A GLOBAL HEALTH THREAT SUCH AS COVID-19 REQUIRES A WELL-COORDINATED GLOBAL RESPONSE: FRONTLINE EXPERIENCES FROM RWANDA

We are living in a world that experiences, on average, 200 epidemic events per year. While most of them go unnoticed, some of them are big enough for us to realize that our lives have been affected, and some of them are large enough to paralyze our daily lives. COVID-19 is one of the three biggest tragedies that have affected my generation; following the HIV pandemic and the 1994 genocide against the Tutsis in Rwanda.

It started in December 2019 in the faraway city of Wuhan (China), ravaging further and faster beyond our expectations, leaving behind fear and panic, and finally it reached our Land of a Thousand Hills in March 2020. I remember that day as if it were yesterday: The State Minister in Charge of Primary Healthcare, accompanied by other senior officials, called us together. From the tone of his voice, it was obvious that something serious had happened. The globally feared disease had already reached us, and that meant we were switching from the phase of COVID-19 Pandemic Intelligence and Preparedness, as it was called, to the full-scale field operation of Rwanda's COVID-19 response.

Previous pandemics ensured Rwanda's preparedness to deal with COVID-19

2009 was an eye opener; when the H1N1 pandemic arrived in Rwanda in a similar manner and, before it progressed too far, the country activated a response mechanism which controlled the disease in a very timely fashion.

The frequently recurring Ebola epidemics in the neighboring country of the Democratic Republic of Congo have always served as a tragic opportunity for us to remain vigilant and learn how we would handle this

disease or any threat of similar magnitude. Rwanda had rolled out Ebola vaccination campaigns, healthcare personnel training and research. At the Centre Hospitalier Universitaire de Kigali (CHUK), where I am primarily based, as Coordinator of the Rapid Response Team for Ebola, I had the time and opportunity to revive my interest in the history of epidemics. I have no doubt that, before the COVID-19 era, all Rwandan healthcare personnel had learned at least one seemingly small yet important lesson when handling highly infectious diseases: there is a 'red zone' where infected patients are cared for and a 'green zone' from where the staff and other partners usually work.

COVID-19 arrived when we were completing one of our regular simulation exercises and drills for the Ebola response. These enable healthcare personnel to remain well informed, confident, and psychologically prepared to manage outbreaks caused by highly infectious pathogens such as the Ebola virus. Although Rwanda has never detected any case of Ebola virus disease, the knowledge and skills we gained through Ebola simulation exercises and drills have put us many steps ahead when comparable knowledge and skills were required to manage COVID-19.
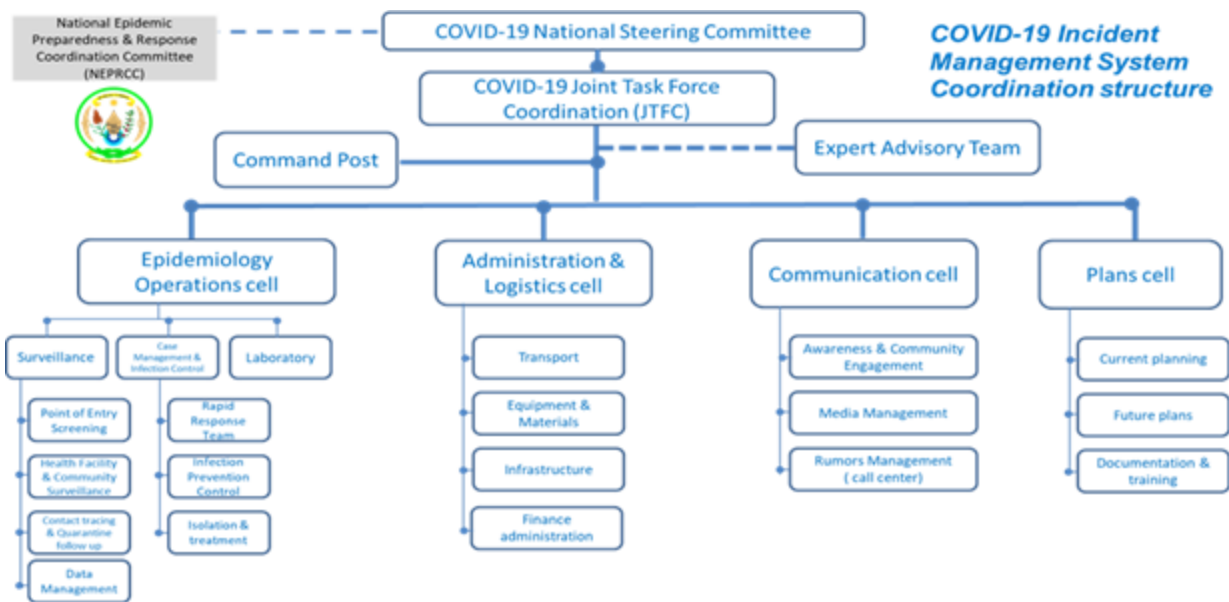
The Rwanda Joint Task Force for COVID-19

