



Africa's Response to COVID-19: What roles for trade, manufacturing and intellectual property?

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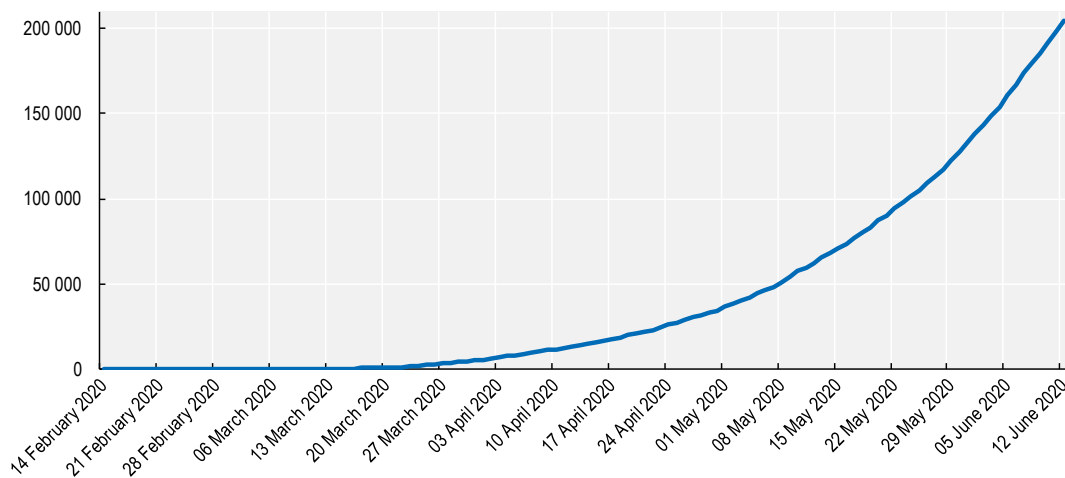
COVID-19 is taking its toll on Africa. This note discusses how policies on trade, manufacturing and intellectual property can speed up Africa's response, focusing on enabling access to medical devices and drugs in four critical areas: testing, protecting, treating and curing (TPTC). For each area, the note provides a snapshot of the global situation, a zoom on trends in Africa, and examples of solutions implemented by the public and the private sectors. The note identifies five priority actions for Africa to respond effectively to COVID-19 and accelerate structural transformation and development across the continent.



Introduction

COVID-19 is taking its toll on Africa. Despite rapid responses to control movements of people and goods, and encourage social distancing, the pandemic is inevitably spreading across the continent, albeit with a significant variation in the number of cases by country. Five countries together account for 56% of the confirmed cases: South Africa (19%), Egypt (15.5%), Algeria (9%), Morocco (7%) and Nigeria (6%). Africa has more than 200 000 confirmed cases across its 54 countries and 5 600 reported deaths (estimated data as of 12 June 2020) (Figure 1). According to the World Health Organization (WHO), one of the biggest challenges in Africa continues to be the availability of essential medical supplies, particularly test kits.

Figure 1. Number of confirmed COVID-19 cases in Africa (as of 12 June 2020)



Source: WHO coronavirus disease (COVID-19) dashboard. Geneva: World Health Organization, 2020. Available online: <https://covid19.who.int/> (last cited: 12 June 2020).

Defeating COVID-19 in the developing world should be a global priority. As Ethiopia's Prime Minister put it "if COVID-19 is not beaten in Africa it will return to haunt us all".

Well-known vulnerabilities make African societies and economies highly exposed to the pandemic and its consequences (OECD, 2020^[1]; AUC/OECD, 2019^[2]). Some of these weaknesses are of particular concern. On the one hand, poor quality of healthcare, coverage and access, availability of medical personnel, especially in remote areas, and the prevalence of other diseases raise concerns about the response capacity on the health front. On the other hand, the persistent structural weaknesses of the continent overexpose African countries to the economic consequences of COVID-19. These include high dependency on imports in areas such as food, drugs, machinery and equipment, weak local production systems, limited quality and coverage of digital connectivity, and prevalence of informality and micro firms, among others. Even if some factors may reduce Africa's exposure to the pandemic, such as its youth population and a certain level of preparedness to pandemics owing to previous outbreaks including the 2004 Ebola crisis, the continent is at high risk (WHO, 2020^[3]).

Africa is at an earlier stage of the epidemiology curve than Europe, the United States and Latin America, which at present is the most hit among the developing regions. Responding and combating a significant spread of the contagion is still possible. Nevertheless, it requires **immediate action on multiple fronts**. The experiences of other countries imply that preventing and slowing diffusion, identifying infected people, isolating and treating them and tracing their contacts are essential.



