



Editorial

Is Africa prepared for tackling the COVID-19 (SARS-CoV-2) epidemic. Lessons from past outbreaks, ongoing pan-African public health efforts, and implications for the future



Soon after the novel coronavirus, SARS-CoV-2 (2019-nCoV), was first identified in a cluster of patients with pneumonia (Li et al., 2020), in the Chinese city of Wuhan on 31 December 2019, rapid human to human transmission was anticipated (Hui et al., 2020). The fast pace of transmission is wreaking havoc and stirring media hype and public health concern (Ippolito et al., 2020) globally. When the World Health Organization (WHO) declared the disease, (now officially named COVID-19) a Public Health Emergency of International Concern (PHEIC) on 31st January 2020 (WHO, 2020a), the Director General Dr Tedros Ghebreyesus justified the decision by stating that WHO's greatest concern was the potential for the virus to spread to countries with weaker health systems. Repeated outbreaks of other preventable emerging and re-emerging infectious diseases with epidemic potential have taken their toll on the health systems of many African countries. The devastating 2014–2016 Ebola Virus Epidemic (WHO, 2020b) in West Africa, demonstrated how ill-prepared the affected countries were to rapidly identify the infection and halt transmission (WHO, 2020d; Largent, 2016; Hoffman and Silverberg, 2018; Omoleke et al., 2016). Similarly, the smoldering remnants of the 2018–19 Ebola Virus outbreak in the Democratic Republic of Congo, have demonstrated even for health services with considerable experience of dealing with a certain emerging pathogen, geography and sociopolitical instability, can hamper the response (Aruna et al., 2019).

A recent analysis of the spatial and temporal distribution of infectious disease epidemics, disasters and other potential public health emergencies in the WHO Africa Region highlighted that 41 African countries (87% of the continent) had at least one epidemic, and 21 countries (45%) had at least one epidemic annually (Talisuna et al., 2020). The top five causes of epidemics were Cholera, Measles, Viral haemorrhagic diseases, malaria and meningitis. Seven countries which experienced over 10 events, all had limited International Health Regulations (IHR) capacities which are now being developed. Most sub-Saharan African countries are operating at maximum capacity with the huge existing workload in hospitals and clinics. The WHO's Joint External Evaluation reports, conducted since 2016, suggest that the ability to respond to an International Health Regulation hazard, such as the importation of an infectious disease like COVID-19, requires almost universal improvement across sub-Saharan Africa

(WHO, 2020c). Thus, it is essential for African countries to take the lead, become proactive and prepare surveillance systems for the rapid detection of any imported cases of COVID-19, to prevent rapid spread as seen in China. The question arises, 'Is Africa prepared and equipped to deal with yet another outbreak of a highly infectious disease – COVID-19?'

The answer to the question is, it is better prepared than ever before. Substantial progress has been made since the 2014–16 Ebola outbreak (WHO, 2020d), with lessons learned from previous and ongoing outbreaks, followed by significant investments into surveillance and preparedness (WHO, 2020d; Largent, 2016; Hoffman and Silverberg, 2018; Omoleke et al., 2016). Africa is now better prepared than ever before. Thus, African countries have been on heightened alert to detect and isolated any imported cases of COVID-19. There has been rapid response to the COVID-19 epidemic from Africa's public health systems, well before any cases of COVID-19 had been reported from Africa. This response has been made possible with the re-organization of the WHO including the creation of the World Health Emergencies Programme; the establishment of the Africa Centers for Disease Control and Prevention (Africa CDC, 2020) and creation and funding of consortia such as the ONE-HUMAN-ANIMAL-HEALTH Africa-Europe research, training and capacity development network (PANDORA-ID-NET) (Pandora-ID-NET, 2020) for tackling emerging and re-emerging infections with epidemic potential. This ONE-HEALTH network works effectively and equitably together across all Africa regions, fully engaging with national disease control authorities and public health institutes, in close liaison with the Nigeria CDC, Africa CDC and other African and global public health agencies. Importantly, this consortium has allowed strengthening of communication and establishment of trust and 'unity of purpose' between African governments, Africa CDC, Nigeria CDC (Nigeria CDC, 2020), local communities and the PANDORA-ID-NET consortium local African and European public health workers and scientists.

