Pandemics in Africa: Does Experience Mean Preparation?

As the COVID-19 pandemic batters every corner of the globe, some nations are using what they've learned from prior outbreaks to push back against the deadly virus. This article analyzes the effect of protocols in Rwanda, Zimbabwe, Mali, Guinea, and Liberia.

Sub-Saharan Africa has a history of battling pandemics: cholera, Ebola, HIV/AIDS, measles, yellow fever, and most recently COVID-19. In a September 2021 interview conducted by this research team, Dr. Ibrahima Socé Fall, assistant director-general for Emergencies Response for the World Health Organization, stated that West Africa has dealt with over 1,000 outbreaks every year, wreaking havoc on citizens, economies, and health systems.

From its onset, health experts were keenly focused on how COVID-19 would play out across the continent. Speculation about the emergent virus and how it would behave was rampant. As Dr. Sam Okuonzi, head of hospital management at Arua Regional Referral Hospital in Uganda, suggested during a WHO health conference in October 2020: "Factors for a lower transmission and disease severity rate in the continent may include, for example, a youthful population, possibly an inherent immunity, possibly something to do with temperature and altitude, possibly something to do with better population response because we have a lot of experience from Ebola and other diseases, and people are prepared for some of these diseases."

While sub-Saharan Africa has experienced numerous viral and bacterial disease outbreaks, three have stood out due to their severity and impact: cholera, Ebola and HIV/AIDS. Has the region's previous pandemic experience strengthened its COVID-19 response? We examined the histories of these three diseases across Rwanda, Zimbabwe, Mali, Guinea, and Liberia to understand whether prior outbreaks bolster a country's COVID-19 response. We found that having prior pandemic experience alone did not strengthen a country's COVID-19 response. Rather, the learnings and resources gained from prior pandemics and, more importantly, how they are applied affect the strength of a country's COVID-19 response.

For instance, although Mali and Guinea both experienced Ebola epidemics, Mali leveraged existing laboratories and significantly expanded testing capacity for COVID-19, while Guinea's overall underinvestment in health infrastructure limited its testing capabilities.

Among the five countries, four factors illustrate how prior pandemic experiences can be leveraged to strengthen the COVID-19 response. The first is recycled and adapted health infrastructure and IT systems, including refitting laboratories used to test for HIV/AIDS cases. The second is sustained investment in health infrastructure to aid the rapid deployment of resources to fight new outbreaks. The third is clear public health dissemination via multiple channels to ensure that as many people as possible have the knowledge to stop the spread in their local communities. The fourth is collaboration among the public, private, and social sectors, as each sector brings additional capacity and specific capabilities to fight COVID-19. We'll now examine how these factors emerged through our five case studies.

Rwanda: Not Reinventing the Wheel

Rwanda has been on the front lines of public health crises and epidemics ranging from HIV/AIDS to Ebola. The country's medical and technological ecosystem has taken lessons from these crises to heart and quickly learned to use the resources they have to stop the spread of COVID-19 in its tracks. Early in the COVID-19 outbreak, Rwanda made the critical decision not to reinvent the wheel, but to redeploy its Weltel infrastructure and technology that had been used to manage the spread of HIV/AIDS. Initially developed as an SMS-integrated system used to increase patients' adherence to the treatment plan for HIV/AIDS, Weltel technology was redeployed for COVID-19 contact tracing to better understand the spread of the disease.

"We are using the same structure, same people, same infrastructure and laboratory diagnostics, but applying it to COVID testing," Sabin Nsanzimana, director general of the Rwanda Biomedical Center, said to NPR in June 2020.

Rwanda's success does not stop at tracking and tracing. The country's network of laboratories and molecular testing facilities were already effectively running to monitor people with chronic conditions such as HIV and hepatitis B and C. These labs were well-equipped with molecular instruments and an experienced staff with technical know-how to support widescale COVID-19 testing. This enabled Rwanda to effectively ramp up its already significant capacity, opening 12 new PCR testing centers in April 2021 that can conduct up to 10,000 tests daily.

The results are notable. Compared with neighboring countries, Rwanda has tested more frequently per population and maintained a low positivity rate. Coupled with extensive data science and data collection linking testing, doctors, contact tracers, and the government, Rwanda's IT solutions in the health care space have paid dividends in the country's ability to safely manage the initial wave of COVID-19.