Learning from the experiences of Europe, the United States and Canada between mid-February and mid-May 2020, and taking into account the specificities of the African continent, this note contributes to the debate on COVID-19 and development. It analyses the channels through which trade and industrial policies can improve the response of the continent's healthcare systems and, at the same time, ignite a growth recovery founded on increased continental integration and industrialisation. The note provides a taxonomy of a variety of scientific, technological and industrial solutions needed to effectively identify and treat affected patients by identifying four areas in which governments, firms, researchers and the international community will need to address major gaps: **testing, protecting, treating and curing (TPTC)**. The first section discusses the challenges of containing the spread of the pandemic in Africa, considering the quality and coverage of the local healthcare systems. It also looks at the challenges linked to implementing measures like social distancing and lockdowns, taking into account the specificities of the continent. The second section presents a taxonomy of technological, trade and industrial solutions to confront the pandemic in the four TPTC areas. For each area, the section presents a snapshot of latest developments, public policies and private responses, namely highlighting initiatives in Africa. The conclusions identify five priority actions for Africa to effectively respond to COVID-19 and specify that this response requires action by leaders in Africa and from the international community. The analysis presented in this note also reveals that responding to this emergency, by mobilising trade and industrial policies, also has the potential to accelerate development in Africa, unlocking industrialisation, modernisation and continental integration.

“One size does not fit all”: the challenges of social distancing and lockdowns to fight COVID-19 in Africa

In early May, the World Health Organization (WHO) projected that 83 000 to 190 000 people in Africa could die of COVID-19, and 29 million to 44 million could get infected in the first year of the pandemic if containment measures were to fail (WHO, 2020^[3]). Containing the spread of the virus is essential, but the experience of severely affected countries such as Italy, Spain and the United States shows that limiting contagion is difficult and takes time, even when extremely strict measures, such as a full lockdown, are implemented. COVID-19 is highly virulent: people with COVID-19 infect, on average, 2 to 2.5 other people, compared to 1.3 in the case of a seasonal flu (WHO, 2020^[4]). An effective strategy for identifying and treating patients is vital. Early in the diffusion stage, the high speed and breadth of infection can generate a shortage in medical devices (from protective masks to ventilators), exposing people, including medical and sanitary personnel to contagion, which in turn can saturate hospital systems' capacity, forming a vicious spiral.

Slowing down the spread of the virus through social distancing and lockdowns – the prevailing measures taken so far to limit contagion worldwide – promises to come at a high price for Africa, both economically and socially. The United Nations Economic Commission for Africa (ECA) projects that a one-month full lockdown across Africa will cost the continent about 2.5% of its annual GDP (USD 65 billion). Implementing these measures is particularly problematic in Africa due to high levels of poverty and informality. One in three Africans (441 million people) live below the global poverty line at USD 1.9 a day (World Bank, 2020^[5]). In most African countries, the majority of the workforce is self-employed in the informal sector and may not be able to afford to self-isolate. Moreover, limited fiscal resources reduce room for deploying income-support measures and counter-cyclical policies to protect people and firms. Shifting to remote working, while possible for some enclaves in the most outward oriented and advanced economies, is not a reality applicable universally across the continent. For example, evidence from survey data from about 2 000 residents living under lockdown in five slums in Nairobi indicates that over 75% left their homes three times on average in 24 hours, 81% suffered complete or partial loss of income, and 70% reported skipping meals due to COVID-19 (Population Council, 2020^[6]).



African governments reacted faster than elsewhere to impose travel restrictions and close borders to minimise contagion. Most African governments suspended international travel in mid-March, at the same time as most European countries. At the time Europe had already suffered close to 1 751 deaths, while Africa had reported just six. They also enacted social distancing and lockdown measures at an earlier stage in the epidemiology curve than many countries in Europe. South Africa, for example, introduced an articulated response, comprising eight overlapping stages, including a strict lockdown and major economic mitigation measures, amounting to approximately 10% of GDP, to assist the affected population (South African Government, 2020^[7]).

Yet Africa is set to enter its first recession in 25 years this year, social unrest is brewing, and severe hardship is kicking in as food security becomes strained (WFP, 2020^[8]). In light of this, African governments, as other countries across the globe, are starting to ease restrictions and get business going again. Fast-tracking testing and being ready to treat patients are thus of growing importance. However, there are obstacles on all fronts, even for the most advanced countries in the continent: testing and pharmaceutical treatments are simply not yet available with the reliability and safety needed. Hospitals, even in major global cities like New York and Milan, saturated quickly due to the unprecedented upsurge in demand. As the virus spreads, medical personnel quickly becomes scarce. Medical equipment is not available in the quantity needed. As countries are hit almost simultaneously, supply chains are being interrupted and imports limited, as governments invoke national emergencies and give preference to supplying the domestic market.

