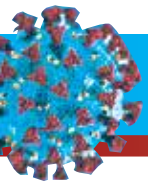


COVID-19

ISSUE PAPER

UGANDA'S PREPAREDNESS FOR EQUITABLE ACCESS TO COVID-19 MEDICAL PRODUCTS

SUMMARY

The World Health Organization (WHO) emphasizes and provides global guidance for the equitable deployment of COVID-19 medical products, including diagnostics, vaccines and therapeutics (DVT) and personal protective equipment (PPE). At the national level, Ministry of Health guidelines list the recommended DVT and PPE for prevention, diagnosis and management of COVID-19 in Uganda.

Unfortunately, Uganda has faced a chronic shortage DVT and PPE as the country battles a virulent second wave of infections. Hospitals have reported shortages of gloves, face masks, face shields, aprons, medical oxygen, among other. National stocks of laboratory items and PPE for health workers have all been low the target of a minimum of two months' supply.

The country has been unable to secure sufficient quantities of vaccines, including through the collaborations that have been established at the global and regional levels to facilitate access to COVID-19 vaccines. COVAX has been unreliable due to vaccine panic buying and hoarding by wealthy countries of the Global North. This has been exacerbated by lack of leadership of the response on the part of Government of Uganda; limited cold chain capacity, extravagance and inefficiency in procurement; scanty service sites; inadequate human resources and skills, limited involvement of the private sector; and lack of awareness and negative attitudes.

GOU and development partners need to invest more in the response, particularly in the health system's capacities, including laboratories, human resources, intensive care units, oxygen production, vaccine cold chain, and diagnostics, medicines and supplies.

Ministry of Health should ensure the meaningful participation and engagement of communities, including vulnerable populations, the private sector and civil society groups, and decentralize some services to general hospitals to improve access.

All vaccines currently in use across the globe should be granted emergency use approval to broaden options; efficiency and integrity in procurement should be enhanced; local research and development should be encouraged; and the private sector should be supported to provide affordable diagnosis, vaccination and treatment, including DVT and PPE.

INTRODUCTION

The coronavirus disease COVID-19 was first reported in the Chinese city of Wuhan in December 2019 and has since spread with alarming speed to all parts of the world, causing millions of deaths and unprecedented disruption to livelihoods.[1] The emergency response to the deadly disease began with restrictions on movement and social gatherings, but is increasingly focusing on effective care for critical cases and mass vaccinations.[2] So far, COVID-19 has been a moving target: At one time, it was all about ventilators, then it was all about test kits and therapeutics; today it is about vaccines.[3]

1.2% of Ugandans can be vaccinated with vaccines so far available (9 July 2021). On average, 12,590 shots are administered daily: at this rate, we will need 2 years to vaccinate 10% of the population

1 ILO, FAO, IFAD and WHO (2020). Impact of COVID-19 on people's livelihoods, their health and our food systems. Joint statement, 13 October 2020. https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems

2 Leslie A. Reperant and Albert D.M.E. Outerhaus (2021). COVID-19 vaccination and critical care capacity: Perilous months ahead. *PubMed*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7945870/

3 Zachary Donnenfeld (2021). Africa Medical Supplies Platform: A model for the world? *ISS Today*, Institute for Security Studies. https://issafrica.org/iss-today/africa-medical-supplies-platform-a-model-for-the-world

Diagnostics, vaccines and therapeutics (DVT) and personal protective equipment (PPE) play a critical role in epidemic control

Realising the critical role of diagnostics, vaccines and therapeutics (DVT) and personal protective equipment (PPE) in epidemic control, the global community[4] has made efforts to ensure access to these medical products for prevention and management of COVID-19. In 2020, global health actors launched the Access to COVID-19 Tools (ACT) Accelerator to lead the development, production and equitable access to COVID-19 medical products.

The COVAX Facility is the ACT Accelerator's vaccine arm, whose mandate is to "maximize the chances" of people in beneficiary countries getting access to COVID-19 vaccines as quickly, fairly and safely as possible.[5]

At the continental level, the Africa Centres for Disease Control and Prevention (Africa CDC) established the Africa Medical Supplies Platform (AMSP) in March 2020 as "an immediate, integrated and practical" response to the COVID-19 pandemic. Its mandate is to link with manufacturers and procurement partners to enable member states of the African Union (AU) to purchase certified medical equipment, including diagnostic kits, PPE and clinical management devices with promptness, cost effectiveness and transparency.[6]

In April 2021, Africa CDC launched the Partnerships for African Vaccine Manufacturing (PAVM) as part of AU's ambition to manufacture at least 60% of the continent's vaccine needs by 2040.

As part of an effort to ensure that Uganda not only maximises the chances of not only benefiting from these global and regional initiatives but also invests internal resources into the control and prevention of COVID-19, HEPS-Uganda, with financial support from the Foundation for Open Society Initiative (OSI), launched a project to strengthen Uganda's civil society advocacy response to the pandemic. HEPS accordingly undertook a rapid assessment of the country's readiness to ensure equitable access to COVID-19 medical products.

Basing on results from the rapid assessment, this paper highlights the key gaps in the country's readiness and makes advocacy recommendations to achieve equity in access to essential DVT and PPE for a human rights-based response to the COVID-19 pandemic in Uganda.

