Limiting the spread of COVID-19 in Africa: one size mitigation strategies do not fit all countries

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On March 11, 2020, when coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared a pandemic by WHO, there were comparatively few cases reported from Africa.[1] Our Comment draws on early imported COVID-19 cases in South Africa, Senegal, Democratic Republic of the Congo, and Egypt as case studies to discuss important mitigation strategies of COVID-19 in Africa.

Early COVID-19 cases in Africa were mostly imported from Europe, due to the higher volume of business and tourism airline traffic between African countries and Europe, and less from China.[2] The first confirmed case was reported in Egypt on Feb 14, 2020, (an adult male whose 17 contacts tested negative) and prompted African preparedness efforts.[3,4] In South Africa, on Feb 29, 2020, a group of nine adult travellers returned from a skiing holiday in Italy, where the COVID-19 epidemic was rampant. After developing a flu-like illness, one traveller tested positive for COVID-19, which was confirmed by RT-PCR on March 5, 2020; his wife was asymptomatic but tested positive on March 8, 2020. Overall, seven of the nine travellers were positive for COVID-19, five of whom were asymptomatic. In Senegal, the first COVID-19 case was reported on March 7, 2020, in a traveller returning from Italy. Contact tracing identified a cluster of transmission of 20 cases within his immediate household. Democratic Republic of the Congo confirmed its first case of COVID-19 on March 10, 2020: an adult male who tested positive in the capital city of Kinshasa after developing a cough and fever, 2 days after returning from France. These early index cases show the imported nature of the epidemic in Africa among young affluent adult travellers from Europe. However, the majority of COVID-19 cases currently being identified and reported from African countries are due to local transmission.

Early estimates of case fatality rates (CFRs) also seem to vary substantially. As of April 24, 2020, South Africa had reported 3635 cases with 65 deaths (CFR 1·8%) and Senegal had reported 442 cases with 6 deaths (CFR 1·3%). These CFRs seem lower than in most European countries (eg, Italy had reported 187 327 cases with 25 085 deaths; CFR 13·4%). Since mortality rates are generally higher in older people, it could be assumed that a younger African population distribution will lessen the death rate of COVID-19 on the continent.[4] However, it is too early to predict the death rate as Africa is at the ascending phase of the epidemic curve. Furthermore, the high prevalence of HIV, tuberculosis, hypertension, and diabetes, coupled with weak health-care systems in Africa, might lead to high mortality rates among comorbid populations. Indeed, Egypt (3659 cases with 276 deaths; CFR 7·5%) and Democratic Republic of the Congo (359 cases with 25 deaths; CFR 6·9%) have reported much higher CFRs than South Africa and Senegal.

Since the emergence of COVID-19 on the continent, African governments have had to decide whether, in addition to following WHO recommendations to test widely, contact trace, and quarantine,[5] they would adopt draconian measures such as total lockdowns, stay at home to save lives campaigns, and travel and movement restrictions as has been done in European and Asian countries.[5] Physical distancing and handwashing, globally adopted interventions to combat the spread of COVID-19, remain a major challenge in the context of overcrowding, poverty, and weak health-care systems.[6] A combination model of country-specific economic estimates of the benefits of disease avoidance and epidemiological projections of the spread of COVID-19 raises several possible issues.[7] First, the benefits of physical distancing could be substantially smaller in low-income countries due to the smaller proportions of older people and because, although physical distancing and lockdowns flatten the epidemic curve and reduce pressure on health systems, this effect is less apparent in countries with already overwhelmed and weak health-care systems. Second, the economic value in terms of lives saved by physical distancing policies is likely to be much higher in high-income countries than countries in which these policies have more detrimental effects on incomes. Although physical distancing slows the transmission of the virus, it exacts a heavy toll on the informal economic and casual labour sector. In search of income for the day-to-day livelihood

of extended families, many Africans could be forced to ignore concerns about contracting COVID-19 and fend for their survival.

Furthermore, the effect of ongoing lockdowns (eg, partial in Senegal and Democratic Republic of the Congo *vs* total in South Africa) and case-finding mitigation strategies will depend on each country's political leadership, socioeconomic realities, and epidemic stage. Early evidence of flattening the epidemic curve through a proactive, 30-day total lockdown and physical distancing is being documented in South Africa. However, before physical distancing measures can be eased, it is crucial to have in place a robust and functioning public health infrastructure to scale up case finding through testing, isolation, and contact tracing to ultimately interrupt coronavirus transmission. To reduce the rate of infections, the South African National Health Laboratory Service is planning to administer 36 000 RT-PCR-based tests per day by the end of April and more than 28 000 trained community health-workers will be sent house-to-house in susceptible communities for screening, testing, and contact tracing using mobile phone technology assisted by Médecins Sans Frontières.[8] Notably, point-of-care RT-PCR-based Xpert Xpress SARS-CoV-2 testing with a fast turnaround (45 min) using small GeneXpert machines (Cepheid, Sunnyvale, CA, USA), ideal for mass community testing, will be available in South Africa by the end of April, 2020.[9]

As COVID-19 spreads across Africa, causing disruption of already fragile health systems, it is becoming clear that responses require action beyond the health sector and must be tailored to the local situation. Lacking governmental financial support, as is being provided for populations and businesses in Europe and USA, most of Africa's poorest citizens will ignore quarantine directives and continue to engage in communal activities to earn incomes for their families. Some countries must also provide for other vulnerable populations such as migrants, stateless people, and forcibly displaced refugees. As larger datasets are generated by increasing case numbers in Africa and while vaccines are awaited, factors which underlie asymptomatic or milder clinical presentations and any differences of mortality or severe disease between geographical regions of Africa need to be investigated further to find local solutions.[10] Possible factors include innate immune mechanisms, HLA types, effects of the BCG vaccination, cross-protective immunity due to repeated infections with other coronavirus species that cause mild upper respiratory tract infections or locally prevalent parasitic infections. These factors could ultimately provide clues to the development of preventive and therapeutic interventions for COVID-19 relevant to Africa and beyond.

In conclusion, while African leaders ponder COVID-19 mitigation strategies to reduce risks of transmission versus the deprivation and hunger that will result from prolonged economic disruption, the quest for solutions must continue. Some countries are investing in low-cost preventive measures to improve physical distancing, such as stopping international travel, reducing the number of people at religious and social gatherings, and universal masking using non-medical cloth masks for the community. Other measures could focus on protecting older people, allowing individuals restricted working hours for income generation, information campaigns for personal hygiene, physical distancing, and handwashing. As lockdowns and physical distancing measures are eased, proactive surveillance, case detection, and contact tracing with isolation will be required to prevent a dramatic resurgence of COVID-19 cases.

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