Moreover, Africa's relatively weak healthcare systems, limited medical supplies and shortfall in medical personnel put the continent at high risk. Most African countries lack adequate healthcare facilities and access even under normal circumstances (the number of hospital beds per 1 000 people is 1.2 in Africa and 3.8 in OECD countries) (World Bank, 2020^[9]). The WHO estimates 3.6 million–5.5 million COVID-19 hospitalisations, of which 82 000–167 000 severe cases requiring oxygen, and 52 000–107 000 critical cases requiring breathing support. The WHO also emphasises that the predicted number of cases requiring hospitalisation would overwhelm available medical capacity in most of Africa (WHO, 2020^[3]). All African countries are net importers of medicinal and pharmaceutical products. ECA estimates that the continent covers 94% of its pharmaceutical needs through imports. Many of the countries providing these pharmaceuticals are heavily disrupted by COVID-19. Moreover, at least 94 countries in the world have now also restricted exports of medical supplies as part of their response to COVID-19 (ITC, 2020^[10]). This puts Africa in a perilous position in accessing essential supplies. On the research side, Africa also lags behind, investing negligible resources in medical and pharmaceutical R&D and participating little in global research consortia. Furthermore, the diagnostic techniques most commonly used are not yet tailored to the African continent. To be effective, the most appropriate testing solution should be quick, affordable, implemented in a decentralised way and should not need to rely on high skilled personnel.

Technological, trade and industrial solutions to face the pandemic

An effective strategy to confront the pandemic requires adequate, accessible, affordable, safe and timely supply of medical devices, drugs and skilled personnel across four areas:

- **Testing:** the mechanisms and protocols for screening the population and identifying those affected by the virus.
- **Protecting:** the range of protective devices (masks, gloves, etc.), hygiene measures and protocols to prevent contagion of doctors and healthcare personnel, patients and the overall population.
- **Treating:** drugs and medical devices to assist hospitalised patients. So far, based on the experience of countries ahead in their epidemiology curve, the main treating device on shortage of supply when a major outbreak occurred were pulmonary ventilators and their replaceable components.



- **Curing:** drugs and treatments to treat the infection, and vaccines to immunise the population.

These areas have been identified by taking into account the challenges that countries face in fighting COVID-19 and the diverse technological, industrial and trade solutions that can be deployed to address them. These areas differ according to scientific content, research and development (R&D) intensity and manufacturing complexity. They also share a common critical requirement: the solutions provided need to be timely, affordable, safe and comply with approved standards (Table 1). In the case of COVID-19, the required effort in R&D and the reliance on scientific research are higher for the solutions linked to testing and curing. Manufacturing involves relatively simpler processes for personal protective equipment (PPE) than for respiration machines, making industrial reconversions a relatively simpler option to secure local access for PPE, even though the management of the specific supply chains is highly complex in all areas. For access to drugs and vaccines, standards, trade facilitation and tailored intellectual property (IP) management are of primary importance.

Table 1. A taxonomy of technological, trade and industrial solutions to face the pandemic

	TESTING	PROTECTING	TREATING	CURING
OBJECTIVE	Enabling massive screening ASAP	Minimising contagion through protective devices (for medical and sanitary personnel, patients and citizens)	Assisting hospitalised patients (providing drugs and assisted breathing to critical patients)	Developing a COVID-19 vaccine and/or drug treatment
CHALLENGES	Inadequate diagnostic equipment (too slow, too capacity-intensive, too expensive and requiring laboratory testing) Lack of universally validated protocol	Global supply shortages	Global supply shortages and few global players capable of producing them Availability of replaceable components (e.g. valves) Required know-how for using sophisticated/new devices High unitary cost	Uncertainty of research outcomes Timing for clinical trials and approbations Affordability
TECHNOLOGICAL, TRADE AND INDUSTRIAL SOLUTIONS	Partnerships for research and technology transfer Fast-tracking testing and clinical trials Enabling global approval based on first national approval Fostering technology transfer and enabling local manufacturing	Enabling local manufacturing by: 1) scaling up local production; 2) reconverting industrial plants (e.g. textiles, printing, beverages and cosmetics) Facilitating imports and exports Co-ordinating donations to target the most vulnerable	Scaling up production of current producers Enabling industrial reconversions (e.g. automakers) Fast tracking imports and exports Bridging capital, competences and technologies to foster innovation	Testing for second-use of existing drug treatments Vaccine research & development Drug and vaccine manufacturing
CRITICAL REQUIREMENTS	MEDICAL SUPPLY NEEDS TO BE: ADEQUATE ACCESSIBLE AFFORDABLE SAFE TIMELY INVOLVING RAPID SCALING UP OF HOSPITAL CAPACITIES & OVERCOMING THE SHORTAGES IN MEDICAL PERSONNEL			

Source: Authors' elaboration.



In terms of critical requirements, whether for testing, protecting, treating or curing, medical supplies need to be adequate and safe (i.e. certified and in line with approved standards), accessible (i.e. available when and where needed), affordable (i.e. price should not exceed domestic purchasing capacity), and timely (i.e. available on time). For Africa, a critical basic requirement is also scaling up hospital capacity and availability of medical personnel, which are extremely weak even in ordinary times.

Testing: in search of reliable methods for decentralised implementation

The WHO's call for "Testing, testing, testing" has ramped up the race for identifying mechanisms to screen and identify people that carry the virus, or that have developed immunity to it, in the fastest, most accurate and least expensive way possible. At present, no unique global protocol for screening citizens is available – which is also a factor explaining large variations in the reporting of national data. The most frequently used method for testing has been the in-lab molecular type, which typically requires a long time for diagnosis, sophisticated equipment and well trained medical personnel. A second method identifies antibodies through serology tests. This approach enables the assessment of whether a person is positive and if she is immune to the virus (although it is yet unclear for how long immunity lasts). Even though the diagnosis for potentially affected patients needs to come from molecular testing, from an epidemiological point of view, the advantages of the serology-based methods could offer manifold advantages: they are cheaper, faster and do not require a high level of skills to be implemented correctly, and ultimately could be used for self-diagnosis (Financial Times, 2020_[11]).