STATEMENT OF THE PROBLEM

84,140
cumulative cases; 2,064 deaths (MOH, 9 July 2021). Hospitals across the country have reported shortage of DVT and PPE

Uganda is one of the countries that had the least COVID-19 cases in the first wave of infections, with 41,905 positive cases registered, 41,422 recoveries and 342 deaths as of April 29, 2021.[7] However, cases shot-up in a more virulent second wave as different variants of the virus were reported across the country, with tests posting a scary positivity rate of 17.1%, cumulative cases reaching an estimated 73,401, and deaths getting to 714 as of June 22, 2021. As of 9 July 2021, a cumulative total of 84,140 cases had been reported with 2,064 deaths.[8]

Although the country has been one of the worst hit in Africa, and is a beneficiary of global and regional collaborations as well as bilateral donations, there has been a critical shortage of DVT and PPE. As of 9 July 2021, only 1,379,070 people had been tested, and only 1,058,084 doses of vaccines – enough for only 1.2% of the population (assuming two jabs per person) – had been administered.[9]

4 ACT Accelerator is a collaboration of governments, scientists, businesses, civil society and philanthropists and global health organizations, including the Gates Foundation, CEPI, FIND, Gavi, Global Fund, Unitaid, Wellcome, WHO and World Bank
5 World Health Organization, 2021. Therapeutics and COVID 19; Living guideline. www.who.int
6 Africa Medical Suppliers Platform (website). https://amsp.africa/about-us/
7 Government of Uganda, 2020. COVID-19 Response INFO Hub. https://covid19.gou.go.ug/
8 Ministry of Health Coronavirus (pandemic) Covid-19 information portal. https://www.health.go.ug/covid/
9 Ministry of Health Coronavirus (pandemic) Covid-19 information portal. https://www.health.go.ug/covid/

For instance, during the first week of July 2021, an average of 12,590 vaccine shots were administered each day. At this rate, it required a further 704 days – nearly two years – to administer enough doses for another 10% of the population.[10] Yet, according to World Health Organization (WHO), a substantial proportion of a population – estimated at 60% – need to be vaccinated to achieve herd immunity against COVID-19.[11]

700 million vaccine doses were pledged to Africa by December 2020, but six months later – at mid-year 2021 – Africa had received only 65 million doses overall

The COVAX project aims, among others, to vaccinate at least 20% of the population in eligible countries 'as soon as [vaccines] are available'.[12] While it is a laudable effort, COVAX has fallen short of even this modest target. On 1 July 2021, the leading funder of AMSP and AU's special envoy tasked with leading efforts to procure COVID-19 vaccines for the continent Strive Masiyiwa stated that "not one dose, not one vial, has left a European factory for Africa".[13]

COVAX had pledged to deliver 700 million vaccine doses to Africa by December 2020, but six months later – at mid-year 2021 – Africa had received just 65 million doses overall, out of which less than 50 million had been received via COVAX. The continent needs 1.6 billion doses in a double-dose regime or 800 million for a single-dose regime, to meet the goal of vaccinating 60% of the population.

Uganda submitted an application on 7 December 2020 for 18 million doses of the vaccine through COVAX,[14] but six months later COVAX had only tentatively allocated 3,552,000 doses to the country, according to Ministry of Health. The first batch of 864,000 doses of the vaccine was received on 5 March 2021 and subsequent deliveries were expected by June 2021.[15]

Similarly, there has been a shortage of diagnostics. For instance, by 25 July 2020, the stock status of laboratory items at national level was below the target of two months of stock.[16]

COVID-19 test kits months of stock (central level) as of 25 July 2020

Item	Month of stock (central level)	Pipeline month of stock
Open System (ABI- 7500 SARS COV-2 test) [1 test]	0.13	1.85
SARS-CoV-2 RT-PCR Kit 1.0 [96 tests]	0.31	1.45
Nasopharyngeal swab with Transport Media	0.48	1.18

For instance, Mutukula Point of Entry (PoE) laboratory experienced limited stock and eventual stock-out of reagents at the peak of the first wave of the COVID-19 pandemic in Uganda.[17]

10 Reuters COVID-19 tracker. https://graphics.reuters.com/world-coronavirus-tracker-and-maps/countries-and-territories/uganda/

11 WHO (2020). Coronavirus disease (COVID-19): Herd immunity, lockdowns and COVID-19. https://www.who.int/news-room/q-a-detail/herd-immunity-lockdowns-and-covid-19

12 Zachary Donnenfeld (2021). Africa Medical Supplies Platform: A model for the world? *ISS Today*, Institute for Security Studies. https://issafrica.org/iss-today/africa-medical-supplies-platform-a-model-for-the-world

13 Cara Anna (2021). Africa's COVID-19 envoy blasts EU, COVAX over vaccine crisis. *Associated Press*, 1 July 2021.

14 Ministry of Health (2021). Press statement; Update on COVID-19 response in Uganda, 11 Febuary 2021

15 GoU and COVAX, 2021. Joint Press Release; Uganda receives 864,000 doses of COVID-19 vaccines

16 Ministry of Health (2020). COVID-19 Situation Report. 25 July 2020.

17 Minstry of Finance,Planning and Economic Development (2020). COVID-19 Interventions Report

Stock-out of test kits at Mutukula Point of Entry laboratory

Date	Action
2 July 2020	Suspended testing for non-truck drivers
30 July 2020	Suspended Central and South-Central testing other than those from Mutukula
3 July 2020	Only selected especially truck drivers being tested
17 August 2020	Complete suspension of testing

5,000,000 ugx per day in private hospitals: access to COVID-19 treatment is unaffordable to the average Ugandan.

