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Lessons from the Ebola epidemics and their applications for COVID-19 pandemic response in sub-Saharan Africa

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Abstract

COVID-19, caused by a novel coronavirus named SARS-CoV-2, was identified in December 2019, in Wuhan, China. It was first confirmed in sub-Saharan Africa in Nigeria on 27 February 2020 and has since spread quickly to all sub-Saharan African countries, causing more than 111,309 confirmed cases and 2,498 deaths as of 03 June 2020. The lessons learned during the recent Ebola virus disease (EVD) outbreaks in some sub-Saharan African countries were expected to shape and influence the region's responses to COVID-19 pandemic. However, some of the challenges associated with the management of the EVD outbreaks persist and create obstacles for the effective management of the COVID-19 pandemic. This article describes the commonalities between the EVD epidemics and COVID-19 pandemic, with a view to draw on lessons learned to effectively tackle the ongoing pandemic. Key successes, failures and lessons learned from previous EVD outbreaks are discussed. Recommendations on how these lessons can be translated to strengthen the COVID-19 response in sub-Saharan Africa are provided.

KEYWORDS

COVID-19, Ebola, lessons, sub-Saharan Africa

1 | BACKGROUND

The scale and public health burden of the COVID-19 pandemic[1] are comparable only to the 1918-1920 Spanish flu outbreak.[2] Africa is no stranger to epidemics. The Ebola virus disease (EVD) outbreaks in West Africa[3] and the Democratic Republic of Congo (DRC)[4] are examples of many disease outbreaks in recent times[5] that have had devastating socioeconomic effects and high fatality rates. Thus, the World Health Organization's announcement on 11 March 2020 of COVID-19 as a global pandemic[6], with potentially catastrophic effects on Africa's fragile health system and economy, may have been a sad reminder of suffering Africa has experienced in previous outbreaks. As of 3 June 2020, sub-Saharan Africa (SSA) has reported more than 111,309 confirmed cases and 2,498 deaths from COVID-19.[7] These figures represent a small fraction of more than six million confirmed cases, and nearly 400,000 COVID-19 related deaths reported globally during the same period.

[1]Coronavirus disease (COVID-19) Pandemic. (2020). Retrieved May 8, 2020 from https://www.who.int/emergencies/diseases/novel-coronavirus-2019.

[2]Taubenberger, J.K., Morens, D.M. (2006). 1918 Influenza: the mother of all pandemics. Emerging Infectious Disease. 12(1): 15-22.

[3]Oleribe, O.O., Salako, B.L., Ka, M.M., et al. (2015). Ebola virus disease epidemic in West Africa: lessons learned and issues arising from West African countries. Clinical Medicine. 15(1): 54-7.

[4]Ebola Virus Disease: Democratic Republic of the Congo. (2020). External Situation Report 85. Retrieved March 26, 2020 from https://www.who.int/emergencies/diseases/ebola/drc-2019/situation-reports.

[5]WHO Outbreaks and Emergencies Bulletin. (2020). Retrieved May 2, 2020 from https://www.afro.who.int/publications/outbreaks-and-emergencies-bulletin-week-17-20-26-april-2020. Accessed May 2, 2020.

[6]Rolling updates on coronavirus disease (COVID-19). (2020). Retrieved May 8, 2020 from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen.

[7]Latest updates on the COVID-19 crisis from Africa CDC. (2020). Retrieved June 3, 2020 from https://africacdc.org/covid-19/.

The worst affected region in SSA is Southern Africa, with 38,219 cases and 780 deaths. This is followed by West Africa with 36,909 cases and 754 deaths, East Africa with 18,856 cases and 554 deaths, and Central Africa with 17,325 cases and 410 deaths.[8] All countries in SSA have reported cases of COVID-19.[9] During the two most recent EVD outbreaks; the West Africa outbreak recorded 28,652 infections and 11,325 deaths as of 30 March 2016;[10] and 3,316 infections and 2,279 deaths in the Democratic Republic of Congo (DRC) as of 28 April 2020.[11] The delayed containment of EVD, the inherent weak health systems of many SSA countries and the associated high EVD-related mortality, led the World Health Organization (WHO) to warn that Africa could be the next COVID-19 epicenter. It was estimated that there would be 1.3 billion COVID-19 cases and 3 million deaths.[12] The number of reported COVID-19 cases and deaths have not risen as steeply as anticipated,[13] though this has been attributed to inadequate testing capacity in the region and poor documentation of deaths.[14] It could also be that the lessons learned from previous infectious disease outbreaks in SSA, including the EVD outbreaks in West Africa and DRC, influenced its early response and resilience to COVID-19.[15]

