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***COVID-19 and Africa***

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**1. Biology**

COVID-19 is a unique coronavirus that was discovered after an outbreak of respiratory illness in Wuhan, China. Coronaviruses had previously been associated with human disease including a spectrum of illness from mild flu-like illness to severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). Coronaviruses are relatively common in humans and animals.<sup>1</sup> It appears that COVID-19 is most commonly transmitted through aerosolized droplets which are inhaled by exposed persons.

**2. History**

The first patients with COVID-19 became ill in December 2019 in Wuhan, and the illness rapidly spread in China. As of December 2, 2020, worldwide there have been 64.1 million persons diagnosed with COVID-19 and almost 1.5 million deaths.<sup>2</sup> The first case in Africa was diagnosed in Egypt on February 14, and as of December 2, there have been 2,184,209 confirmed cases have been reported in Africa with 52,231 deaths.<sup>3</sup>

**3. Clinical Manifestations**

Infection with COVID-19 can result in a spectrum of illness from asymptomatic infection to flu-like symptoms to severe respiratory illness and death. The period of time from exposure to the onset of symptoms may be 2-14 days, but most commonly is 4-5 days. Transmission can occur during the pre-symptomatic phase and during asymptomatic infection, which has important implications for the use of prevention measures. Increasing age is clearly associated with more severe illness, in addition to hypertension, diabetes, chronic lung disease, and obesity. Some of the most severe manifestations of COVID-19 infection may be caused by the immune response of the infected person when the immune response overreacts and makes symptoms worse. Treatment for COVID-19 infection can include the antiviral drug remdesivir, or a drug to suppress the overreactive immune response, dexamethasone. Remdesivir is not widely available in Africa, but dexamethasone is. Hydroxychloroquine was speculated to have antiviral activity, but clinical trials have shown that it may actually cause harm. Herbal treatments have also been speculated to have activity, but scientific studies are lacking.

#### 4. Epidemiology

Globally the United States, India, and Brazil are the countries with the highest number of reported infections. Statistics from the Africa Center for Disease Control (CDC) show that it is the region with the least number of COVID-19 cases, with cases dropping even more recently. Southern Africa has the largest number of cases, followed by Northern, Western, Eastern, and Central Africa. South Africa has reported 796,472 cases, the highest total on the continent. As of December 2, 2020, South Africa had both the highest number of infections and deaths with 21,709 fatalities<sup>3</sup>. This is followed by Morocco, which has reported 359,844 cases so far and 5,915 deaths<sup>3</sup>. Overall, the number of fatalities due to the virus in the region has been relatively small when compared to other regions like Europe. Africa has reported deaths translating to 2 persons per million population being lost to the virus compared to 202 persons and 112 persons in Europe and America respectively. Epidemiologists predicted that Africa would report much higher numbers of COVID-19 cases, but Africa's CDC has tracked cases closely and fortunately the disease burden appears to be less than expected. There has been speculation that the lower numbers of cases being reported may be due to the relatively young population of Africa (hence, less likely to have symptoms and get tested), the relatively warm climate (COVID-19 may be heat sensitive), strong prevention measures such as lockdowns and contact tracing, inadequate laboratory infrastructure, and the cost of testing leading to fewer tests, insufficient public health reporting of cases, and suppression or denial of infections by political leaders.

#### 5. Prevention

Given the limited treatment options and the potential for severe disease, prevention measures represent the cornerstone of COVID-19 control. Since the virus is spread through aerosolized particles, social distancing of, at least, two meters from other persons is critical. Masks limit the aerosolization of saliva and respiratory secretions, and they, therefore, play an important role in prevention. Because the virus may persist on surfaces, handwashing for at least 20 seconds can inactivate COVID-19. For infected persons, quarantine for at least 14 days is essential to prevent transmission to others. Contact tracing and testing of exposed persons has been employed in a number of African countries. Finally, lockdowns and curfews that have limited interpersonal contacts may lead to disease control. Extensive efforts are underway to develop a vaccine for COVID-19, but there are unanswered questions such as the completeness and duration of immunity, cost, and access to a vaccine for Africa. Recent press reports suggest evidence of efficacy for three vaccine candidates, and regulatory authorities are currently reviewing study results for possible vaccine distribution beginning in December 2020.

#### 6. Political and economic aspects

##### a. Spectrum of attitudes in political leaders

COVID-19 has exposed a spectrum of leadership styles in Africa with some leaders taking the role of a crisis leader, while others ignore the pandemic or even spread misleading information. Head of states in countries like South Africa, Kenya, Rwanda, Uganda, Nigeria, Egypt, Ethiopia,

Mauritius, and Ghana stepped up their response in a vigilant, proactive, and bold manner by adopting strict measures to curb the spread of the pandemic. This is reflected by the number of tests done in these countries, representing 80% of all tests in the continent<sup>4</sup>.