Inadequate stock at central level leads to stock-outs at service points and hence people who require the tests will not be able to access them.

Within this shortage, it is critical that COVID-19 control measures are equitable and inclusive, and the needs of vulnerable people, such as the poor, homeless, unemployed, persons with disabilities, elderly and others, are considered, for the response to be effective.[18]

Access to COVID-19 treatment has been unaffordable, especially in the private sector. Following public outcry and a petition by activists, on 8 July 2021, Uganda's Constitutional Court ordered the country's Ministry of Health to ensure private hospitals charge "reasonable fees" for treatment and management of COVID-19 patients.[19] By the time of writing this paper, the Court Order was yet to be implemented.

OBJECTIVES OF THE PAPER

The overall objective of our advocacy around the COVID-19 pandemic is to contribute to improved access to commodities for the prevention, diagnosis, management and control of COVID-19 in Uganda, and to ensure that access is such commodities is equitable and inclusive of the affected people, populations at high risk and other vulnerable people. We undertook a rapid assessment which aimed to examine the preparedness for equitable access to COVID-19 medical products (DVT and PPE), including financing, procurement, and the supply chain. We attempted to identify opportunities to overcome the identified challenges to access COVID-19 medical products.

18 Zackary D Berger, Nicholas G Evans, Alexandra L Phelan, and Ross D Silverman (2020). Covid-19: control measures must be equitable and inclusive. *BMJ* 2020;368:m1141. https://www.bmj.com/content/368/bmj.m1141

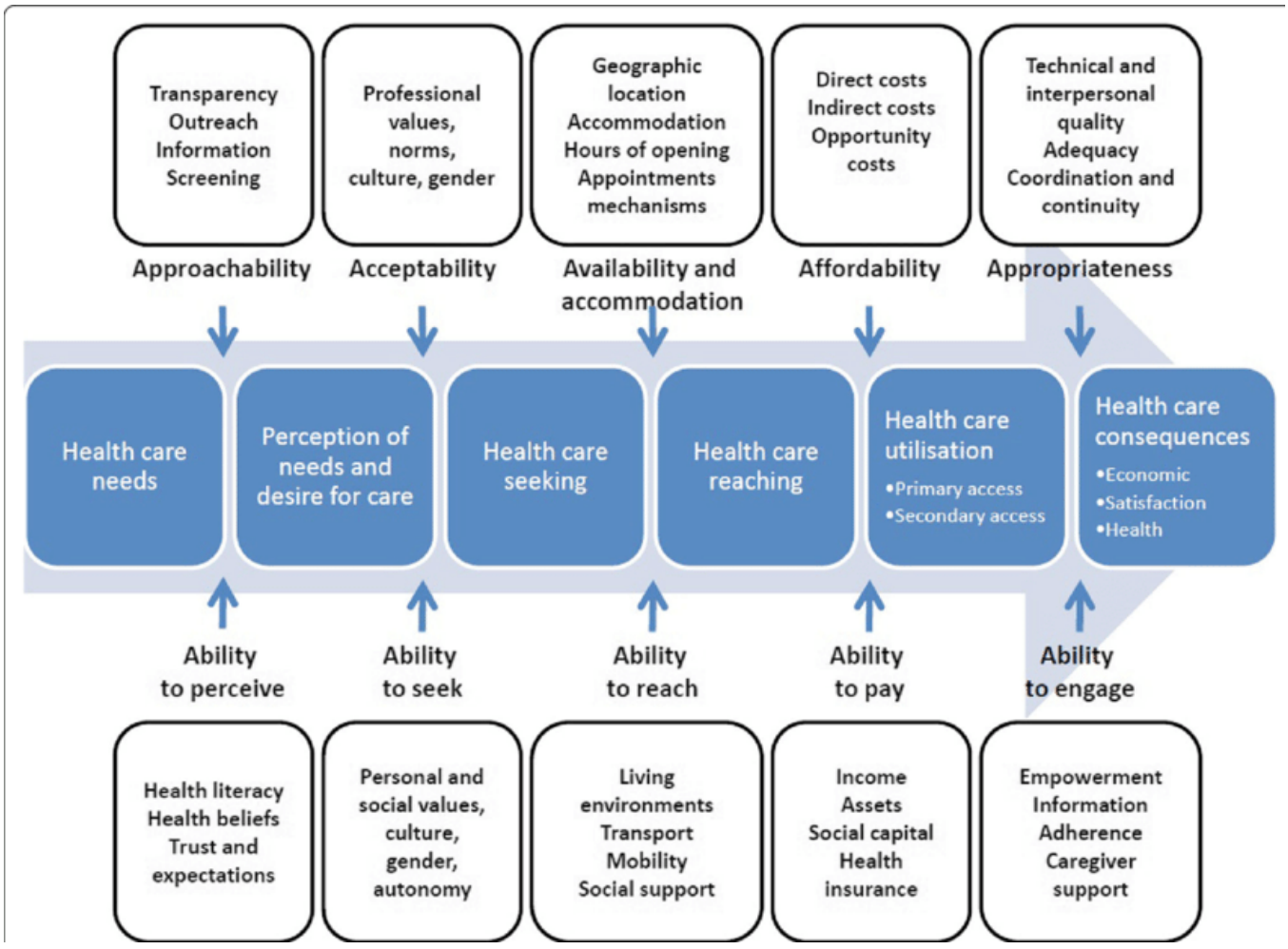
19 CEHURD (2021). In victory for health rights: Uganda's high court orders government to regulate COVID-19 treatment costs. https://www.cehurd.org/cehurds-statement-in-victory-for-health-rights-ugandas-high-court-orders-government-to-regulate-covid-19-treatment-costs/