In this article, we discuss the lessons learned from the Ebola epidemics in SSA and highlight relevant strategies to strengthen the public health and clinical management responses for the ongoing COVID-19 responses in SSA.

2 | LESSONS FROM EVD OUTBREAKS

2.1 | Public Health Response

The first confirmed COVID-19 case in SSA was reported in Nigeria on 27 February 2020.[16] This was nearly three months after the first confirmed case was reported in December 2019, in Wuhan, China.[17] Although, the WHO had warned Africa to prepare for the worst-case scenario and expressed concerns over Africa's capacity to deal with COVID-19 outbreak,[18] there was no evidence that significant efforts were made to identify an effective public health response strategy for the region.[19] The EVD outbreaks showed that the surveillance capacity in many countries in SSA was weak, with serious implications for case finding and contact tracing, and mass community testing.[20] This resulted in delay in identifying the outbreaks and slowing down timely reporting of the outbreaks to WHO, which in turn contributed to a delay in galvanizing international support to put a public health response in place.[21]

International support was also needed to institute social interventions to curtail myths and misconceptions, address concerns about cultural aberrations resulting from changes in burial rites, and bridge the mistrust between citizens and government.[22] The delay in instituting public health and social measures increased the number of EVD infections exponentially, and increased the risk to lives and deaths of many health care workers and volunteers.[23] Unlike the EVD epidemic, the COVID-19 response in SSA has been quicker and more decisive than in other parts of the world.[24] The response has been led by governments of the affected countries. External support has been limited to technical assistance from WHO and Africa Centre for Diseases Control, a regional entity that was absent during the 2014 EVD outbreak, gifts from philanthropists and in-country re-allocation of funds and technical support from partners. Countries have had to work with weak and poorly funded public health systems to balance of COVID-19 preventive measures, clinical care and sustenance of weak and fragile economies.[25]

Countries mostly adopt measures such as promotion of regular hand washing, use of hand sanitizers, and social distancing[26] which can be challenging to practise on a continent where significant large numbers of the population reside in urban slums, informal settlements and townships with poor access to water,

[8]Ibid.

[9]WHO Outbreaks and Emergencies Bulletin, op. cit. note 6.

[10]WHO Ebola Situation Report. (2020). Retrieved May 2, 2020 from https://apps.who.int/iris/bitstream/handle/10665/204714/ebolasitrep_30mar2016_eng.pdf.

[11]Ebola virus disease – Democratic Republic of the Congo (2020). Retrieved May 2, 2020 from https://www.who.int/csr/don/30-April-2020-ebola-drc/en/.

[12]COVID-19 in Africa. (2020). Protecting Lives and Economies. United Nations Economic Commission for Africa. Retrieved May 2, 2020 from https://www.uneca.org/sites/default/files/PublicationFiles/eca_covid_report_en_rev16april_5web.pdf.

[13]Pearson, C.A., Van Schalkwyk, C., Foss, A.M., et al. (2020). Projected early spread of COVID-19 in Africa. medRxiv. 2020.04.05.20054403.

[14]Nkengasong, J. (2020) Let Africa into the market for COVID-19 diagnostics. Nature; 580(7805): 565.

[15]El-Sadr, W.M., & Justman, J. (2020). Africa in the Path of Covid-19. New England Journal of Medicine.10.1056/NEJMp2008193.

[16]WHO, op. cit. note 6.

[17]WHO, op. cit. note 6.

[18]UNECA, op. cit. note 12.

[19]Adeshakin, A., Ayanshina, O., Essien-Baidoo, S. (2020). COVID-19 Transmission Dynamics and Response: Opinions and Perspectives from Africa. Preprints. 2020040414 (https://doi.org/10.20944/preprints 202004. 0414.v1).