Generalised testing is becoming the shared goal for all countries under lockdown to safely ease restrictions, restore trust and gradually reopen economies. For Africa, and for all developing countries where social distancing is hard to implement and will make the most vulnerable pay the highest price, access to safe, affordable and adequate serology test kits is crucial. They can be deployed in decentralised settings, quickly and without the need of highly skilled paramedical personnel. A major challenge is the reliability of existing testing techniques, especially if they will need to be used for widespread screening (WHO, 2020_[12]).

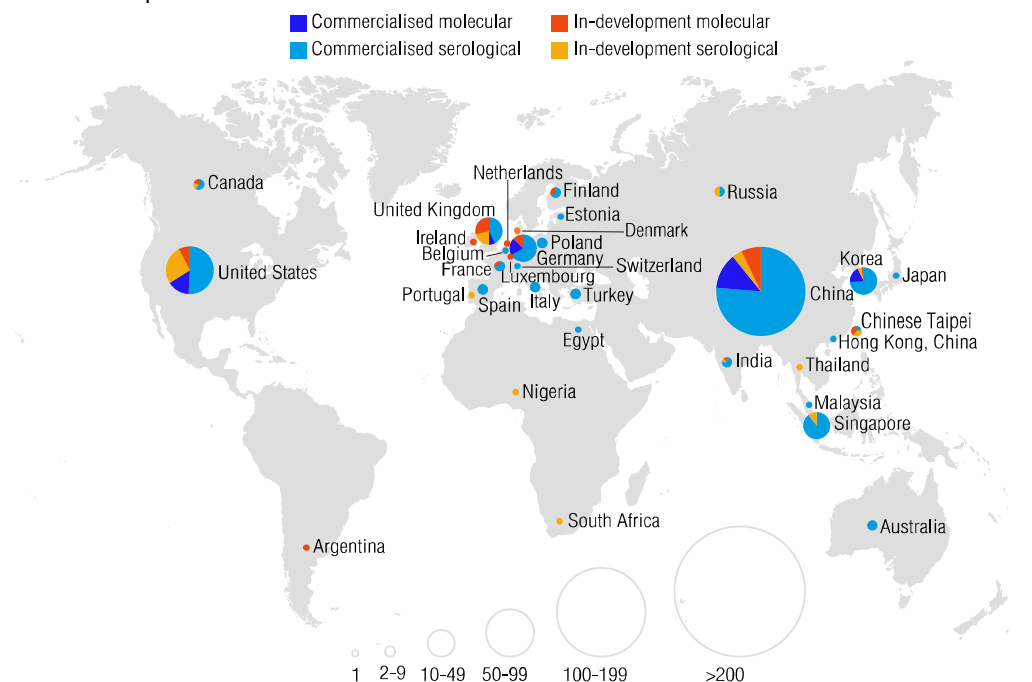
The race to develop and manufacture testing kits is open and intensifying. As of 18 May, companies' self-reported data to the Foundation for Innovative New Diagnostics (FIND) show that 540 different testing kits are available for commercialisation – up 76% compared to 7 April – and 90 more are currently in development. A third of all tests (35%) have been commercialised by Chinese companies, followed by the United States (13%) and Korea (12%). Companies in the United States account for 26% of in-development tests, of which the majority are serological tests that have the potential to deliver mass testing (Figure 2). In Africa, two private firms from Egypt have commercialised one test each, and companies in Ghana, Kenya, Nigeria, Senegal, South Africa and Uganda have tests in development (FIND, 2020_[13]; ECA, 2020_[14]). In Latin America, four Brazilian firms have commercialised a test each and a company from Argentina is involved in developing one (FIND, 2020_[13]).