An estimated 2 million Chinese nationals live and work in Africa, and there is increasing travel in the opposite direction, with people going to China for education, business and leisure. Prior to the travel restrictions imposed after the COVID-19 outbreak, there were an average of eight flights a day operated between China and African cities (Haider et al., 2020a,b). There are ongoing efforts in

Africa to prepare to deal with imported cases or subsequent local outbreaks of COVID-19, led by the Africa CDC, Nigeria CDC, African Union, PANDORA-ID-NET and other research and capacity development and training consortia. Many African countries have already introduced screening of arrivals for COVID-19 at airports, and at some seaports. 'First public health emergency responders' from African countries met in Senegal in early February 2020 to equip themselves with the latest advances on COVID-19 diagnostics (Corman et al., 2020), prevention and healthcare knowledge. Over 20 African nations are now able to test for COVID-19. Several African countries have identified isolation and quarantine centers and Nigeria, Kenya, Ethiopia, Ivory Coast, Ghana, Uganda and Botswana have rapidly dealt with suspected cases carrying out laboratory tests, and in some cases, placing them in quarantine while laboratory tests were performed.

Nigeria was one of the first countries to recognize the risk and start planning the response for COVID-19. In a massive effort of national coordination, a multi-sectoral National Coronavirus Preparedness Group was established by Nigeria CDC on January 7, 2020, one week after China first reported the cases and three weeks before WHO declared the disease to be of international concern. The country has also established diagnostic capacity for COVID-19 in three laboratories within the country in one month. Nigeria CDC has established a national team that meets daily to assess the risk coronavirus poses to the nation and review its response to it. Uganda quarantined more than 100 people who arrived at Entebbe International Airport, some at hospitals in Entebbe and Kampala, and others were confined in their homes. Zambia has dedicated two medical facilities in the capital, Lusaka, to quarantine people suspected of having the disease. They include designating a new 800-bed capacity hospital in Lusaka, funded and built by China development aid to Zambia. Thermal body scanners have also been set up at all ports of entry to detect travelers showing symptoms of the virus. Kenya has introduced mandatory screening at all ports of entry, and established isolation facilities and a rapid response team to handle suspected cases. South Africa has set up national and provincial response teams, designated 300 health officials to ports of entry and begun screening all travelers from China. The Africa CDC has trained numerous participants from across Africa, including Egypt, on enhancing detection of COVID-19 at points-of-entry in collaboration with US-CDC, WHO, and the International Civil Aviation Authority (WHO, 2020e). Two airlines, Kenya Airways and South African Airlines, were also represented in the training. Additional training and resources have been provided to Egypt and other at-risk countries for infection prevention and control in healthcare facilities, medical management of COVID-19, and risk communication and community engagement. The Africa Union, West African Health Organization (WAHO) and external donors have been quick to provide support to the Africa CDC. In response to emergency grant calls for COVID-19, there have been several consortia fielding grant applications for research and capacity development.

The long anticipated and inevitable and detection of the introduction of SARS-CoV-2 into Africa was announced on 14 February 2020, by the Minister of Health and Population of Egypt, Dr Hala Zayed, who confirmed the first case of the novel coronavirus disease COVID-19 in Egypt. The patient was a 33 year old male of foreign origin whose 17 contacts tested negative but were under home quarantine for 14 days. This has ignited a reflection on the readiness of the continent to take on the challenge and showcase its new potential. Following detection of this first case in Africa, the Africa CDC, Nigeria CDC and other national public health institutes in liaison with the WHO are scaling up preparedness efforts in the African region, supporting countries to implement recommendations outlined by the WHO International Health Regulations Emergency Committee. The Emergency

Committee recommended that all countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of SARS-CoV-2. Thirteen nations with close links with China, including Nigeria, South Africa, Kenya and the Democratic Republic of the Congo, have been identified as especially high-risk priority zones for proactive surveillance, detection and containing the spread of COVID-19. The WHO has sent diagnostic kits to 29 laboratories in Africa, and reagents and positive controls are being shipped worldwide by PANDORA-ID-NET partner in Germany, Charité-Universitätsmedizin Berlin Institute of Virology, to ensure the capacity to screen and test. Some countries in Africa, including DRC, are also leveraging the capacity they have built up to test for Ebola, to test for COVID-19. Thus, early detection of cases with implementation of infection control procedures will remain a priority to control the spread of COVID-19 in Africa.