[20]Swanson, K.C., Altare, C., Wesseh, C.S., et al. (2018). Contact tracing performance during the Ebola epidemic in Liberia, 2014-2015. PLOS Neglected Tropical Diseases. 12(9): e0006762.

[21]Gous, N.M., Onyebujoh, P.C., Abimiku, Al., et al. (2018) The role of connected diagnostics in strengthening regional, national and continental African disease surveillance. African Journal of Laboratory Medicine. 7(2): 775-775.

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[23]Calnan, M., Gadsby, E.W., Kondé, M.K., et al. (2018). The Response to and Impact of the Ebola Epidemic: Towards an Agenda for Interdisciplinary Research. International Journal of Health Policy and Management. 7(5): 402-11.

[24]Sub-Saharan Africa: COVID-19 mitigation measures. (2020). Retrieved May 3, 2020 from https://www.controlrisks.com/covid-19/covid-19-mitigation-measures-across-sub-saharan-africa.

[25]El-Sadr & Justman, op. cit. note 15.

[26]Anderson, R.M., Heesterbeek, H., Klinkenberg, D., et al. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? The Lancet. 395(10228): 931-4.

sanitation and hygiene infrastructure.[27] In addition, by 30 March 2020, 46 countries have imposed partial or full closures of their borders (airports, ports and in some cases land borders), 44 have closed schools, banned public gatherings, or put in place other social distancing measures; and 11 have declared a state of emergency.[28]

Like the EVD epidemic, the lockdown in response to the COVID-19 pandemic has been challenging, as social distancing is contrary to the culture of regular body contacts[29] and families are further impoverished due to the loss of daily wages and the disruption of the food supply chains.[30] Data showed numbers as high as 63% of families live on daily earnings.[31]

At the micro-level, a significant number of COVID-19 infected persons grapple with stigma and discrimination,[32] just like people did during the EVD outbreak. Stigma causes a delay in seeking formal health care. [33]Stigmatization and discrimination of COVID-19 infected and affected people may be an important cause for delay in taking tests and seeking timely COVID-19-related medical care, which may aid community transmission of the virus. Stigma may also affect the re-integration of individuals into their communities and workplaces,[34] as it did with EVD. Myths and misconceptions also promote poor compliance with public education messages. Some erroneous COVID-19 beliefs include insinuations that people with dark complexion do not get infected with SARS-CoV-2; hot tea, lime drinks and pepper soup can cure COVID-19; and medical face masks imported from China were infected with SARS-CoV-2.[35] Many religious gatherings promulgate spiritual protection messages.[36] The 2014 EVD epidemic also witnessed myths and misconceptions, limiting effective public response and disrupting research.[37]

2.2 | Facility care and ambulatory care

Access to facility and ambulatory care was a challenge during the EVD epidemic.[38] In addition, the capacity to test due to poor access to laboratory reagents, have implications for case identification.[39] Poor access to Personal Protective Equipment (PPE) led to the death of a large number of health care workers, further undermining the weak health system.[40,41] Laboratory diagnosis of EVD was often delayed, resulting in persons with and without the disease staying in holding bays long enough for those not infected, to contract EVD.[42] The poor capacity to report and document all deaths also resulted in under-reporting of the deaths from EVD.[43] In addition, the limited number of health facilities and health care providers, and poor hospital infrastructure cannot meet the requirements for COVID-19 hospital care.

With 17 of the 20 lowest-ranked countries in the Healthcare Access and Quality Index; 18 of the 20 countries ranked most at risk in the European Commission's INFORM Epidemic Global Risk Index; and 18 of the 20 countries ranked most vulnerable in the Rand Corporation's Infectious Disease Vulnerability Index from SSA, access to quality health care during the COVID-19 response looks dismayed.[44]

2.3 | Clinical trial conduct during disease outbreaks

During the 2014 EVD epidemic, 10 clinical trials were implemented to test new and re-purposed agents,[45] and nine clinical trials were conducted to test candidate vaccines.[46] As of 02 June 2020, 1,872 clinical trials have been registered with clinicaltrials.gov for COVID-19, with only nine taking place in SSA.[47] COVID-19-related clinical trials to be conducted in SSA should consider the social context of communities in determining appropriate study design. Like in the recombinant vesicular stomatitis virus vaccine trial, the ring vaccination design found appropriate for the West Africa context may be a

[27]Global & Africa Scorecard-25 Countries with Least Sustainable Access to Improved Clean Water Source. (2012). Retrieved April 5, 2020 from https://www.who.int/pmnch/media/news/2012/201205_africa_scorecard.pdf.