Epidemic intelligence, preparedness and response require a strong platform and real-time interactions between institutions beyond those in the health sector.

For some time now, Rwanda has had a well-designed structure to respond to any disease threat that could potentially disrupt public life, as was the case for COVID-19. From the very beginning, we met the pandemic head-on with a strong collaboration between the Ministry of Health, the Rwanda Biomedical Centre and a newly created and innovative multisectoral platform: The Rwanda Joint Task Force for COVID-19, operating from what was known as the Central Command Post. Having been in Rwanda for slightly more than ten years (returning from China, where I did my medical studies), I had not previously experienced the country's response to a major health risk; but I soon realised that Rwanda takes all public health threats very seriously.

Our country's leadership had set up a multidisciplinary and multisectoral structure (Figure 1 below) to ensure that the country could respond well to the three main pillars for controlling epidemics: (1) controlling the source of infection; (2) cutting-off the human-to-human transmission chain; and (3) protecting vulnerable populations. The structure was reviewed and adopted even before the first COVID-19 patient was identified in Rwanda. Staff were recruited from government institutions, the private sector and partner organizations such as the Center for Disease Control, the United Nations Children's Fund, the World Health Organization, and others. The COVID-19 response was to be rolled out in a phased approach, with nominees having full-time responsibilities, and all sitting together in Central Command Post Headquarters in Kigali. Response team members had to commit to being available for their respective roles on a full-time basis since tasks would increase as more COVID-19 patients were identified, and control measure were being adjusted accordingly.

Figure 1. The Structure of the Rwanda Joint Task Force for COVID-19

National Epidemic Preparedness & Response Coordination Committee (NEPRCC)

COVID-19 Incident Management System Coordination structure

COVID-19 National Steering Committee

COVID-19 Joint Task Force Coordination (JTFC)

Command Post

Expert Advisory Team

Epidemiology Operations cell
- Surveillance
  - Point of Entry Screening
  - Health Facility & Community Surveillance
  - Contact tracing & Quarantine follow up
  - Data Management
- Case Management & Infection Control
  - Rapid Response Team
  - Infection Prevention Control
  - Isolation & treatment
- Laboratory

Administration & Logistics cell
- Transport
- Equipment & Materials
- Infrastructure
- Finance administration

Communication cell
- Awareness & Community Engagement
- Media Management
- Rumors Management (call center)

Plans cell
- Current planning
- Future plans
- Documentation & training

The key measures that were taken to respond quickly during the first and second wave of the disease

As was the case in several countries, a window period was given to anyone who wished to return to Rwanda before the first key response measure had to be implemented: the closure of Kigali International Airport.

This was a critical time when we needed to screen all incoming travellers for COVID-19, while at the same time implementing contact tracing in order to identify people who would need to be tested for COVID-19. I remember that certain flights had a high number of coronavirus-infected people on board, to the extent that a decision was quickly made to put all returnees in quarantine regardless of whether or not they demonstrated typical signs of COVID-19. They were housed in government-designated facilities free of charge, and tested both on arrival and at the end of their quarantine. Similarly, we also tested all airport departures to ensure that we were not threatening other countries by sending them travellers with COVID-19.