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Zimbabwe: Leveraging Public-private Partnerships from Cholera

Cholera was an equally educational experience for Zimbabwe, albeit with far more disastrous consequences. From August 2008 to July 2009, the country reported over 4,000 deaths from cholera, impacting 90% of the country's districts. With a crumbling health system, Zimbabwe also faced inadequate water and sanitation infrastructure in urban and rural areas, overcrowded settlements, and an economic crisis. According to Simukai Chigudu, associate professor of African politics at Oxford University, Zimbabwe's response addressed both institutional and communal challenges. Data was not readily available, so developing a process to gather and transmit data was the initial step.

The country created a centralized approach to review the information, take action, and communicate updates to prevent misaligned messaging. Guidelines around case management were updated, standardized, and rolled out across health facilities. Zimbabwe used this approach to address a key driver of the outbreak: limited access to clean water and sanitation facilities in the rural areas. Zimbabwe established a centralized task force that mobilized resources from many sources, supplemented by interventions in health education campaigns and media messaging. Although the cholera outbreak was officially declared over in July 2009, the country has observed and effectively contained sporadic outbreaks due to the measures put in place.

By September 14, 2021, as stated by the World Health Organization, Zimbabwe had reported 126,399 confirmed cases of COVID-19, 4,543 deaths, and 4,552,455 vaccine doses administered. With about 16% of its population vaccinated, according to the Reuters COVID-19 tracker, these statistics make Zimbabwe a relative success story in Africa where less than 2% of the continent's total population is fully vaccinated.

The structures put in place to address the cholera outbreak became key facilitators in the Zimbabwean government's response to the COVID-19 pandemic. The National Task Force on Epidemic-Prone Diseases, which was established at the start of the cholera outbreak, has become a standing committee that supports any outbreak. According to Dr. Rugare Kangwende, director of monitoring and evaluation at the Ministry of Health and Child Care, "a robust weekly routine monitoring system that rides on an existing system" was critical in getting reliable and timely data and making lifesaving decisions. Ultimately, harmonizing across both government and nongovernmental agencies was critical in both strengthening the health system and in conducting social mobilization interventions to sensitize communities on COVID-19.

Mali: Being Proactive and Leveraging Existing Infrastructure

Despite demonstrating some of the most proactive measures on the continent to halt the spread of COVID-19, Mali saw the virus spread faster than in neighboring countries Algeria and Niger. Mali reported its first domestic COVID-19 case on March 25, 2020, much

later than many adjacent countries. However, even prior to the disease's arrival, Mali instituted various precautions following the onset of the outbreak in China. For instance, two weeks prior to the declaration of the first case, Mali instituted temperature screenings at Modibo Keita International Airport. In the days before the first case, Mali halted all air traffic, banned public gatherings, and instituted a national curfew.

In preparation for the pandemic, Mali was also able to leverage various learnings from the Ebola outbreak of 2014 to assist with preparation. Dr. Fall described the nature of the Malian Health Ministry's proactive task force, established before the first detected case, that led to successful containment of the first Ebola case. He said the country quickly adapted a "culture of evidence-based preparedness," which was critical. Furthermore, Mali leveraged the expertise it acquired from combating Ebola less than a decade prior to efficiently operate its university clinical research center of the Faculty of Medicine and Odontostomatology. In addition, the Ministry of Health strengthened the capacity of the health system by increasing capacity at four laboratories for PCR diagnostics.

Despite these proactive measures, the on-the-ground resources and decision-making to address COVID-19 cases led to a rapid spread. Though Mali instituted COVID-19 precautions ahead of its peers, these measures were lifted as of July 25, 2020, following indication from the Economic Community of Western African States that cases had been declining. Meanwhile, although the Ministry of Health learned to invest heavily in pandemic testing and research resources, the health system remained underfunded. Upon the onset of its first COVID case, the country only had 49 hospital beds available and a short supply of personal protective equipment and hospital equipment. Mali's actions did not prove successful, as they would reach 45 confirmed cases and five deaths a mere month into the pandemic, a number that would cumulatively approach 15,000 over the next 18 months.

Guinea: Underinvestment in Resources for Two Pandemics

The Republic of Guinea demonstrates that prior exposure to Ebola does not necessarily guarantee successful deployment of resources to fight other pandemics such as COVID-19. Despite the Ministry of Health and Public Hygiene of Guinea leveraging the strengths acquired from the Ebola outbreak in 2014, such as maintaining P3-level laboratories to adequately address the COVID-19 pandemic, Guinea experienced the unthinkable: another onset of the Ebola outbreak simultaneously with the COVID-19 pandemic. On February 14, 2021, the government of the Republic of Guinea declared a resurgence of Ebola following a report of seven cases, less than a year after declaring its first COVID-19 case in the country. Thus, Guinea was far from prepared for the COVID-19 virus, let alone simultaneous pandemics.