On 22nd February, 2020 an Emergency Ministerial meeting on COVID-19 was organized by the African Union and the Africa Centres for Disease Control and Prevention following which the WHO DG announced several additional measures and plans for supporting the Africa response to COVID-19 (WHO, 2020g). He appointed Dr John Nkengasong, Director of the Africa CDC, and Professor Samba Sow, Director-General of the Center for Vaccine Development in Mali, as special envoys on COVID-19, to provide strategic advice and high-level political advocacy and engagement in Africa. A WHO Strategic Preparedness and Response Plan has been developed, with a call for US\$675 million to support those African countries which are most vulnerable. WHO have also shipped over 30,000 sets of personal protective equipment to several countries in Africa, and 60,000 more sets are to be shipped to the 19 vulnerable countries in the coming weeks. During the past month about 11,000 African health workers have been trained using WHO's online courses on COVID-19, which are available free of charge in English, French and other languages at OpenWHO.org.

As of 5th March, 2020, worldwide there were 93,090 laboratory confirmed cases of COVID-19 reported to the WHO. Of these 80,422 cases (with 2,984 deaths) were from China, and 12,668 cases (with 214 deaths) were from 76 countries outside China. From Africa there have been 5 cases from Algeria, 1 from Nigeria, 1 from Senegal and 2 from Egypt (WHO, 2020f). Given the extent of the outbreak in China, and with a high degree of awareness of COVID-19 in Africa, and proactive screening on the rise, more COVID-19 cases are anticipated in Africa. Several lessons have been learnt from the SARS-CoV-2 epidemic, which is the third lethal human zoonotic coronavirus with epidemic potential to emerge past 2 decades, the first being SARS-CoV identified in 2002 and second MERS-CoV in 2012 (Hui et al., 2014; McCloskey et al., 2014). Whilst the news and social media hype has evoked public and political anxieties, it is important to note that COVID-19 appears to have less than 3% mortality rates and is not more serious than outbreaks of viral respiratory tract infections such as influenza (Ippolito et al., 2020). It is crucial that other communicable diseases which impact a higher toll and burden on health services in Africa are not neglected or sidelined by the current hype and scaremongering of the COVID-19 epidemic.

An important need remains for ensuring long-term sustainability of what is being built. Africa needs to continue its upward trajectory of activities so as to align public health resources, scientific expertise and experience, and political commitment so that any future infectious disease outbreaks can be stopped before they become an epidemic in Africa. Africa needs more investments into ONE-HEALTH collaborative activities across the continent in order to meet the challenges of current and future public health threats (Kock et al., 2020; Petersen et al., 2019; Talisuna et al., 2020; Hui et al., 2020; Zumla et al., 2016). A whole new young generation

of enthusiastic, committed and dedicated African public health workers, epidemiologists, researchers, healthcare workers and laboratory personnel have emerged over the past 5 years, and they need to be supported by security of funding to build their careers and sustain their capabilities to take forward their research and training portfolios. The future of Africa's public health security relies on them. Increased governmental and donor investments are required to advance locally led, world-class public health work with surveillance, data and analytics capabilities and further expanding state-of-the-art laboratory capacities with more trained personnel to sustain capacity to rapidly respond to outbreaks at their source. A well-planned long-term strategy from the Africa Union will add major value for consolidating African leadership of public health capacity building, training and research.

Conflicts of interest

All author declare no other conflicts of interest

Author contributions

Sir Prof Alimuddin Zumla, Dr Nathan Kapata, Dr Chikwe Ihekweazu, Prof Giuseppe Ippolito and Prof Francine Ntoumi conceptualized the editorial and developed the first draft. All authors contributed to writing and finalizing the manuscript.