While the spectrum of leadership response during COVID-19 is a portrayal of an individual president's character and style of leadership, it is also a portrayal of what resources a country can mobilize in time of crisis, past experiences in dealing with disease outbreaks and trade-offs the leaders have to make in time of crisis. While South Africa, an industrialized country, was able to fast-track production of tests and personal protective equipment, Uganda capitalized on what its scientist and public health specialists learned from previous outbreaks like Ebola, and Tanzania chose to use the faith of its citizens by resorting to prayers together with closing academic institutions, and non-mandatory masking and social distancing. All these might have influenced the spectrum of attitudes each country's political leader exhibited.

#### b. Economic consequences

##### *i. Macro level*

Although the number of cases with COVID-19 in Africa is low, the region's economy has been hit hard. The economic impact of COVID-19 is the result of the measures implemented by the region to stop its spread. Measures implemented to stop the virus' spread, including closing borders and country lockdowns, have resulted in closing businesses and income-generating activities. Consequently, this has resulted in low trade and investments, reduction of tax revenues in countries, contraction of exports due to low demand from foreign countries and regional supply shock affecting domestic and intra-regional trade. The region's economic growth has been projected to decline from 2.4% in 2019 to -2.1 to -5.1%, with the pandemic sparking its first recession in 25 years<sup>5</sup>. The impact of COVID-19 to the region's economy has so far been exponential and has both impacted progress made by the region in the past decade as well as slowing its growth prospects for years to come.

##### *ii. Micro level*

Microeconomic consequences of COVID-19 relate to those borne by individuals and households. In the region, a high proportion of the population is reliant on informal work, which is characterized by the absence of contracts or income protection. The challenge currently faced by millions of Africans and their households, most of whom were already living below the poverty line, is that their day labor, small business activity or small-scale farming have dramatically been affected by partly or complete closure of the economy by lockdowns. This has left most people with a lack of sources for their daily livelihood. In South Africa for instance, 3 million individuals are currently reported to be unemployed, which has led to their inability to pay for health care, food and rent. This has increased the incidences of homelessness and hunger.

## 7. COVID-19 in Africa

### a) Challenges

#### *i. Limited testing*

While infection rates have been low in most countries in Africa, experts fear this is not the real representation of the severity of COVID-19 continentally. Most of the fear is related to the limited

testing capacity of most countries as most of them are struggling to acquire testing supplies to match local needs. Only 16 countries on the continent have conducted more than 100,000 tests while only three, South Africa, Morocco, and Ethiopia, have conducted over half a million tests<sup>6</sup>. Meanwhile, Nigeria, home to around 200 million people, has only conducted around 1,500 tests per million people. The disproportionate testing according to country's population is a demonstration of limited testing in the region.

*ii. Inadequate reporting*

Africa has had a consistently low per capita rate of confirmed cases of COVID-19 since the index case was reported in Egypt, on February 14, 2020. Big gaps in the data representing the number of COVID-19 cases in the region is palpable. Global COVID-19 data platforms including the John Hopkins center, WHO, and CDC routinely report data by country; these institutions report that most African countries do not have frequently-updated testing data. Although this could be due to limited testing, some countries have decided not to report their COVID-19 case count. Countries like Tanzania stopped reporting the number of people with the virus as early as April and declared the country free of the virus in May. This is despite the numbers of positive cases being high in neighboring countries like Kenya, Uganda, and Zambia. Inadequate reporting is a barrier to experts estimating the impact of the pandemic to the region and planning for resources to combat it.

*iii. Limited health care infrastructure including PPE*

The COVID-19 pandemic has exposed shortfalls in the African health care system. The shortfalls range from inadequate health care infrastructure and availability of medical products such as personal protective equipment to combat the pandemic to a lack of essential human resource and research capacity. Although some shortfalls may require long-term measures, others require short-term measures if the region is to successfully stop the pandemic. The African CDC Director Dr. John Nkengasong has reported a lack of community health workers (CHWs) and front-line health workers, who might have been pivotal in the fight against the pandemic. Out of the needed 25,000 front-line health workers, Africa has 5,000. The continent has also not met the 2 million African CHWs target aimed for 2020. While these may take a long time to address, it is currently battling the daily need for, at least, half a million PPE kits including face shields, goggles, apron, medical masks, and gloves. This has limited the health care system's ability to handle the pandemic.