THE CONCEPT OF EQUITY IN HEALTH

According to WHO[20], equity in health means that health care resources are allocated according to need; health care is provided in response to legitimate expectations of beneficiaries; and that payment for health care is made according to the ability to pay.[21]

Equity in health also means that all people have access to a minimum standard of health services if and when required, irrespective of their economic, social and demographic circumstances.[22]

On the other hand, access is the ability to identify healthcare needs; to seek, reach, obtain and use health care services; and to actually have the need for services fulfilled.[23] This study adopted five dimensions of accessibility as expounded by Levesque and colleagues[24]: approachability, acceptability, availability and accommodation, affordability, and appropriateness.



20 WHO (2000). Equity in Access to Public Health. New Delhi: World Health Organization.

21 WHO (2000). Equity in Access to Public Health. New Delhi: World Health Organization.

22 Davari, M., Khorasani, E., Bakhizade, Z., Jafarian, M., Darab, M., & Maracy, M. (2015). Measuring Equity in Access to Pharmaceutical Services Using Concentration Curve; Model Development. *Iran Journal of Pharmaceutical Research , 14* (4), 1317-1326.

23 Levesque, JF., Harris, M.F. & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *Int J Equity Health* 12**,** 18 (2013). https://doi.org/10.1186/1475-9276-12-18

24 Levesque, JF., Harris, M.F. & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *Int J Equity Health* 12**,** 18 (2013). https://doi.org/10.1186/1475-9276-12-18

Equitable access to COVID-19 DVT has been taken to mean that the products are available everywhere, regardless of where they have been developed or who funded them; appropriate options exist for all healthcare settings, whether in low- or high-income countries; safe and effective options reach all groups of people, regardless of race, age or other demographics; and that they are affordable to poor and rich countries alike and not only to those who can pay the most.[25]

NORMATIVE GUIDANCE ON COVID-19 MEDICAL PRODUCTS

WHO: There is an urgent global need to develop effective and safe vaccines and to make them available at scale and equitably across all countries.

WHO has provided technical, policy and clinical guidance, including tools for planning, training and monitoring the control, prevention and management of COVID-19 at different levels. The COVID-19 Strategic Preparedness and Response Plan (SPRP) of February 2021 and its Operational Plan provide guidance on the public health response to COVID-19 at national and sub-national levels. One of the focus areas of the 2021 SPRP is ensuring that capacities are in place in all countries to equitably deploy COVID-19 DVT.

On its part, the COVID-19 Operational Plan sets out the key actions and measures to be taken at national and sub-national level to ensure a comprehensive and effective response to COVID-19, including the implementation of new vaccines, therapeutics, and diagnostics in every country and context, including the most challenging and under-resourced contexts.

The COVID-19 SPRP 2021 and Operational Plan recommend that all countries conduct a substantive gender, equity and inclusion analysis, in line with existing human rights frameworks, to inform programming. In the twin documents, WHO recommends that gender equality, health equity and human rights should be mainstreamed in operations from the outset of program design, planning and implementation to ensure gender-responsive and equity-oriented programming, monitoring, impact assessment and reporting.

In addition, the SPRP emphasizes meaningful participation, collaboration and consultation with population groups experiencing poverty and social exclusion, frontline workers including female healthcare workers, women-led organisations, affected communities including women and adolescent girls, and those facing vulnerabilities, discrimination and additional barriers to access services.

Our rapid assessment focused on selected indicators from WHO's global guidance tools for preparedness and response to COVID-19 to collect data on key activities related to COVID-19 tools (DVT and PPE) under the following pillars:

1) Surveillance, rapid-response teams, and case investigation;
2) Points of entry;
3) National laboratories;
4) Infection prevention and control;
5) Case management; and
6) Operations support and logistics.

Data on access to vaccines was collected on the implementation of key activities as prescribed in WHO's COVID-19 vaccine introduction readiness assessment tool:

1) Planning and coordination
2) Resources and funding
3) Regulation
4) Prioritization, targeting and surveillance
5) Service delivery
6) Training and supervision
7) Monitoring and evaluation
8) Vaccine, cold chain and logistics
9) Safety surveillance
10) Demand generation and communication.

25 Wellcome (2020). Wellcome. https://wellcome.org/what-we-do/our-work/coronavirus-covid-19/access

NATIONAL POLICIES AND GUIDELINES

Ministry of Health recommends a set of DVT and PPE for prevention, diagnosis and management of COVID-19 in Uganda. The Uganda National Guidelines for Management of COVID-19 recommend use of the following items depending on severity of illness or exposure to infection.