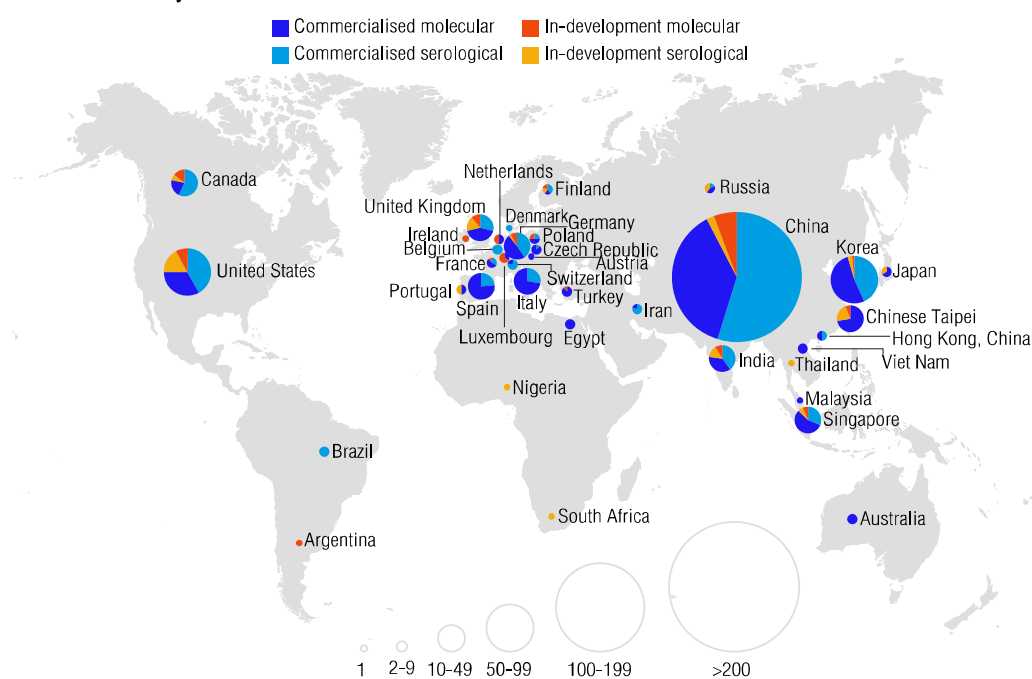
Figure 2. Number of commercialised or in-development tests for COVID-19, 2020

Numbers by country of origin and testing technology

Panel A. 7 April 2020



Panel B. 18 May 2020



Note: The data on FIND are self-reported and the authors have not checked the reliability of the information.

Source: Authors' elaboration based on FIND (2020), SARS-COV-2 Diagnostic pipeline, https://www.finddx.org/covid-19/pipeline/?section=molecular-assays#diag_tab



The scientific, technological and industrial challenges linked to developing and commercialising testing kits deployable on a large scale are multiple. The principle challenges are the time needed and the reliability of the processes to develop, prototype, test and approve them for commercialisation. The research efforts for developing reliable and affordable tests involve a variety of players, including big pharmaceutical companies and co-operation between specialised laboratories and firms. Co-operative projects are often international and merge competences of different players (researchers, doctors and hospital personnel, and biotechnology firms). Table 2 presents some examples of ongoing actions in this area.

Table 2. Ongoing efforts in research for testing methods: selected examples

<p>Big pharma are among the first-movers in COVID-19 testing technologies</p> <p>Switzerland: Roche was one of the first to develop a diagnostic test for COVID-19, relying on the expertise gained by providing tests for SARS. (Reuters, 2020^[15]).</p>
<p>Governments are stepping in to finance the development of new testing kits</p> <p>Canada: The government announced 1 billion Canadian (USD 700 million) dollars for medical research for COVID-19 (Prime Minister's Office, 2020^[16]). Most of these resources are earmarked for vaccine development. Federal agencies are also channelling investments to existing and new research projects to rapidly detect, manage, and reduce the transmission of COVID-19. By April the total public investment for diagnostics research amounted to approx. USD 7 million for 13 projects (Canadian Institutes of Health Research, 2020^[17])</p>
<p>Research partnership and technology transfer for diagnostic kit development</p> <p>Senegal, United Kingdom and France: Diatropix, a specialised platform for quick diagnosis of African pandemics set up in Dakar, Senegal in 2018, is working with Mologic (a UK biotechnology company, partner of the French Institute Pasteur) to prototype a pocket-sized kit, which will cost less than one US dollar (Financial Times, 2020^[18]). The partnership could produce 4 million kits, by adapting the auto-diagnostic kit developed to test Ebola. Diatropix consists of a collaborative team of five, enabled by a partnership with the Development Research Institute (IRD), the Senegal Office of the Institute Pasteur, the Merieux Foundation and two technology transfer partners: Mologic and BioMerieux.</p>
<p>Local and foreign entrepreneurs and venture capitalists are stepping up to boost local testing capacities</p> <p>Nigeria: To address Nigeria's alarmingly low number of tests (South Africa has tested 100 times more people than Nigeria), a one-year-old genomics research start-up, 54gene, launched a USD 500 000 fund to boost local testing capacity. Venture capitalists are also stepping in to fund innovative solutions. Ventures Platform, a Lagos VC firm, partnered with the local science and research agency to find and fund innovative tech-based solutions for coronavirus-related issues (Quartz Africa, 2020^[19]).</p>
<p>Multilateral actions are supporting countries without diagnostic capacities</p> <p>Africa: The Africa Task Force for Coronavirus (AFTCOR) established in the framework of the Africa Union Commission response to COVID-19, is working with existing supply chain systems to step up functioning regional lab referral networks to help countries without diagnostic capacity find a suitable, timely option for testing (AU and Africa-CDC, 2020^[20]).</p>
<p>New technologies are tackling logistical challenges in testing deliveries</p> <p>Ghana: Zipline, an American medical product delivery company headquartered in Silicon Valley but with distributions centres in Rwanda and Ghana, is deploying drones to help transport kits from remote clinics to testing centres. The drones can carry 15 000 tests a day with 300 flights (Time, 2020^[21]). A diagnostics company also partnered with the Kwame Nkrumah University of Science and Technology to develop a simple-to-use COVID-19 testing kit that gives results in 15 to 20 minutes. The kit is now awaiting approval from the Ghana Food and Drugs Authority.</p>
<p>Simple swab-based solutions to tackle COVID-19</p> <p>Uganda: Researchers at Makerere University have developed a swab tube dipstick test for COVID-19 that can reportedly give results within minutes at the cost of just one US dollar.</p> <p>Kenya: The Kenya Medical Research Institute has started manufacturing a simple swab-based COVID-19 rapid testing kit.</p>