[28]Sub-Saharan Africa: COVID-19 mitigation measures, op cit, note 24.

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[32]Coronavirus disease 2019 (COVID-19) Situation Report – 35. (2020). Retrieved May 2, 2020 from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200224-sitrep-35-covid-19.pdf?sfvrsn=1ac4218d_2.

[33]Oleribe, Salako, Ka, et al, op. cit. note 3, pp. 54-57.

[34]Nylander, D. (2020). How might the social stigma around covid-19 perpetuate the spread of disease? Retrieved April 5, 2020 from https://blogs.bmj.com/bmj/2020/03/23/social-stigma-surrounding-covid-19-perpetuate-spread-of-disease/.

[35]COVID-19: Myths and facts. (2020). Retrieved June 1, 2020 from https://www.avert.org/coronavirus/covid-19-myths-and-facts.

[36]Across Africa, COVID-19 heightens tension between faith and science. (2020) Retrieved June 2, 2020 from https://oxfamblogs.org/fp2p/across-africa-covid-19-heightens-tension-between-faith-and-science/.

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[38]McQuilkin, P.A., Udhayashankar, K., Niescierenko, M., et al. (2017). Health-Care Access during the Ebola Virus Epidemic in Liberia. American Journal of Tropical Medicine & Hygiene. 97(3): 931-6.

[39]Swanson, Altare & Wesseh, et al, op. cit. note 20.

[40]McQuilkin, Udhayashankar & Niescierenko, et al, op.cit. note 38, pp 6.

[41]Shoman, H., Karafillakis, E., Rawaf, S. (2017). The link between the West African Ebola outbreak and health systems in Guinea, Liberia and Sierra Leone: a systematic review. Global Health.13(1):1-1.

[42]Klitzman, R. (2015). Evolving Challenges and Research-Needs Concerning Ebola. American Journal of Public Health. 105(8): 1513-5.

[43]Gous, Onyebujoh & Abimiku, et al, op. cit. note 21, pp. 755.

[44]Sub-Saharan Africa: COVID-19 mitigation measures, op. cit. note 24.

[45]Keshtkar-Jahromi, M., Martins, K.A.O., Cardile, A.P., et al. (2018). Treatment-focused Ebola trials, supportive care and future of filovirus care. Expert Review of Anti-infective Therapy. 16(1): 67-76.

[46]Overview of candidate Ebola vaccines as of August 19, 2019. (2019). Retrieved May 3, 2020 from https://www.who.int/immunization/sage/meetings/2019/october/6_Ebola_Candidate_Vaccines_19-09-19.pdf.

[47]COVID-19 Studies. (2020). Retrieved June 1, 2020 from https://clinicaltrials.gov/ct2/results?cond=COVID-19.

priority design for COVID-19 vaccine trials in SSA. 'Ring vaccination' is an infection control approach wherein a cluster of individuals at high risk for infection are vaccinated on the basis of their social or geographic connection to a known case including families, neighbours and friends. This creates a protective "ring" or cluster of immune individuals around newly diagnosed cases, thereby preventing further spread of infection.[48] The recombinant vesicular stomatitis virus vaccine trial was found morally appropriate for West Africa because the cluster-based randomization reduced unequal treatment of individuals in communities, avoiding placebos and blinding, and keeping the delayed vaccination to the minimum period required to measure an effect.[49]

Adaptive clinical trials design may be apt for the conduct of therapeutic clinical trials in SSA as this would facilitate access to experimental therapeutics, prompt decision making about effective therapies, and also allow for early enrolment of children and young adolescents into clinical trials thereby identifying appropriate drug doses early enough for their effective use of COVID-19 therapies.[50] The high fatality associated with EVD also prompted debate about compassionate access to experimental therapeutics.[51-52] In COVID-19 pandemic, compassionate access to pharmaceutical interventions for COVID-19 is also being discussed, although consensus for the adoption of compassionate treatments with experimental drugs such as remdesivir; lopinavir/ritonavir; lopinavir/ritonavir with interferon beta-1a was reached early and more readily.[53]