Contact tracing and testing would have been difficult without our highly competent Data Science Team, who provided all the data needed to re-calibrate the COVID-19 response in different districts of Rwanda. Their main role was to assist in mapping the locations where we found the positive cases, with full geospatial data, link them to their contacts using telephone network signals and produce a daily dashboard to guide the decision on whether or not we needed to institute a lockdown, and where and when to implement it.

We relied heavily on technology to support the COVID-19 response, such as using drones to continue essential services (i.e., medication deliveries during lockdown) and deliver messages on how to prevent COVID-19 in our communities. We used robots to assist in clinical areas such as temperature-taking in the red zone, delivery of drinking water, medications and other functions. We also used 'Weltel' platforms through mobile phones (also used in the HIV response) to follow up contacts to detect when they developed symptoms which would indicate that they needed a COVID-19 test.

Like many countries in Sub-Saharan Africa, Rwanda has a limited number of healthcare professionals, despite its existing health priorities. When COVID-19 arrived as a top priority among other pressing needs, the shortage of staff became even more pronounced. However, it is not only about how many staff you have but also about how they should work. The Rwanda Medical Association has been active in mobilizing doctors to take on as many responsibilities as possible to enable us to address the pandemic. A recent initiative, 'Operation Save the Neighbour', was launched in Gasabo District to enable doctors and

nurses to work in the communities where they live, following up COVID-19 patients in home-based care in their neighbourhood. Several other medical societies also boosted healthcare workers' understanding of how COVID-19 interacts with other co-morbidities, and other specific healthcare needs (i.e., coronavirus in children, pregnant women, patients needing emergency surgical services, and so on).

The major factors that helped us to control the pandemic

Examples of good practice include the ability to bring together and collaborate with several diverse stakeholders as one team in a well-delineated geographical location; and the active participation of the private sector as part of the response team.

A notable feature has been the role played by the Rwandan leadership in the response. The President guided all the operations of the Central Command Post and visited in person to reassure us of his full support, saying we should do everything that is needed to slow down the pandemic, and that we should request any available resources that would make our tasks easier. Ministers, State Ministers and Permanent Secretaries were all assigned to COVID-19 quarantine and isolation sites to follow their daily activities and ensure that things ran smoothly and that we had everything that was needed, be it meals, deliveries, linen, medical visits, provision of medications, housekeeping, logistics and so forth. When I was deployed to Rusizi (Western Province), I found the Permanent Secretary of the Ministry of Local Government had been sent there months before me, to live there as long as was necessary to manage the control of transmission in that area. He participated in all COVID-19 activities, from Monday to Sunday, as long and often as was needed.

All decisions were people-centred, based on transparency in data sharing and in-depth consultation with beneficiaries ? the Rwandan population. The response was further strengthened by a robust social protection framework (i.e., distribution of food to the most vulnerable and affected communities, childcare for children left behind when their parents had to be put into isolation or COVID-19 treatment centres, etc.): all difficult decisions that required the support of the people if lockdown measures were to be strictly adhered to.

Weekly Scientific Advisory Group (SAG) meetings provided a friendly environment to share reviews of scientific data on this novel disease. Importantly, all decisions made by our leadership were based on scientific facts that had been thoroughly discussed in the SAG meetings.

A summary of the latest relevant data is published by the Ministry of Health every evening on the Twitter handle @RwandaHealth with updated numbers, as per Figure 2 from 4 March 2021:

Figure 2: Latest figures on COIV-19 in Rwanda

Amakuru mashya | Updates | Mise à jour

COVID-19 04 03 2021

Abanduye bose **Total cases** Bilan total	19,334 (+146)	
Abakize **Recovered** Rétablis	17,682 (+113)	
Abakirwaye **Active cases** Cas actifs	1,396	
Abarembye **In critical condition** En état critique	11	
Ibipimo **Tests** Testés	1,025,213 (+4,224)	
Test positivity rate Ijanisha ku bandura Taux de positivité	3.4%	
Ijanisha ku bakira **Recovery rate** Taux de guérison	91.4%	
Abapfuye **Deaths** Décès	266 (+1) 1.4%	