DVT and PPE recommended for use in Uganda

Therapeutics	PPE	Diagnostics
Paracetamol, Hydroxychloroquine, Amoxicillin, Zinc, Azithromycin, Intravenous Vit C, statins, Oxygen, IV Ceftriaxone, IV Ampicillin, Amoxicillin-Clavulanic acid, IM/IV Gentamicin, IV Norepinephrine, IV Epinephrine Dobutamine	Medical masks are needed during patient interaction without contact. Facial protection, gown, apron, gloves, medical mask, gum boots are required for tasks that involve contact with patients while N95 mask is also required when in Risk of Aerosols with or without patient contact. Heavy duty rubber gloves and alcohol-based disinfectants for cleaning purposes.	PCR for diagnosis of COVID. RDT is used for surveillance in the communities.

The policy guidelines prescribe the testing of only people with symptoms and those at high risk (e.g. health workers, in-patients, contacts of a confirmed case, returnees from overseas) undermines equitable access to diagnostics and testing.[26] The rationale of the policy is to target the limited resources to where there is greatest need since the country is unable to carry out extensive testing of the population.

Ministry of Health and laboratories should identify additional methods of testing beyond RT-PCR, such as the use of antigen rapid diagnostic tests (RDTs) at points of care to increase access to Coronavirus tests.

GOU recommended the use of non-medical masks made of fabric by non-medical personnel to maximise the availability PPE for medical workers. Subsequently, GOU exempt items used by medical workers in the treatment of COVID-19 from taxes.

GOU also exempted disposable medical face masks, re-usable face masks made of fabric, face shields and the raw materials used in making them from taxes. The others are non-woven surgical caps, protective goggles with indirect side ventilation, biohazard bags, disinfectants and sanitizers.

FINANCING OF DVT AND PPE

There has been very limited investment in COVID-19 DVT and PPE by GOU and development partners. According to Uganda's national SPRP, the funding requirement for FY2020/21 for laboratory and surveillance is projected at about USD 22 million, of which there is a funding gap of up to USD 8.4 million (38%).[27]

The civil society should advocate for national leadership of the national response to COVID-19 by GOU through investment in DVT and PPE, and other interventions needed for an effective response.

Uganda subscribes to COVAX, so far the only global initiative that is working with governments and manufacturers to ensure COVID-19 vaccines are available worldwide to both high-income and low-income countries. However, it is evident that Uganda is yet to make full use of these collaborations to ensure equitable access to COVID-19 vaccines.

That said, the country has tethered all hopes for vaccines on donations and self-financing from COVAX and donations from bilateral and private donors.[28]

26 Roser, M., Ritchie, H., Ortiz-Ospina, E., & Hasell, J. (2020). Coronavirus Pandemic (COVID-19). OurWorldInData.org. https://ourworldindata.org/coronavirus#citation

27 MOH (2020). COVID-19 Preparedness and Response Plan March 2020-June 2021

28 MOH (2021). Update on COVID-19 response in Uganda. Press statement, 11 February 2021

Developed countries must work within the COVAX facility arrangements when placing orders for COVID-19 vaccines and desist from "vaccine nationalism" and other selfish tendencies.

In addition, some developed countries subscribing to COVAX are stuck to "vaccine nationalism" by making direct agreements with the manufacturers to access the vaccines before it becomes available to other countries, rather than through COVAX. This has undermined the COVAX facility's intention to equitably allocate vaccines to all countries.

RESEARCH AND DEVELOPMENT

As of 4 May 2021, there were 280 vaccine candidates in development [29], and more than half a dozen vaccines were in emergency use across the world, even though some had not gone through WHO's emergency-use and pre-qualification evaluation process. WHO had given "emergency-use listings" to vaccines from Pfizer BioNTech, SK BIO, AstraZeneca/ Oxford University, and Serum Institute of India.[30] None of the current COVID-19 vaccines has been developed or manufactured in Africa.

However, there has been some effort to develop DVT and PPE in Uganda. On 27 January 2021, Mulago Hospital launched a clinical trial of a herbal COVID-19 medication named UBV-01N.[31]

On March 17, 2021, a locally-made COVID-19 antigen RDT test kit (swab tube dipstick agglutination test kit) was launched. The kit is expected to be sold at a relatively more affordable price (approximately one USD). However, at the time of our assessment, there was no information on when mass production of these kits would start.

In June 2021, a pathologist at Mbarara University of Science and Technology, Prof. Patrick Ogwang, launched an herbal remedy named Covidex that quickly became popular and expensive after National Drug Authority (NDA) approved its emergency use in the management of COVID-19.[32]

In early July, researchers at the Gulu University's faculty of Bio-technology and Pharmaceutical Studies (PharmBiotec) came to the limelight with another COVID-19 herbal remedy named Covilyce. However, the researcher did not have funding at the time to produce commercial quantities even though there was high demand.[33]

Government of Uganda and partners of the East African Community and the African Union should collaborate to invest in R&D by pooling resources to facilitate local inventors and production.

It is notable that while there have been some effort to develop COVID-19 DVT and PPE, there has not been much public investments in local research and development (R&D).