2.4 | Rapid data sharing

Rapid data sharing during outbreaks enhances understanding of disease transmission, facilitates prompt evaluation of the public health response, and helps predict future outbreaks.[54] During the EVD outbreak in West Africa, failure to collect, store, curate and disseminate data, poor political will, and low priority for rapid data sharing contributed to a delayed response.[55]

Improved competency for high data quality; and development of country framework/policies for data sharing are required to avoid the opacity in data sharing that was witnessed during the West Africa EVD outbreak. Also, the exportation of biological samples and data from SSA to the global North during the EVD outbreak was rampant.[56] Unfortunately, there is little investment in biorepository and biobank infrastructure for ongoing and future research in SSA.[57] The limited ability to store biological samples and data during the COVID-19 pandemic will significantly limit the conduct of future research in the region.

2.5 | Global Health Security

Today's top global health security risks include novel, emerging and re-emerging infectious diseases; the speed at which disease can spread due to globalization; the emergence of drug-resistant pathogens; and the risk of theft or illicit use of dangerous pathogen(s). The Global Health Security Agenda addresses these risks through a partnership of 67 countries of which 16 are from SSA as at 16th of July 2017.[58,59] Member countries from SSA face challenges with attaining the required technical skills needed to engage on the platform fully.

The gaps are likely to have been identified through the WHO-led Joint External Evaluations process but have remained unrectified due to financial challenges. This causes an ethical quagmire, as the inequitable distribution of resources, and poor country capacity to build technical expertise for planning and preparing for outbreak, epidemic and pandemic responses may be exaggerated by the inefficient use of the limited financial resources by the countries.[60]

3 | DISCUSSION

Although the number of confirmed COVID-19 cases in SSA is currently low compared to the number of confirmed cases in Europe and the United States, the region's weak and poorly resilient health systems, poor emergency preparedness, low testing, and poor contact tracing, are causes for concerns about effective management of the COVID-19 pandemic. Probably because infection preventive measures such as total lockdown are not economically

[48]Rid, A., & Miller, F.G. (2016). Ethical Rationale for the Ebola "Ring Vaccination" Trial Design. American Journal of Public Health. 106(3): 432-5.

[49]Haire, B.G., & Folayan, M.O. (2016). Ebola "Ring" Vaccine Trial Was Ethically Innovative. American Journal of Public Health.106(9): e1. https://doi.org/10.2105/AJPH.2016.303311.

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[52]Joffe, S. (2014). Evaluating Novel Therapies During the Ebola Epidemic. JAMA. 312(13): 1299-300.

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[55]McCarthy, M. (2016). Slow response contributed to scale of West African Ebola epidemic, CDC concludes. BMJ. 354: i3814.

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sustainable, some African countries are gradually lifting this control strategy. To address the concerns of a likely spike in the reproductive ratio of COVID-19 infections following easing lockdowns in these countries, we support the implementation of a community-based approach adopting syndromic diagnosis (clinical diagnosis based on the constellation of symptoms and signs that are characteristic of COVID-19 infection) using active case finding, especially in hard-to-reach areas where laboratory-confirmed diagnosis is non-existent. Contact tracing, home quarantining, district-level facilities for appropriate respiratory support that can be managed by locally available human resources, equipped with adequate personal protection, need to be developed as long-term assets for the healthcare system.[61]

In addition, the social impact of stigma and discrimination, myths and misconceptions, extensive required changes in socio-cultural practices and financial hardship resulting from the public health measures may be problematic for the COVID-19 response in SSA as it was for the EVD response. The dearth of COVID-19 related clinical trials on the continent and the poor preparedness for storage of biological specimens and data is problematic for generating regional specific evidence-informed responses for COVID-19 now and in the future with implications for its positive contribution to global health security. The COVID-19 related experiences in China, the United States of America, Italy and Spain indicate that a lot more than an efficient health system delivering quality care is needed to control the pandemic. A pandemic-resilient system for countries in SSA will require investments in strengthening and efficiently coordinating its huge informal community-based health care system. If that is done, governments can rely on the system to deliver the care and community participation that is needed during pandemics. Considerations for cultural beliefs were central to the mitigation efforts of the EVD epidemic;[62] and would be crucial for an effective response to COVID-19 pandemic in SSA. There is a dire need to facilitate the involvement of countries in SSA in COVID-19 related trials. This needs to be pushed by both the government of countries in SSA and the Africa Centre for Disease Control.