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www.rbc.gov.rw

As the leader of national-level case management, I was often required to provide highlights on patients' clinical conditions, outcomes of care and ideas for better curative approaches, such as promising drugs being trialled. In October 2020, we issued the Third Edition of Clinical Management Guidelines and soon we will have to decide on the key new information on COVID-19 for the Fourth Edition. In terms of therapeutic updates, we have recently used the drug Favipiravir with very satisfactory results in terms of the time needed for the patient taking the drug to be virus-free. This drug was especially suitable for those patients who are asymptomatic, or with mild disease or for moderate cases at an early stage. COVID-19 intensive clinical care required our biomedical engineers to become involved, especially those specialized in critical care and respiratory care equipment. This was a significant contribution to the clinical management of COVID-19 in Rwanda.

Key challenges for the global COVID-19 response

Looking back to June 2020 when south-west Rwanda was struggling with wide-spread community transmission of COVID-19 due to a high rate of infected cross-border truck drivers, I must admit that cross-border collaboration could have been better. The general population were confused in the differences in preventive measures with neighboring countries and this resulted in policies that were not well aligned and adversely affected movements between countries.

Another way of determining if the virus is moving from one location to another, or otherwise linked, is by sequencing to determine those genomic details. It is an expensive technology and not all countries have that kind of laboratory capacity. This is a challenge for countries without access to genomic surveillance data and unable to run such tests themselves. Some countries were grouped together and ran a few samples as part of the genomic surveillance: but we could do better not only by doing more but also by encouraging countries to better interpret the obtained data. In Rwanda, we have started doing the viral sequencing to obtain those genomic details and there is a gradual increase in capacity building in this

domain. We collectively missed an earlier opportunity to interpret the data in a positive way; but we now realize how they can help us to better understand this disease, especially as lockdowns gradually ease and international travel is resumed. A strict international travel policy and a robust understanding of population movements are key in disease responses.

The World Health Organization and other health service organisations would do well to find a way to avoid naming variants after countries (South African strain, the UK strain, etc.). This has created an unnecessary and preventable stigma that threatened to curtail the use of advanced scientific details such as that obtained through COVID-19 genomic data. The scientific contradictions arising from such unhealthy strain-naming often create a confusing environment that could delay important decision-making, not only for COVID-19 but also for other future pandemics.

The world is now blessed with the availability of promising new vaccines. At the time of writing, I have not yet received my shot but my fellow frontline colleagues have already started to be vaccinated. The number of vaccinated Rwandans will continue to increase until we reach a level that will stave off COVID-19 in Rwanda, the so-called 'herd immunity'. I wish the same for our region, the African continent and the world in general, because as WHO has said: no one should feel safe until all countries have received the vaccines up to the agreed proportion (ideally, 60% of the population). We must all strive to promote an equitable share of the available vaccines at a pace that is able to protect us from COVID-19 in a world that is tightly inter-connected (the 'Global Village').

As Peter Piot says: "Epidemics on the other side of the world are a threat to us all. No epidemic is just local".

Photo capture: Myself on the boat, on a working visit to Nkombo Island (Rusizi District); reaching out to remote areas for COVID-19 prevention.

Photo capture: Removal of Personal Protective Equipments (PPEs) after an intervention on Nkombo Island (Rusizi District).

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Further reading:

- COVID-19 in Rwanda: A country's response COVID-19 in Rwanda: A country's response | WHO | Regional Office for Africa
- COVID-19 Clinical Management Guidelines in Rwanda COVID-19 Clinical Management guidelines.pdf (rbc.gov.rw)
- COVID-19 Home Based Care in Rwanda : Home Based Care (rbc.gov.rw)
- Info Note For Passengers Arriving Or Departing From Rwanda : Info Note For Passengers (rbc.gov.rw)
- WelTel Digitally Supported Patient Care Home – WelTel

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