Strict protection of intellectual property rights (IPRs), particularly patents on vaccines and diagnostic commodities, undermines rapid scale up of production and access to life-saving medical products. Given that patents are intended to provide market monopoly rights, they are obviously a prime possible concern.[34]

29 WHO (2021). Draft landscape and tracker of COVID-19 candidate vaccines. https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

30 WHO (2021). Coronavirus disease (COVID-19): Vaccines. https://www.who.int/news-room/q-a-detail/coronavirus-disease-(covid-19)-vaccines

31 Uganda Virus Research Institute (2021). Uganda successfully joins trials race for coronavirus drug. https://www.uvri.go.ug/news/uganda-successfully-joins-trials-race-coronavirus-drug

32 Godfrey Olukya (2021). Ugandan-made COVID drug now on black market. *AA*, 6 July 2021. https://www.aa.com.tr/en/africa/ugandan-made-covid-drug-now-on-black-market/2295296

33 Caroline Ayugi, Tobias Jolly Owiny and Tonny Abet (2021). Govt blocks Gulu varsity Covid drug. *Daily Monitor*, 14 July 2021. https://www.monitor.co.ug/uganda/news/national/govt-blocks-gulu-varsity-covid-drug-3472632

34 Christopher Garrison (2004). Intellectual property rights and vaccines in developing countries. *Background paper for WHO workshop, 19-20 April 2004*. https://www.who.int/intellectualproperty/events/en/Background_paper.pdf?ua=1

Some developed countries have opposed a proposal sponsored by India and South Africa to waive patents on COVID-19 DVT to facilitate the production of generic vaccines so as to increase supply, lower prices and increase access.[35] More than 100 countries that are members of the World Trade Organisation (WTO), including the United States (US), have backed the proposal.[36]

In a statement issued on 05 May 2021, the US WTO envoy stated: "This is a global health crisis, and the extraordinary circumstances of the COVID-19 pandemic call for extraordinary measures. The (Biden) Administration believes strongly in intellectual property protections, but in service of ending this pandemic, supports the waiver of those protections for COVID-19 vaccines."

Government of Uganda should support the proposal of waiving patents on COVID-19 DVT and PPE at the World Trade Organization for purposes of containing the COVID-19 pandemic.

PROCUREMENT AND SUPPLY MANAGEMENT

Africa CDC launched the Partnership to Accelerate COVID-19 Testing including utilising pooled procurement.[37] The aim was to mitigate the effects of competition for COVID-19 DVT and PPE with wealthy nations. However, there is no evidence so far that Uganda has utilised this partnership and benefited from continent-wide economies of scale.

On 5 June 2020, Ministry of Health published the following unit costs (including shipping charges) of COVID-19 test kits: Altona PCR kits USD 25; GeneXpert kits USD 19.8; ABI kits USD 17.2; COBAS 6800/8800 kits USD 18.9; and RDT kits USD 5.[38] There have been complaints about high charges for COVID-19 tests.[39]

Africa CDC in February 2021 provided guidance for African countries to utilise antigen RDTs in testing to be able to increase testing capacity. Uganda should follow the guidance and increase use of antigen RDT tests.

RDTs are the most affordable among the diagnostics on the market, and have the advantage of being usable in settings that do not have laboratory facilities. However, Ministry of Health recommends that RDTs should be used only for community surveillance and research, given their unreliability.[40] The only recommended diagnostic test for COVID-19 in Uganda, as of 30 June 2021, is the RT-PCR test.[41]

SERVICE DELIVERY CHALLENGES

High cost of COVID-19 DVT and PPE: The total cost of conducting each PCR test is as high as USD 65.[42] PCR tests involve sample collection, transportation media and triple packaging which Ministry of Health estimates to cost USD 36 per person.

Advocate for policies to prevent illicit profiteering through hiking prices and hoarding of life saving Pharmaceuticals in Uganda especially in the face of a public health emergency and or pandemic.

Given the high cost of the tests, GOU introduced user fees of USD 50-65 for certain categories of clients, including organizations seeking to test their staff, truck drivers, private clients, and travellers. Private tests were charged USD 50 in public facilities.

In August 2020, the media[43] reported that some private laboratories were charging up to UGX 330,000 (USD 89) per test.

35 Medicins Sans Frontieres (MSF, 2021). Access to medicines. https://www.msf.org/photo-story-year-coronavirus-pandemic-response

36 BBC (2021). Covid: US backs waiver on vaccine patents to boost supply. BBC, 6 May 2021. https://www.bbc.com/news/world-us-canada-57004302

37 Ondoa, P., Kebede, Y., Loembe, M; Bhiman, J., Tessema, S. & Sow, A. (2020). COVID-19 testing in Africa: Lessons learnt. *Elsevier*

38 MOH (2020). Ministry of Health Clarification on cost of COVID 19 Testing. Press Release, 5 June 2020. https://www.health.go.ug/cause/ministry-of-health-clarification-on-cost-of-covid-19-testing/

39 Halima Athumani (2020). Uganda cuts cost of COVID test from $65 to $50. *Voice of America*, 24 October 2020. https://www.voanews.com/africa/uganda-cuts-cost-covid-test-65-50

40 Nalumansi, A; Lutalo, T; Kayiwa, John; Watera, Christine; Balinandi, S (2020). Field evaluation of the performance of a SARS-CoV-2 antigen rapid diagnostic test in Uganda using nasopharyngeal samples

