

The Late Arrival of Coronavirus Disease 2019 (COVID-19) in Africa: Mitigating Pan-continental Spread

Jean Nachega,^{1,2,3,a} Moussa Seydi,^{4,a} and Alimuddin Zumla^{5,6,a}

¹Department of Medicine and Center for Infectious Diseases, Stellenbosch University, Cape Town, South Africa, ²Department of Epidemiology and Center for Global Health, University of Pittsburgh Graduate School of Public Health, Pittsburgh, Pennsylvania, USA, ³Departments of Epidemiology and International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA, ⁴Service de Maladies Infectieuses et Tropicale, Centre Hospitalier Universitaire de Fann, Université Cheikh Anta Diop, Dakar, Senegal, ⁵Department of Infection, Division of Infection and Immunity, Centre for Clinical Microbiology, University College London, London, United Kingdom, and ⁶National Institute for Health Research Biomedical Research Centre, University College London Hospitals, London, United Kingdom

The novel coronavirus disease 2019 (COVID-19) has rapidly spread to all 7 continents. Due to yet unknown reasons, the African continent has remained relatively unaffected. We discuss the importance of mitigating pan-continental spread in light of the fragile healthcare systems.

Keywords. COVID-19; SARS-Cov-2; Africa; pandemic.

On 30 January 2020, the World Health Organization (WHO) Director-General declared coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a Global Public Health Emergency of International Concern [1]. Since then, COVID-19 has spread to all continents. As of 28 April 2020, there have been 2 954 222 laboratory-confirmed cases of COVID-19 with 202 597 deaths (6.8% case-fatality ratio). The African continent has remained relatively unaffected, but African countries with unstable health systems and travel links between China, Italy, and other high COVID-19-endemic countries are most vulnerable. In anticipation of importation of cases to Africa, WHO, the Africa Centers for Disease Control and Prevention (CDC), national governments, and public health organizations have spent 2 months scaling up preparedness efforts to control the spread of the COVID-19 pandemic throughout Africa [2–4]. This support is critical to allow African governments to implement the International Health Regulations Emergency Committee recommendations.

The WHO African Region recently saw an upsurge in cases. As of 28 April, 2020, 21 388 confirmed COVID-19 cases with 875 deaths (4.0% case fatality) have been reported from across 33 countries [4]. The male-to-female ratio among the confirmed cases is 1.4, and the median age is 41.5 years (interquartile

range, 31–54 years), which might explain the low number of deaths compared with the global average. The highest number of confirmed cases have been reported from South Africa (4793 cases), Algeria (3517 cases), Cameroon (1621 cases), and Ghana (1550 cases) (Figure 1) [4]. Many of the cases in the African region are sporadic importations from the European Union or the United States, and surprisingly, none are from China, as anticipated [5]. All index cases of early cases reported in the WHO African Region had a history of travel to France, United Kingdom, Italy, Switzerland, Spain, Germany, United States, United Arab Emirates, India, Iran, Japan, or New Zealand [6].

Without adequate capacity for polymerase chain reaction testing to confirm the causative virus (SARS-CoV-2) for suspected cases of COVID-19, community transmission may remain undetected for prolonged periods and lead to local outbreaks, as seen in and around Seattle, Washington. The WHO has rapidly built capacity for COVID-19 testing in 37 African countries, and as the number of cases rises, COVID-19 will have a major impact on already severely constrained/vulnerable healthcare systems [3]. To prevent excessive morbidity and mortality in the event of uncontrolled COVID-19, greater resources and novel approaches to strengthen the weak healthcare systems will be needed.

Also, the spread of COVID-19 in sub-Saharan Africa is an additional concern because the continent already bears approximately 70% of the global human immunodeficiency virus (HIV) burden. The countries that have experienced the highest COVID-19 burden so far, including China, South Korea, Japan, Italy, and Iran, are very different from sub-Saharan Africa and thus there is limited information on how coinfection with HIV will affect patients with COVID-19. Of note, risk factors for more serious illness and fatal outcomes include older age (>60 years old) and comorbidities such as cardiovascular disease, chronic lung disease, diabetes,

Received 22 March 2020; editorial decision 26 March 2020; accepted 27 March 2020; published online March 30, 2020.

^aJ. B. N., M. S., and A. Z. contributed equally to this work.

Correspondence: J. B. Nachega, Department of Epidemiology and Center for Global Health, University of Pittsburgh Graduate School of Public Health, 130 DeSoto Street, Pittsburgh, PA (jbn16@pitt.edu).