Author declarations and acknowledgments

All authors have a specialist interest in emerging and re-emerging pathogens. All authors are members of the Pan-African Network on Emerging and Re-Emerging Infections (PANDORA-ID-NET – <https://www.pandora-id.net/>) funded by the European and Developing Countries Clinical Trials Partnership the EU Horizon 2020 Framework Programme for Research and Innovation. Sir Zumla is in receipt of a National Institutes of Health Research senior investigator award. Professor Ippolito and Dr Vairo are supported by the Italian Ministry of Health (Ricerca Corrente Linea 1).

Dr Chikwe Ihekweazu is Director of the Nigeria CDC.

References

- <http://www.africacdc.org/Africa-centers-for-disease-control-and-prevention>. [Accessed 17 February 2020].
- Aruna A, Mbala P, Minikulu L, et al. Ebola virus disease outbreak – Democratic Republic of the Congo, August 2018–November 2019. *MMWR Morb Mortal Wkly Rep* 2019;68(December (50)):1162–5.
- Corman VM, Landt O, Kaiser M, et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill* 2020;25(January (3)), doi:<http://dx.doi.org/10.2807/1560-7917.ES.2020.25.3.2000045>.
- Hui DS, I Azhar E, Madani TA, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health – the latest 2019 novel coronavirus outbreak in Wuhan, China. *Int J Infect Dis* 2020;91:264–6, doi:<http://dx.doi.org/10.1016/j.ijid.2020.01.009>.
- Hui DS, Memish ZA, Zumla A. Severe acute respiratory syndrome vs. the Middle East respiratory syndrome. *Curr Opin Pulm Med* 2014;20:233–41.
- Hoffman SJ, Silverberg SL. Delays in global disease outbreak responses: lessons from H1N1, Ebola, and Zika. *Am J Public Health* 2018;108(3):329–33, doi:<http://dx.doi.org/10.2105/AJPH.2017.304245>.
- Ippolito G, Hui DS, Ntoumi F, MAeurer M, Zumla A. Toning down the 2019-nCoV hype – and restoring hope. *Lancet Resp Med* 2020;8(3):230–1, doi:[http://dx.doi.org/10.1016/S2213-2600\(20\)30070-9](http://dx.doi.org/10.1016/S2213-2600(20)30070-9).
- Kock RA, Karesch WB, Veas F, et al. 2019-nCoV in context: lessons learned?. *Lancet Planet Health* 2020;S2542–5196(20)30035–8, doi:[http://dx.doi.org/10.1016/S2542-5196\(20\)30035-8](http://dx.doi.org/10.1016/S2542-5196(20)30035-8) [published online ahead of print, 2020 February 6].
- Haider N, Yavlinsky A, Simons D, Osman AY, Ntoumi F, Zumla A, et al. Passengers' destinations from China: low risk of novel coronavirus (2019-nCoV) transmission into Africa and South America. *Epidemiol Infect* 2020a;148:e41, doi:<http://dx.doi.org/10.1017/S0950268820000424> Published 2020 February 26.
- Najmul Haider, Alexei Yavlinsky, David Simons, Abdinasir Yusuf Osman, Francine Ntoumi, Alimuddin Zumla, Richard Kock. In press, *Epidemiology and Infection*.
- Largent EA. EBOLA and FDA: reviewing the response to the 2014 outbreak, to find lessons for the future. *J Law Biosci* 2016;3(3):489–537, doi:<http://dx.doi.org/10.1093/jlb/lsw046> [published 2016 September 16].
- Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020;., doi:<http://dx.doi.org/10.1056/NEJMoa2001316> [published online ahead of print, 2020 January 29].
- McCloskey B, Dar O, Zumla A, Heymann DL. Emerging infectious diseases and pandemic potential: status quo and reducing risk of global spread. *Lancet Infect Dis* 2014;14(10):1001–10, doi:[http://dx.doi.org/10.1016/S1473-3099\(14\)70846-1](http://dx.doi.org/10.1016/S1473-3099(14)70846-1).
- Nigeria CDC 2020. <https://ncdc.gov.ng/ncdc>. [Accessed 18 February 2020].
- Omoleke SA, Mohammed I, Saidu Y. Ebola viral disease in West Africa: a threat to global health, economy and political stability. *J Public Health Afr* 2016;7(1):534, doi:<http://dx.doi.org/10.4081/jphia.2016.534> [published 2016 August 17].
- PANDORA-ID-NET: Pan-African Network for rapid research and response and preparedness for infectious diseases epidemics. <https://www.pandora-id.net/>. [Accessed 17 February 2020].
- Petersen E, Abubakar I, Ihekweazu C, et al. Monkeypox – enhancing public health preparedness for an emerging lethal human zoonotic epidemic threat in the wake of the smallpox post-eradication era. *Int J Infect Dis* 2019;78:78–84, doi:<http://dx.doi.org/10.1016/j.ijid.2018.11.008>.
- Talisuna AO, Okiro EA, Yahaya AA, et al. Spatial and temporal distribution of infectious disease epidemics, disasters and other potential public health emergencies in the World Health Organisation Africa region, 2016–2018. *Global Health* 2020;16(1):9, doi:<http://dx.doi.org/10.1186/s12992-019-0540-4> [published 2020 January 15].
- WHO. Coronavirus disease (COVID-19) outbreak. 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
- WHO. Ebola outbreak 2014–2016. 2020. <https://www.who.int/csr/disease/ebola/en/>.
- WHO. WHO African Region: JEE mission reports. 2020. <https://www.who.int/ihr/procedures/mission-reports-africa/en/>.
- WHO. Ebola virus disease. 2020. <https://www.afro.who.int/health-topics/ebola-virus-disease>.
- WHO. Management of ill travellers at Points of Entry–international airports, seaports and ground crossings – in the context of COVID -19 outbreak. 2020. <https://www.who.int/publications-detail/management-of-ill-travellers-at-points-of-entry-international-airports-seaports-and-ground-crossings-in-the-context-of-covid-19-outbreak>.
- WHO. Coronavirus disease 2019 (COVID-19). 2020. . (Accessed 5th March, 2020) https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200304-sitrep-44-covid-19.pdf?sfvrsn=783b4c9d_6.
- WHO. Emergency ministerial meeting on COVID-19 organized by the African union and the Africa centres for disease control and prevention. 2020. <https://www.who.int/dg/speeches/detail/emergency-ministerial-meeting-on-covid-19-organized-by-the-african-union-and-the-africa-centres-for-disease-control-and-prevention>.
- Zumla A, Dar O, Kock R, et al. Taking forward a 'One Health' approach for turning the tide against the Middle East respiratory syndrome coronavirus and other zoonotic pathogens with epidemic potential. *Int J Infect Dis* 2016;47:5–9.