41 GOU (2020). COVID-19 Response INFO Hub. https://covid19.gou.go.ug/

42 MOH (2020). http://www.health.go.ug>downoad-attachment

43 *The Independent* news magazine, 14 August 2020

Cost of COVID-19 tests at the private and public health facilities

Sector	Laboratory	Price (UGX)
Public	Uganda Virus Research Institute (UVRI) Central Public Health Laboratory (CPHL) Infectious Disease Institute (IDI) Laboratory Makerere University Mildmay Laboratory Tororo Mobile Laboratory Mutukula Mobile Laboratory Adjumani Mobile Laboratory Joint Clinical Research Centre (JCRC) Uganda Cancer Institute, Fred Hutchison Laboratory Makerere University Hospital	185,000
Private	Nakasero Hospital	250,000
	Lancet Laboratories	250,000
	Medpal International Hospital	250,000
	Test and Fly Laboratories	250,000

Ministry of Health should decentralize COVID-19 testing to RRHs and general hospitals, given that they already have GeneXpert machines. This will help bring down the cost of transporting samples and minimise the turnaround time.

Researchers at Makerere University were reported in April 2020 to have developed an RDT kit that they anticipated would cost about one USD. This would improve affordability of the test kits if produced to scale. It should also be noted that GeneXpert machines have been deployed at different regional referral hospitals (RRHs) and general hospitals, most of which are serving as testing hubs.[44]

Uganda has purchased COVID-19 vaccines at higher prices than high-income countries. At the time of our assessment, the country was expecting AstraZeneca/Oxford vaccine from the COVAX facility at USD 7 per dose.[45] The two-dose vaccine together with shipping and handling costs, would bring the total cost per person to USD USD 17, a price that is 20% more than South Africa and roughly triple that being paid by the European Union.

Prices charged to countries for AstraZeneca Vaccine

Buyer	Price Per dose/ USD	Source
Uganda	7	(Ministry of Health, 2021)
South Africa	5.25	(Dyer O. , 2021)
European Union	2.15	(Dyer O. , 2021)
UK	3	(Dyer O. , 2021)
US	4	(Dyer O. , 2021)

Advocate for GOU support for local manufacture of DVT and PPE.

Prices of medical masks skyrocketed as COVID-19 infections surged. For example, N2M Company Ltd delivered 3,200 packets of surgical masks, each containing 50 masks, at UGX 247,343, translating to a pricy UGX 4,946 per mask.[46] Similarly, prices of surgical face masks rose at the start of the pandemic as demand shot up.

Pool procurement of diagnostics at national or regional levels to leverage economies of scale.

Upon the outbreak of the pandemic, the price of the drug Hydroxychloroquine shot-up, to UGX 250,000 per pack of 100 tablets, from about UGX 25,000 in pre-COVID-19 times. This increase in price was a result of a sharp increase in demand of the drug.

Uneven distribution of testing sites: Ministry of Health enhanced the capacities 100 laboratories across the country to function optimally as hubs.[47] At the start of the pandemic, only UVRI was carrying out the tests, but as of 11 February 2021, Ministry of Health had accredited a total of 21 facilities and laboratories to test for COVID-19.[48] Out of the 21 testing sites that had been accredited by Ministry of Health 17 were in the central region.

44 Nalugwa, T; Shete, P; Nantale, M; Farr, K; Ojok, C (2020). Challenges with scale-up of GeneXpert MTB/RIF in Uganda; a health systems perspective. *BMC Health Services Research*

45 MOH (2021). Update on COVID-19 response in Uganda. Press statement, 11 February 2021.

46 Ministry of Finance, Planning and Economic Development (2020). COVID-19 interventions report.

47 The list of the hubs can be accessed from http://cphl.go.ug/hub-list

48 MOH (2021). Update on COVID-19 response in Uganda. Press statement, 11 February 2021

There has been limited involvement of the private secttor in testing. At the time of our assessment, the country did not have even a single national supplier of COVID-19 test kits for the private sector. Lancet Laboratories reported that it was directly importing test kits for use in their laboratory which was not cost effective given the small quantities involved.

Ministry of Health should promote private sector participation in COVID-19 testing by incentivising private importers and distributers of tests kits and related diagnostic supplies.

The absence of a large scale private importer is a disincentive to other private laboratories to participate in COVID-19 testing.

In addition, other service points such as community-level pharmacies have not been adequately utilised to increase access to testing services.

DVT and PPE shortages and stock-outs: Quantification of non-medical masks was carried out based on population projections for 2020 and the need for masks was estimated at 32,979,928, with the total cost of masks and their distribution estimated at UGX 81.2 billion.[49] As of 3 March 2021, a total of 24,997,096 masks had been distributed to Ugandans.[50]

However, there has been a critical shortage of essential medical supplies for prevention and management of COVID-19 in Uganda, including PPE for health workers.[51] As at 25 July 2020, the stock status of laboratory items at national level was below the target of two months of stock.[52]

Shortages of gloves, face masks, face shields, aprons and other PPE have been reported in most hospitals.[53] By 22 December 2020, up to 1689 health workers had contracted COVID-19.[54]

By July 2020, the stock was inadequate as the stock status of PPE were mostly less than 1month of stock.[55]

PPE stock status (central level) by July 2020

Item	Month of stock	Pipeline month of stock
Surgical Masks	0.44	1.68
N95 respirators	0.20	2.60
Face Shield	0.12	0.82
Protective googles	0.45	5.00
Examination gloves	0.03	1.18

Shortages of DVT and PPE have been attributed to low production capacity and delayed delivery from suppliers and lack of leadership by GOU, reflected in under-investment in the response, pilferage and outright theft of COVID-19 response funds, as well as to an escalation in global demand, panic buying and hoarding by developed nations.[56]

Ministry of Health should carry out an assessment to determine whether the installed capacity for oxygen production is effectively providing the required oxygen supply necessary for oxygen therapy.