Clinical Infectious Diseases® 2020;71(15):875–8

© The Author(s) 2020. Published by Oxford University Press for the Infectious Diseases Society of America. All rights reserved. For permissions, e-mail: journals.permissions@oup.com.
DOI: 10.1093/cid/ciaa353

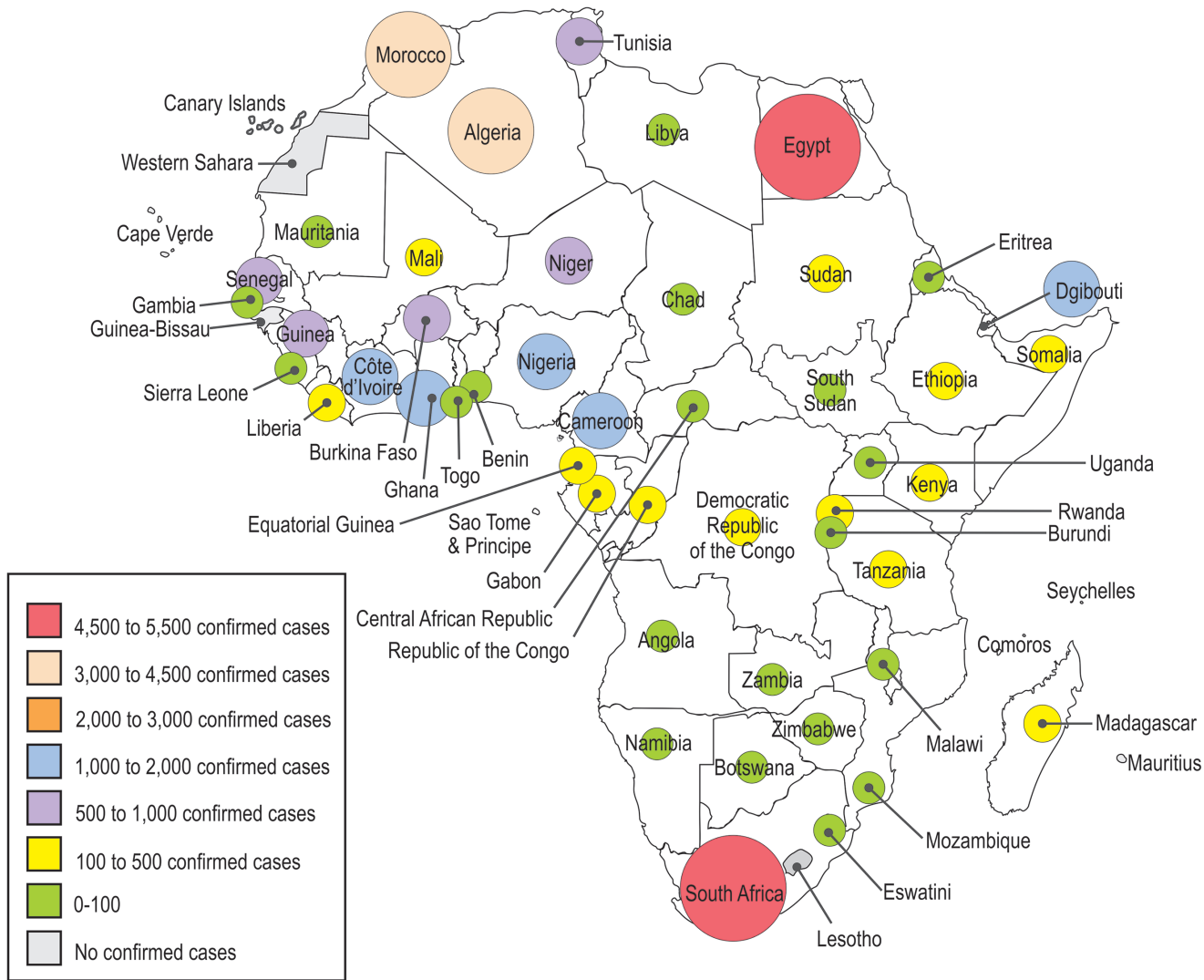


Figure 1. Coronavirus disease-2019 status in Africa, as of 28 April 2020 [4].

or cancer, which are also prevalent in aging patients with HIV. Therefore, it can be reasonably hypothesized that many people in Africa will be at high risk of COVID-19. As the pandemic expands in sub-Saharan Africa, it will be critical to determine whether COVID-19-associated disease severity and mortality will be increased in immunocompromised patients, especially those with uncontrolled HIV (high viral load or low CD4+ T-cell count). Furthermore, there is concern that population confinements, due to necessary lockdowns implemented in several African countries, will interrupt the supply/refill of critical medications such as antiretroviral therapy (ART). Creative strategies learned from the HIV epidemic include differentiated service delivery models (eg, community-based ART services such as home delivery of ART) [7] and the use of cellphone text messages to reinforce norms related to hygiene and health-seeking behavior [8].