As COVID-19 is a pandemic, testing needs are high and almost simultaneous everywhere. There is fierce competition not only to develop a solution, but also to access the testing kits and their components (e.g. swabs, reagents) once available. Deploying testing in a decentralised way and with no need for technical personnel is a priority for Africa. To do so, actions on multiple fronts are needed, involving global solidarity, continental co-operation and national action. It is of significant importance to:

- Support global research efforts in this area. This is of global interest and funding should be expanded;
- Rely on local research capacity and players in Africa, involving them in regional partnerships, to enable identification of solutions that could work under the specific circumstances of African countries. Some African countries have gained capacity through their responses to the Ebola 2014 crisis, which could be scaled up to respond to this emergency;
- Fast-track approval of successful solutions and ensure access to African countries;
- Facilitate access to imports, knowledge and technology, lift IP protection on testing solutions and make use of existing flexibilities to enable local manufacturing and affordable access, when possible.

Protecting: limiting contagion among health workers, patients and citizens

Limiting contagion among health workers, patients and citizens is critical in all pandemics. For COVID-19, it is even more so given the virulence and high diffusion rate of the virus. Protective devices, which are in high demand, include masks (both surgical for sanitary use, and the simpler, disposable or reusable ones for everyday use), gloves, sanitising products and hospital gear, such as aprons, bodysuits and visors. Their timely availability makes a big difference in the capacity to contain the contagion.

Most of these medical supplies are disposable, involve relatively simple manufacturing processes, and must meet safety norms and certifications. Stopping the circulation of counterfeited medical supplies and equipment is essential to ensure patients safety (OECD, 2020^[22]; OECD/EUIPO, 2020^[23]).¹ The personal protective equipment (PPE)² market is highly concentrated. The top ten exporters account for 70% of total exports. PPE shortages in Italy, Spain, France and more recently the United States, reveal that the timely availability of these “commodities” cannot be taken for granted. The People’s Republic of China (hereafter “China”) is the world’s top PPE exporter, accounting for 32% of total exports during 2016-18, followed by Germany (8%) and the United States (6%). Since protective garments make up a large share of PPE, countries with capabilities in textiles also feature among the world’s top exporters, such as India and Jordan, while Malaysia is among the world’s largest glove producers, due to its large rubber resources. Africa as a whole accounts for approximately 1% of global imports and 1% of global exports. The continent could leverage on its expanding textile sector to produce PPE as part of the COVID-19 response.

Most PPE enters Africa from China (Figure 3). China accounts for 41% of all PPE imports to Africa, followed by France (8%), Spain (6%) and Germany (5%). India and Turkey are also important suppliers of PPE, particularly of protective garments (8% and 5% respectively) and gloves (4% and 5% respectively). Malaysia is also a big source of gloves (11% of total), while Viet Nam accounts for 4% of mouth-nose protection equipment. About 11% of PPE exports from African countries are for intra-African trade. This percentage goes up to 19% for protective garments, indicating local capabilities in this segment that could be scaled-up. South Africa is the top exporter within the continent, accounting for 7% of exports of all PPE items. Many of Africa’s top sources of PPE are countries that are currently ramping up production to satisfy

¹ For more information on counterfeited medical supplies see the OECD/EUIPO on Trade in Counterfeit Pharmaceutical Products (OECD/EUIPO, 2020^[23]).

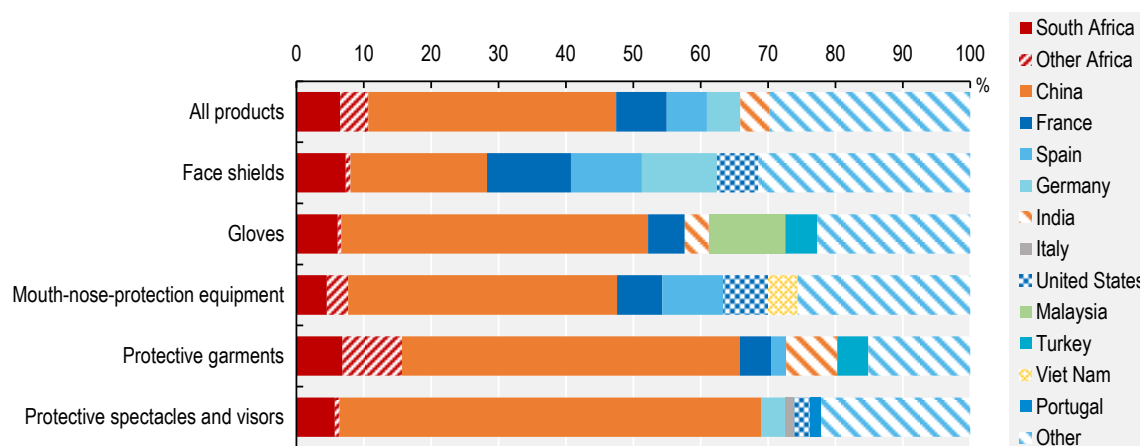
² Personal Protective Equipment (PPE) includes protective garments, face shields, gloves, mouth-nose protection equipment, protective garments and protective spectacles and visors, as in (Bown, 2020^[24]).