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Repurposing Guinea's standard operating procedures for the COVID-19 outbreak was unsuccessful because the country underinvested in its health care resources and information-sharing. Guinea has one of the lowest health care expenditures per capita in the world ($38) and a low medical workforce density of less than 1.5 people per 10,000, according to the World Bank. As a result, when 160 of the country's 2,000 health care workers were infected with the virus in June 2020, the hospital system was overrun and ill-prepared.

In addition, Guinea's treacherous terrain limits access to vaccines in remote areas and hampers widespread dissemination of information. A distrust of the Guinea medical system in prior outbreaks plagued the country with declines in hospital admissions. Lastly, while state laboratories were available for both COVID and Ebola testing, no other testing was available for other diseases, leading to inevitable delays in the detection of other viruses. The combination of factors ultimately contributed to more than 30,000 COVID-19 cases through December 2021. Thankfully, the Ebola outbreak was declared over in June 2021.

Liberia: Information-sharing and Strong Political Will

Like Guinea, Liberia initially responded poorly to the Ebola epidemic between 2014 and 2015. The WHO

recorded a total of 10,678 cases leading to 4,810 deaths. In 2014, Liberia was beset by generally unprepared and undeveloped health care systems (e.g., 50 doctors to serve a population of 4.3 million) and was still recovering from a lengthy civil war. In a 2019 analysis, Dr. Fall describes how the unprepared health system not only led to far-reaching impacts on the Liberian health system but also a "deceleration of progress" across overall health outcomes, ranging from access to care, increases in mortalities from nonfatal diseases, and several others.

Despite the major negative impacts from Liberia's Ebola epidemic to the country's health outcomes, the country learned from its earlier handling and was able to successfully contain subsequent epidemics. WHO Liberia Emergency Preparedness and Response Officer April Baller wrote in the *PanAfrican Medical Journal* that Liberia's successful health care training, implemented as a response to Ebola, led to zero infections among the 20,000 health care workers who received this training. Dr. Fall detailed later health events in his 2019 analysis, noting how effective application of communication and containment measures led to reduced response times for minor measles and meningococcal disease outbreaks. These were lessons Liberia continued to apply when COVID-19 first hit the country in early 2020.

In a *Nature* interview, Mosoka Fallah, director of Liberia's National Public Health Institute, said that "the political will was there from the start" of COVID-19. This political will led to proactive measures implemented early by the Liberian health department. Dr. Impouma Benido, a WHO Africa director, described how Liberia enacted an Integrated Disease Surveillance and Response strategy on February 3, 2020, based on lessons from the Ebola epidemic. By February 21, about 90% of Liberia's health facilities had staff trained in COVID-19 surveillance. Within 35 days, testing capacity became available nationwide. Furthermore, Liberia launched a mass public information campaign in early March and supplemented it with public health regulations to reduce COVID-19's spread.

As a result, Liberia was successful for much of 2020 in containing the disease, with rates 22 times less than in the United States. However, like in other African countries, resource scarcity limited the impact of these preparatory measures. For example, COVID tests took a median of five days to return results, particularly problematic as initial symptom onset is when viral load is largest. While Liberia had early success, "persistent health systems' weaknesses and the unique nature of COVID-19" will continue to challenge Liberian COVID-19 outcomes, according to a 2021 WHO report.

Preparing for the Next Pandemic

The rapid global onset of COVID-19, coupled with its numerous and prolonged waves as the virus evolves, requires countries to have quick, adaptive, and sustained responses. There is simply no time to reinvent the wheel.

Africa has experienced over 10.7 million COVID-19 infections and more than 236,000 deaths on the continent as of January 2022, according to Reuters. According to USAID's COVID-19 Fact Sheet, more transmissible variants such as Delta and omicron, limited vaccine access and challenges with roll-out, fragile health care systems, and the beginning of winter in southern Africa have driven up cases and deaths. These issues will continue to prolong the COVID-19 pandemic in the region. Leveraging the lessons from prior pandemics and COVID-19 will continue to be critically important.

As seen from the cases of Rwanda, Zimbabwe, Mali, Guinea, and Liberia, adapting existing health infrastructure and IT systems, making sustained investments, reaching the public across channels and partnering across private, public, and social sectors will be essential to minimize COVID-19's effects on the region's people and economy as much as possible.

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THE LAUDER GLOBAL BUSINESS INSIGHT REPORT | 2022

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