A secondary outcome of these clinical trials should include concerted efforts to build biorepositories and support the development of regulatory systems for biorepositories in the region as this will help current and future vaccine and therapeutic COVID-19 research. All COVID-19 related research should be approved by the appropriate ethics committees, with considerations for research protocols to be fast-tracked. Community engagement in the design and implementation of these trials should not be excluded.[63] During the EVD outbreak, the WHO recommended the establishment of a special committee that could rapidly review research protocols and promoted associated community engagements.[64] This recommendation is appropriate for the COVID-19 pandemic. Community engagement also needs to facilitate effective communications with communities through education and information dissemination by trusted community leaders. Early engagement of community leaders in the design and implementation of COVID-19 control measures, to think through and proffer context-specific responses to the call for social distancing, self-isolation or quarantine in overcrowded cities and informal settlements, and appropriate burial practices cannot be overemphasized.[65]

Their support for the elimination of COVID-19 related stigma and discrimination is also important.[66] As with Ebola,[67] COVID-19 survivors can play a significant role in educating the communities to adhere to COVID-19 control measures as educators and change agents. Local and digital channels such as town criers, radio programmes, social media and other platforms used by people in the communities will serve as effective communication channels. Also, engagement activities can be implemented with civil societies, religious and opinion leaders, youth organizations, networks, influencers and volunteer programmes by designing social and behavioural change communication interventions, with consideration for the need to tailor interventions and age appropriate messaging to different communities and groups.

Finally, countries in SSA need to improve their current investment in health as a commitment to ensuring global health security. Though, the COVID-19 pandemic will affect the economies of many countries in SSA with a negative impact on economic growth,[68] this pandemic as well as the EVD epidemics has shown more than ever before, that strengthening of health systems is required for any meaningful sustainable economic growth. Investing in quality health care requires an up-front investment with high economic return compared to the bail-out by global banks that charge exorbitant fees.[69]

Lessons learned from previous EVD outbreaks, and the current COVID-19 pandemic should gear countries in SSA to address global health security concerns which would invariably translate to economic development and growth. This health investment could be driven by public-private partnership, similar to the approach adopted during EVD response.[70] Public-private partnerships have been recognized as a veritable tool to achieve universal health coverage for higher-quality health services at affordable cost in low-income countries.[71] This approach would ensure governments of

[61]Cash & Patel, op. cit. note 30, pp. 1687-1688.

[62]Li, Z-J., Tu, W-X., Wang, X-C., et al. (2016). A practical community-based response strategy to interrupt Ebola transmission in Sierra Leone, 2014–2015. Infectious Diseases of Poverty. 5(1): 74.

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[71]Kumar, R. (2019). Public–private partnerships for universal health coverage? The future of "free health" in Sri Lanka. Globalization and Health. 15(1): 75.

countries in SSA achieve maximum benefits from limited capital investments. Private partners will also achieve a sustainable return on their investments and expertise while patients and the public would enjoy higher-quality health services at the same or less cost.

4 | CONCLUSION

The COVID-19 pandemic and EVD epidemics in sub-Sahara Africa have commonalities. Within the four years interval between the West Africa EVD epidemic and the COVID-19 pandemic, the region has improved its ability to handle emergencies, even though this improvement may seem marginal. Key lessons from the EVD epidemics must be translated to actions that enable countries respond promptly and adequately to the COVID-19 pandemic. The continent needs to strengthen its coordination of responses to an epidemic, while it supports systems for handling research protocols, data sharing and sample transfer. Community systems need to be strengthened to support prompt organization and efficient responses during epidemics, not only for health education and promotion but in anticipation of care facilities being overwhelmed and unable to serve patients in need.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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