their domestic markets. These could prove useful partners for knowledge sharing on how to make industrial reconversion work and could become once again stable sources of PPE once the epidemic slows down in their home markets.

Figure 3. Africa's imports of personal protective equipment (PPE), by country of origin, 2016-18

Share of total imports, 2016-18 (%)



Note: The classification for PPE follows the methodology of Bown, C. (2020), COVID-19: China's exports of medical supplies provide a ray of hope, Peterson Institute for International Economics <https://www.piie.com/blogs/trade-and-investment-policy-watch/covid-19-chinas-exports-medical-supplies-provide-ray-hope>. It is based on the definitions provided by the Commission Implementing Regulation (EU) 2020/402 of 14 March 2020 making the exportation of certain products subject to the production of an export authorisation.

Source: Authors' elaboration on UN Comtrade (2020), database, <https://comtrade.un.org/data/>

Ensuring availability and access to PPE is essential to minimise the damages of the pandemic, but also to manage societal expectations. Anxiety among citizens grows fast when there is a perceived shortage of a basic supply. When this happens, trust in governments' capacity to deliver effective solutions plummets.

To address the supply shortages of protective devices, governments are pursuing multiple avenues simultaneously (Table 3):

- **Secure and increase imports**

China, the world's leading PPE producer, has re-started manufacturing and has been ramping up production. According to government data, production of masks at the end of February stood at 116 million a day, 12 times its supply prior to the outbreak (Bown, 2020^[24]; State Council of China, 2020^[25]). Competition for accessing PPE is high. Given pandemic nature of the COVID-19 emergency, almost every country needs the same supplies at the same time and orders surpass capacity. According to press reports, several countries rushed to secure supplies from China, including Brazil, France and the United States, causing delays and a system of distribution based on delivering to the highest bidders (Reuters, 2020^[26]). The price of masks for state procurement has climbed to USD 0.6-0.8, almost 10 times its usual cost in the United States (Bloomberg, 2020^[27]). Identifying mechanisms to avoid price gouging and price hikes is essential to ensure affordable access to these goods. In this respect trade facilitation and tariff reduction measures on PPE and other COVID-19 related goods are of particular importance (OECD, 2020^[28]; OECD, 2020^[29]).



- **Scale up production, where existent, and prioritise domestic markets**

Manufacturing companies specialised in protective medical devices are scaling up production to meet the upsurge in demand. Some are shifting to a seven-day workweek. However, this has been challenging. Masks and protective clothing use a melt-blown polypropylene (PP) for filtering. This material is complex to produce and it is difficult to scale up its supply in the short-run. The price of melt-blown has risen by nearly 20 times in China. Most countries resorted to special provisions to incite companies to benefit primarily the domestic market, making local production a safer option for traditionally importing economies. In the case of the European Union, regulations were enacted in mid-March to ensure regional market deliveries of protective equipment to EU countries that need it most (European Commission, 2020^[30]).

- **Foster industrial reconversions**

A growing number of firms worldwide have reconverted their plants and some countries focus on scaling up local production to meet national needs. Several reasons motivated these reconversions – from the need to keep business running when only “essential activities” are allowed, to responding to government requests or incentives, to showing an image of a “caring, territorial rooted business”. However, producing something new, even relatively simple like protective gear, is not easy. Firms need time to learn how to produce efficiently. From identifying the required raw materials to redesigning production lines, training workers and engaging with new suppliers, firms need to gain new expertise to reconvert their production lines. In the case of PPE, they also need to meet quality and safety standards. Leaving the process at the individual firm’s responsibility could be costly. A co-ordinated approach seems more effective, including facilitating access to raw materials, standards for production and logistical channels.

