online version of this article (Tables/Figures) contains supplementary material, which is available to authorized users.

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in laboratory and field-epidemiology survey-design, prevention and control of epidemics in the sub-Saharan African Region. In this regard, LAGET will host training sessions for laboratory scientists, technicians and students from the Faculty of Medicine in N'Djamena, with the scope to subsequently expand to neighboring universities/countries and scientific organizations.

The LAGET will also progressively become part of a biomedical research and patient monitoring network, operating under the AEGIS of Africa CDC. The LAGET is supported by many national and international collaborators, in particular the Italian Agency for Development Cooperation (AICS), the Chadian Ministry of Health and Prevention, the MAGIS Network, the WHO and the Global Health Fund, the Universities of Rome Tor Vergata in Italy, Montpellier and Reims (URCA) in France, and the Chantal BIYA International Reference Centre for Research on HIV/AIDS Prevention and Management (CIRCB) in Cameroon.

The LAGET started disease surveillance activities in the month of December 2020 during the COVID-19 pandemic, by supporting Chad's SARS-CoV-2 RT-PCR screening capacities. Since, the LAGET has developed and diversified its molecular testing platform, notably by performing weekly viral load quantification of Human Immunodeficiency Virus (HIV-1), Hepatitis B (HBV) and C (HCV), allowing a better virological diagnosis, clinical monitoring of antiviral treatment for patients (15). In this respect, the LAGET plans to increase its molecular diagnostic capacities by extending its RT-PCR detection panel assays to Zika virus, yellow fever virus, papillomavirus, measles virus, Chikungunya virus and *Mycobacterium tuberculosis.*

The LAGET has developed its immunoassay branch to determine the immunological status of patients with respect to numerous infectious agents, and consequently has contributed to several biomedical studies concerning the SARS-CoV-2 seroprevalence or the production of protective antibodies following COVID-19 vaccination campaigns in Chad (16).

Finally, the LAGET will also progressively become part of a biomedical research and patient follow-up network, operating under the AEGIS of the African Union with the technical support of the African Centre for Disease Control and Prevention (Africa CDC). The Regional Integrated Surveillance and Laboratory Network (RISLNET) was established by the Africa CDC to coordinate and integrate all public health laboratory, surveillance and emergency response assets, including public health data, to effectively support prevention, rapid detection and response to current and emerging public health threats within defined geographic regions of Africa.

The sustainability and success of LAGET will depend on good coordination within the local team, the health staff, as well as the public authorities of the Ministry of Public Health and Prevention of Chad, Africa-CDC and the technical/financial partners. If national and international health authorities support us, together with an effective communication strategy, we will be able to meet this challenge.

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