To date, there are no proven effective treatments for COVID-19 disease. Numerous trials are currently evaluating therapeutic interventions targeting the SARS-CoV-2 virus and its damaging immune response in the lungs, which causes acute respiratory distress syndrome and is a major cause of death [9]. Among them, 2 phase III trials involving remdesivir (GS-5734), a nucleoside analog inhibitor originally under development for Ebola that has shown efficacy against SARS-CoV-2 in vitro and prevents serious pulmonary complications in vivo, began in March and are scheduled to conclude in May 2020 [10]. A randomized clinical trial of lopinavir/ritonavir, an HIV drug used extensively throughout Africa, conducted in China found no improvements in disease length, viral shedding, or 28-day mortality [9]. A small (n = 36), nonrandomized clinical trial that investigated the use of chloroquine/azithromycin reported that hydroxychloroquine was efficient in clearing viral

nasopharyngeal carriage of SARS-CoV-2 in French patients with COVID-19 in only 3 to 6 days. However, the quality of evidence was low due to the small sample size, lack of clinical outcomes, and lack of randomization, and therefore the results of the study are not conclusive [11]. There remains an urgent need to conduct adequately powered, randomized clinical trials to confirm the effectiveness of chloroquine/azithromycin for treatment of COVID-19.

In the absence of an effective treatment or vaccine, traditional measures for epidemic control of respiratory illness need to be reinforced in Africa, including social distancing, frequent handwashing, coughing and sneezing etiquette, and avoidance of touching one's eyes, nose, and mouth. Africa is known for its well-earned reputation of community, and many daily activities revolve around social interactions including church or market shopping. Social distancing will be particularly challenging, especially for individuals who are seeking food or require daily pay. With an average incubation period of 5–7 days (and possibly as long as 12–14 days), it is critical that those who have COVID-19 or who have had close contact with a person with confirmed COVID-19 self-quarantine for 14 days. Innovative strategies to reduce social interactions must begin immediately and utilize television (TV), church services (through radio, TV, social media), radio advertisements, toll-free COVID-19 hotlines, and local leaders to inform the public.

Several countries in Africa have implemented travel bans on nationals from high-COVID-19–endemic countries or complete lockdowns. Further, the Africa CDC established the Africa Task Force for Novel Coronavirus on 3 February 2020 and is working with WHO on surveillance, including screening at points of entry across the continent, infection prevention and control in healthcare facilities, clinical management of people with severe COVID-19 infection, laboratory diagnosis, and risk communication and community engagement. The African Union has solicited the Infection Control Africa Network to provide training in COVID-19 containment; 14 countries have participated in 2 courses with additional instruction scheduled [12].

African governments must continue to provide and leverage additional funding for essential health services during the COVID-19 pandemic, particularly tuberculosis (TB), malaria, HIV, and maternal child health. People-centered delivery of prevention, diagnosis, treatment, and care services should be ensured in tandem with the COVID-19 response. As the modes of transmission of TB, COVID-19, and other respiratory tract infections (RTIs) are similar, measures must be put in place to limit transmission of TB and COVID-19 in congregate settings and healthcare facilities. Provision of personal protective equipment to healthcare workers who are putting their lives at risk must be prioritized and scaled-up. Accurate diagnostic tests are essential for all RTIs (including COVID-19) and require a sustained supply of diagnostic tests. Existing pan-African networks for emerging and re-emerging diseases that work in close

liaison with the Africa CDC and WHO regional office will play a crucial role in buffering the impact of COVID-19. Existing TB laboratory networks and mechanisms for specimen transport and processing should be used for COVID-19 diagnosis and surveillance.

In conclusion, the global burden of COVID-19 will increase over the next few weeks, but as more people recover the transmission will decrease. Effects of temperature and humidity play a significant role in the spread of respiratory virus infections during what is commonly known as the “flu” season caused by influenza virus [13]. It remains unclear whether this will hold true for SARS-CoV-2 or how much the seasons contribute to the shift from an epidemic to a pandemic. However, if COVID-19 is not contained, it is possible that countries in the southern hemisphere like South Africa, Brazil, and Australia might see increased infection intensities during their winter months between May and September 2020 [14, 15]. Data from China showed that more than 99.0% of people aged between 1 and 70 years who contract COVID-19 will recover without any specific treatment and generate herd immunity. Most will have a cold/flu symptom and will not even know they are infected. Effective public health messaging on COVID-19 should align with political and scientific briefings by African governments, and this should be focused on educating as well as reassuring the public. Elderly patients with comorbidities or those with immunosuppression are at highest risk, and we must work to prevent infection in these populations. Relatively lower longevity rates compared to European countries and a large proportion of the population being under 70 years of age may ironically be advantageous for Africa.