Nathan Kapata*

Zambia National Public Health Institute, Minsitry of Health, Lusaka, Zambia

Chikwe Ihekweazu

Nigeria Centre for Disease Control, Jabi, Abuja, Nigeria

Francine Ntoumi^{a,b}

^aUniversity Marien NGouabi, Brazzaville, Congo

^bInstitute for Tropical Medicine/University of Tübingen, Germany

Tajudeen Raji

Africa Centres for Disease Control and Prevention, Addis Ababa, Ethiopia

Pascalina Chanda-Kapata

Ministry of Health, Lusaka, Zambia

Peter Mwaba

Lusaka Apex Medical University, Lusaka, Zambia

Victor Mukonka

National Public Health Institute, Ministry of Health, Lusaka, Zambia

Matthew Bates

School of Life Sciences, University of Lincoln, Lincoln, United Kingdom

John Tembo

HerpeZ and UNZA-UCLMS Project, University Teaching Hospital, Lusaka, Zambia

Victor Corman^{a,b}^aCharité – Universitätsmedizin Berlin, Institute of Virology, Berlin, Germany^bGerman Centre for Infection Research (DZIF), Berlin, Germany

Sayoki Mfinanga

National Institute of Medical Research, Dar es Salaam, Tanzania

Danny Asogun

Institute of Lassa Fever Research and Control, Irrua Specialist Teaching Hospital, Irrua, Nigeria