*iv. Promotion of unproven treatments (hydroxychloroquine, Madagascar tonic)*

Although a handful of drugs like remdesivir and dexamethasone have currently been proven to treat COVID-19, there were no proven treatments at the early phases of the pandemic. But, under intense pressure, limited time and poorly conducted clinical trials and observational data, many clinicians and African leaders are embarking on the use of unproven treatments. Several countries in Africa have touted the use of alternative and herbal remedies to treat COVID-19. Madagascar's president, Andy Rajoelina, claimed that an herbal tonic called COVID-Organics, which was developed by the Malagasy Institute of Applied Research, was a promising cure, convincing other leaders, including the presidents of Tanzania and the Democratic Republic of Congo, of its effectiveness. Despite a lack of enough trials demonstrating its efficacy, many countries in the Africa and the world advocated the use of hydroxychloroquine, an anti-malarial drug known to

reduce fever and inflammation. Promotion of unproven treatments risks the lives of both COVID-19 patients and those who are free from the virus.

*v. Uncertainty about viral survival in heat*

Africa has seen fewer confirmed cases of COVID-19; this has been despite its dense population and inadequate hygiene in the urban areas. The disproportionate number of cases has argued another explanation to account for the spread of the virus. One hypothesis has been uncertainty of viral survival in heat and warm weather. COVID-19 has so far exhibited a geographical spread in countries located in the colder parts of the Northern Hemisphere. Countries and cities with the highest spread and maximum number of cases have temperatures in the sub-zero minimum temperatures. In contrast, most countries and major cities in Africa witnessed temperatures ranging from 18°C to 40°C during the outbreak of the pandemic. The higher temperature might also explain the smaller number of cases in Africa, among other explanations. Not just the present coronavirus outbreak, even the earlier epidemics like MERS and SARS, which killed thousands across Asia and America, had a minimal impact in Africa. The uncertainty about the virus's survival in heat provides hope in how it will impact the region.

*vi. Political leaders*

Political leaders in Africa have continued to educate citizens on the virus. The message sent by political leaders and the way they have reacted to the crisis has been a big determinant of how severe COVID-19 has affected each respective country. One of the main challenges created by political leaders during the COVID-19 pandemic has been the spread of misinformation regarding the virus, its origin, prevention, testing and treatment. This has led to a lot of uncertainty, anxiety, and chaos among their citizens, that can risk further spread of the virus. This coupled by a lack of regional cooperation, coordination and networking among political leaders in the region might also account for and lead to a sub-par response to the pandemic.

b) The future for pandemics in Africa

i. *Health care infrastructure*

Strengthening health systems is an important goal for the region's ability to handle future pandemics. Health system strengthening in this context should span from investing in and building health research capacity to address and surveil pandemics to increasing human resources, including CHWs and front-line workers, in important areas. It is also key to partner with and engage local traditional sources of care to avoid an unparallel response to pandemics and the promotion of unproven treatments. The continent should protect its health care workers through adequate infection prevention and control measures. All these require investment in health by governments in the region.

ii. *Testing capacity*

Lack of access to testing during this pandemic has hampered efforts to save lives. As of July 2020, the region had received 1.6 million tests donated by the Jack Ma Foundation and about 1 million tests procured by the Africa CDC to cover a population of 1 trillion, translating to 1300 tests per million population<sup>7</sup>. If the region intends to limit further spread of the current pandemic and future ones, it strongly has to increase its testing capacity to reach a substantial level. To achieve optimal

capacity, countries in the region need to increase the capacity, functionality and qualities of their national laboratories for testing during pandemics. Together with partnership, the region also needs to build independent diagnostics capability.

*iv. Transparent reporting*

Building independent and transparent systems for testing and reporting of pandemics in the region should be a priority. These systems will not only enable the region to address the current pandemic but also surveil for future pandemics. Educating and engaging leaders and the community throughout the process of establishing appropriate systems is important to avoid political interference and increase acceptability by communities in the region.

*v. Access to vaccines and treatment*

The region should learn from the current pandemic and previous ones to address barriers in accessing vaccines and treatments. Harnessing of research, technology and innovations to address the shortages of vaccines and treatment is imperative. All these should be driven by local and international investment in research that will lead to the development of vaccines and treatment. Global response to the pandemic should also be equitable by ensuring the low-income countries like those in the region have fair access to available vaccines and treatments developed for COVID-19.

*vi. Political leadership*

Political leaders have proven to be pivotal in determining the direction of pandemic in Africa. The ability of the region to respond to the ongoing pandemic and future pandemics relies on political leaders being vigilant, well informed, transparent and mobilizing regional cooperation. Engaging community leadership could be key in ensuring prompt responses to future pandemics.

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