Notes

Financial Support. J. B. N. is an infectious diseases internist and epidemiologist supported by US National Institutes of Health (NIH)/National Institutes of Allergy and Infectious Diseases grant number 5U01AI069521 (Stellenbosch University Clinical Trial Unit of the AIDS Clinical Trial Group) as well as NIH/Fogarty International Center grant numbers 1R25TW011217-01 (African Association for Health Professions Education and Research) and 1D43TW010937-01A1 (University of Pittsburgh HIV Comorbidities Research Training Program in South Africa) and a Senior Fellow Alumni of the European Developing Countries Clinical Trial Partnership (EDCTP). A. Z. is a co-principal investigator of the Pan-African Network on Emerging and Re-Emerging Infections (PANDORA-ID-NET; <https://www.pandora-id.net/>) funded by the EU Horizon 2020 Framework Program for Research and Innovation, and is in receipt of an NIH Research Senior Investigator award. M. S. is an infectious diseases and tropical medicine expert and member of the COVID-19 Task Force Response in Senegal.

Potential conflicts of interest. All authors have a specialist interest in emerging and re-emerging pathogens and report no potential conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

References

1. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel

- coronavirus(2019-nCoV). Geneva, Switzerland: World Health Organization. Available at: [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)). Accessed 21 March 2020.
2. Kapata N, Ihekweazu C, Ntoumi F, et al. 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. *Int J Infect Dis* **2020**; 93:233–6.
 3. Largent EA. EBOLA and FDA: reviewing the response to the 2014 outbreak, to find lessons for the future. *J Law Biosci* **2016**; 3:489–537.
 4. World Health Organization. Coronavirus disease (COVID-2019) situation reports. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>. Accessed 28 April 2020.
 5. Haider N, Yavlinsky A, Simons D, et al. Passengers' destinations from China: low risk of novel coronavirus (2019-nCoV) transmission into Africa and South America. *Epidemiol Infect* **2020**; 148:e41.
 6. World Health Organization. Importation pattern of COVID-19 cases into the WHO African Region, 25 February – 18 March 2020. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>. Accessed 22 March 2020.
 7. Rory Leisegang R, Calkins K, Cotton M, et al. HIV-positive patients receiving antiretrovirals through home delivery: does it matter? A causal analysis. Poster 5543. Presented at: Conference on Retroviruses and Opportunistic Infection; March 6–11, 2020; Boston, MA, USA.
 8. Nachega JB, Forrest JI, Wiens M, et al. Mobile health applications for HIV prevention and care in Africa. *Curr Opin HIV AIDS* **2015**; 10: 464–71.
 9. Clinical Trial Gov Registry. Available at: <https://clinicaltrials.gov/ct2/results?cond=covid19&term=&cntry=&state=&city=&dist=>. Accessed 22 March 2020.
 10. Dong L, Hu S, Gao J. Discovering drugs to treat coronavirus disease 2019 (COVID-19). *Drug Discov Ther* **2020**; 14:58–60.
 11. Cao B, Wang Y, Wen D. A trial of lopinavir–ritonavir in adults hospitalized with severe Covid-19. *N Engl J Med* **2020** Mar 17. DOI: [10.1056/NEJMoa2001282](https://doi.org/10.1056/NEJMoa2001282).
 12. Gautret P, Lagier JC, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents* **2020**:105949. doi:[10.1016/j.ijantimicag.2020](https://doi.org/10.1016/j.ijantimicag.2020)
 13. The role of absolute humidity on transmission rates of the COVID-19 outbreak. Available at: <https://www.medrxiv.org/content/10.1101/2020.02.12.20022467v1>. Accessed 24 March 2020.
 14. Infection Control Africa Network (ICAN). Online training ECHO programme. Available at: <https://www.youtube.com/watch?v=OWDmx2XIOkK&feature=youtu.be> Accessed 21 March 2020.
 15. Seasonality of SARS-CoV-2: Will COVID-19 go away on its own in warmer weather? Available at: <https://ccdd.hsph.harvard.edu/will-covid-19-go-away-on-its-own-in-warmer-weather/>. Accessed 24 March 2020.