Linzy Elton

Center for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Hospital Campus, London, United Kingdom

Liã Bárbara Arruda

Center for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Hospital Campus, London, United Kingdom

Margaret J. Thomason

Center for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Hospital Campus, London, United Kingdom

Leonard Mboera

SACIDS Foundation for One Health, Sokoine University of Agriculture, Morogoro, Tanzania

Alexei Yavlinsky

Institute of Health Informatics, Faculty of Pop Health Sciences, UCL, London, United Kingdom

Najmul Haider

The Royal Veterinary College, University of London, Hatfield, Hertfordshire, United Kingdom

David Simons

The Royal Veterinary College, University of London, Hatfield, Hertfordshire, United Kingdom

Lara Hollmann

Chatham House Centre on Global Health Security, Royal Institute of International Affairs, London, United Kingdom

Swaib A. Lule

Institute for Global Health, University College London, London, United Kingdom

Francisco Veas

Faculty of Pharmacy, Montpellier University, IRD UMR5569, Montpellier, France

Muzamil Mahdi Abdel Hamid

Dept of Parasitology and Medical Entomology, Institute of Endemic Diseases, University of Khartoum, Sudan

Osman Dar

Chatham House Centre on Global Health Security, Royal Institute of International Affairs, London, United Kingdom

Sarah Edwards

Ethics and Governance, University College London, London, United Kingdom

Francesco Vairo

National Institute for Infectious Diseases Lazzaro Spallanzani – IRCCS, Rome, Italy

Timothy D. McHugh

Center for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Hospital Campus, London, United Kingdom

Christian Drosten^{a,b}^aCharité – Universitätsmedizin Berlin, Institute of Virology, Berlin, Germany^bGerman Centre for Infection Research (DZIF), Berlin, Germany

Richard Kock

The Royal Veterinary College, University of London, Hatfield, Hertfordshire, United Kingdom

Giuseppe Ippolito

National Institute for Infectious Diseases – Lazzaro Spallanzani – IRCCS, Rome, Italy

Alimuddin Zumla^{a,b}^aCenter for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Hospital Campus, London, United Kingdom^bDivision of Infection and Immunity, University College London and NIHR Biomedical Research Centre, UCL Hospitals NHS Foundation Trust, London, United Kingdom

* Corresponding author.

E-mail addresses: nkapata@gmail.com (N. Kapata),chikwe.iheweazu@ncdc.gov.ng (C. Iheweazu),fntoumi@fcrm-congo.com (F. Ntoui),TajudeenR@africa-union.org (T. Raji),pascykapata@gmail.com (P. Chanda-Kapata),pbmwaba2000@gmail.com (P. Mwaba),vmukonka@gmail.com (V. Mukonka),mbates@lincoln.ac.uk (M. Bates),john.tembo@gmail.com (J. Tembo),victor.corman@charite.de (V. Corman),gsmfinanga@yahoo.com (S. Mfinanga),asogun2001@yahoo.com (D. Asogun),linzy.elton@ucl.ac.uk (L. Elton),larruda@ucl.ac.uk (L. Arruda),m.thomason@ucl.ac.uk (M. Thomason),leonard.mboera@sacids.org (L. Mboera),a.yavlinsky@ucl.ac.uk (A. Yavlinsky),nhaider@rvc.ac.uk (N. Haider),dsimons19@rvc.ac.uk (D. Simons),LHollmann@chathamhouse.org (L. Hollmann),swaiblule@gmail.com (S. Lule),francisco.veas@ird.fr (F. Veas),mahdi@iend.org (M. Abdel Hamid),Osman.Dar@phe.gov.uk (O. Dar),sarah.edwards@ucl.ac.uk (S. Edwards),francesco.vairo@inmi.it (F. Vairo),t.mchugh@ucl.ac.uk (T. McHugh),christian.drosten@charite.de (C. Drosten),rkock@rvc.ac.uk (R. Kock),giuseppe.ippolito@inmi.it (G. Ippolito),a.zumla@ucl.ac.uk (A. Zumla).

Received 19 February 2020