In mid-June 2021, there were reports of a critical shortage of medical oxygen in Uganda, particularly in major referral hospitals across the country.[57]

49 MOH (2020). Update on COVID-19 Response in Uganda. Press statement, 13 June 2020
50 MOH (2021). http://library.health.go.ug/
51 Elias Biryabarema (2020). Uganda health workers say they lack vital equipment to fight COVID-19. Reuters, 3 June 2020. https://www.reuters.com/article/us-health-coronavirus-uganda-idUSKBN23A218
52 MOH (2020). COVID-19 Situation Report. 25 July 2020.
53 Elias Biryabarema (2020). Uganda health workers say they lack vital equipment to fight COVID-19. Reuters, 3 June 2020. https://www.reuters.com/article/us-health-coronavirus-uganda-idUSKBN23A218
54 MOH (2020). Update on COVID-19 response in Uganda. Press statement, 22 December 2020
55 MOH (2020). COVID-19 situation report 25 July 2020
56 WHO (2020). Shortage of personal protective equipment endangering health workers worldwide. News release, 3 March 2020. https://www.who.int/news/item/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide
57 Godfrey Olukya (2021). Uganda hospitals run short of oxygen amid spike in COVID-19 cases. Anadolu Agency, 15 June 2021. https://www.aa.com.tr/en/africa/uganda-hospitals-run-short-of-oxygen-amid-spike-in-covid-19-cases/2275032

Ministry of Health and civil society should educate the public and create more awareness about COVID-19 generally and civil responsibilities, including actively taking preventive action and seeking vaccination and prompt care.

By December 2020, wealthy nations, which represent only 14% of the world's population, had already secured about 53% of the vaccines on the market. Canada alone had secured sufficient vaccines for up to six vaccination rounds for each of its people.[58]

Inadequate cold chain capacity: Uganda does not have the capacity to handle vaccines that must be kept at negative 80°C. This has narrowed the country's options to Oxford/AstraZeneca, which requires a more modest 2°- 8°C. Ministry of Health also considered the Chinese vaccine for the same reason.[59] If the country had the capacity to handle any of vaccines on the market, it would have more options to improve access.

Limited public awareness: The uptake of vaccines was initially low due to limited awareness, scary myths and misinformation.[60] While the concept of access to medicines includes acceptability as a component, the low uptake of testing and vaccines was hardly based on genuine fears.

National Drug Authority (NDA) should strengthen pharmaco-vigilance to identify COVID-19 DVT and PPE-related adverse events, and communicate the necessary safety and mitigation measures to all stakeholders, including high-risk groups.

A study conducted in March-April 2021 to determine the acceptability of COVID-19 vaccine among persons at high risk of COVID-19 morbidity and mortality in Uganda recommended increased sensitisation, myth busting and utilisation of opinion leaders to encourage vaccine acceptability.[61]

By February 2021, an assessment of COVID-19 communication showed that little or no effort had been made on the part of Ministry of Health to engage with communities before major preventive and protective measures were announced and enforced by GOU, and that GOU had not engaged in dialogue at the grassroots level.[62]

CONCLUSION

COVID-19 has exposed many gaps in the health system but also in the country's preparedness for emergencies, including epidemics. While nearly everyone has been affected by the unprecedented pandemic, vulnerable people have been affected more. It has been stated during the pandemic that no one is safe until everyone is safe. Thus, the response at the global, national and sub-national levels must ensure equity in access to COVID-19 DVT and PPE. The lack of determination and urgency to invest in the health system has left the public exposed to unethical charges in the private sector. The global community, regional actors, GOU, Ministry of Health, Ministry of Finance, NDA, the civil society, media, private sector, and individuals have a role to play, but GOU/Ministry of Health must take leadership to ensure the response is inclusive.

58 Owen Dyer (2020). Covid-19: Many poor countries will see almost no vaccine next year, aid groups warn. https://www.bmj.com/content/371/bmj.m4809

59 MOH (2021). Update on COVID-19 response in Uganda. Press statement, 11 February 2021

60 Keneth Iceland Kasozi, et. al (2021). A Descriptive-multivariate analysis of community knowledge, confidence, and trust in COVID-19 clinical trials among healthcare workers in Uganda. *MDPI*, Vol 9, Issue 3. https://www.mdpi.com/2076-393X/9/3/253/htm

61 Bongomin, F. et. al (2021). COVID-19 vaccine acceptance among high-risk populations in Uganda. *Therapeutic Advances in Infectious Disease,* 9 June 2021. https://journals.sagepub.com/doi/full/10.1177/20499361211024376#

62 Awobamise, A. O., Jarrar, Y., & Okiyi, G. (2021). Evaluation of the Ugandan Government's Communication Strategies of the COVID-19 Pandemic. *Online Journal of Communication and Media Technologies*, 11(1), e2021xx. https://doi.org/10.30935/ojcmt/10824