In addition to channelling support to the most vulnerable, the following actions are particularly important to ensure availability and timely access to PPEs in Africa:

- Facilitate PPE imports and exports, including within Africa.
 - Fast-track the finalisation of rules of origin for PPE-related textile products under the African Continental Free Trade Area (AfCFTA) negotiations;
 - Share, free of charge, the standards and guidelines for the manufacture, testing and certification of PPEs, which is already underway in the African standardisation community;
 - Harmonise standards and conformity assessment for PPE-related textile products.
- Foster the setting up of import and export consortia to negotiate better prices and secure relevant quantities.
- Facilitate effective industrial reconversions, preferably around regional poles within the continent:
 - Issue guidance at the national and continental levels to orient firms in reversion processes.
 - Enable Business-to-Business (B2B) knowledge sharing to speed up reversion processes.
 - Share protocols and lifting IP protections to enable local manufacturing.
- Value local solutions and ideas: promote dialogue and cross-fertilisation of public institutions, academia, industry and investors to spur new ideas and co-operation, and scale-up successful experiments in given locations.
- Leverage regional industrial hubs within the continent to scale-up production. Several African countries – Morocco, South Africa, Tunisia, Egypt and Mauritius – have medical supply capacity, whose development can be accelerated through collaborations. Over the longer-term, the AfCFTA could support the emergence of regional value chains to better serve Africa’s health market, that ECA estimates at USD 259 billion annually. To that effect, trade negotiators should ensure that medical supplies are not restricted within the AfCFTA’s “excluded lists” and consider including health services as an additional priority sector for liberalisation under the trade in services negotiations.



Table 3. Ensuring access to personal protective equipment to limit contagion

<p>Reconverting to donate to the local community</p> <p>Italy (Veneto): Grafica Veneta, a leading printing company, produced and donated one million masks to the regional government. The process required the reconversion of a rotary press and the restructuring of the printing process in order to use a specific fabric to match the safety standards.</p> <p>United States: The US Distilled Spirits Council of the United States (DISCUS) launched an online portal to assist hundreds of distillers to produce hand sanitizer to address the national shortage created by the pandemic. For example, Wildrye Distillery in Montana converted their distillery into a hand sanitizer production facility. The production is made free for local community (Bozeman News, 2020^[31]).</p>
<p>Sharing knowledge and know-how to enable industrial reconversion</p> <p>South Africa-United States: A 1 000 employee South African group, which supplies government with uniforms and patient wear and manufactures 95% of its production in country, is engaged in firm-to-firm knowledge sharing with a US-based firm producing masks for the US Federal Emergency Management Agency. The US firm is going to share knowledge and IP to enable the South African group to manufacture and produce locally (People magazine, 2020^[32]).</p>
<p>Foreign investors are using pharmaceutical expertise to produce sanitisers</p> <p>Ethiopia: Sansheng Pharmaceuticals, a Chinese-owned pharmaceutical producer with facilities in Ethiopia's Eastern Industrial Park was equipped to produce 5 billion solid preparations, 300 million ampoules and 10 million large volume parenteral preparations, annually. In response to demand for sanitising substances, the company launched in March a new production line to manufacture 24 000 litres of hand sanitiser daily (Malinga, 2020^[33]).</p>
<p>Local providers of protective equipment for agriculture and mining are reconverting to produce PPEs</p> <p>South Africa: U-Mask redirected its production from protective masks for mining and agricultural companies to medical respirator masks. During the early stages of the epidemic, the company donated 30 000 premium masks to China to help stop the spread of the epidemic. Since then, the company's production has increased by 15% in two months (Mail & Guardian, 2020^[34]).</p>
<p>Digital delivery platforms are using their logistics to deliver medical supplies</p> <p>South Africa: Following the lockdown alcohol ban, the alcohol delivery app "Bottles" shifted to deliver essential food and medical supplies on the same day, leveraging their existing partnerships with retailers.</p>
<p>Activating public procurement for PPE</p> <p>Ghana: The government worked with regional health directorates to distribute PPE across the country. The government is also fostering domestic production of PPE. Domestic production of face masks, head covers, surgical scrubs and gowns started on 7 April. Ghana estimates that a total of 3 600 000 will be produced domestically, with an output of 150 000 per day (H.E. President Of The Republic Nana Addo Dankwa Akufo-Addo, 2020^[35]).</p>
<p>Lead firms are donating protective masks and sharing logistical delivery capabilities</p> <p>Jumia, the pan-African e-commerce giant, donated face masks to Nigeria's health ministry and replicated the gesture in Kenya, Ivory Coast, Uganda and Morocco. Jumia partnered with local authorities to share its logistics network to distribute health products to local communities (Quartz Africa, 2020^[19]).</p>
<p>Continental co-ordination is at work to monitor and secure access to PPE</p> <p>The African Union's Africa Task Force for Coronavirus is working with Member States to foster and manage relationships with reliable manufacturers in the continent. It also aims to connect Member States that either have depleted stockpiles or are anticipating shortages, with supply chains for shared continental resources such as PPE, laboratory supplies and equipment, and if necessary, medical countermeasures (AU and Africa-CDC, 2020^[20]).</p>

Treating: ensuring availability of trained medical personnel and ventilators

The technological and industrial solutions linked to treating COVID-19 are more complex to manufacture than PPE. They also require well-trained personnel to make them function properly. The experience of most affected countries shows that the main challenges are linked to availability of ventilators and capacity to maintain them fully operational and functional over long periods of time (according to virologists, COVID-19 "eats the pulmonary cells" making breathing increasingly difficult in severe cases). Patients tend to be in intensive care with assisted breathing between two to four weeks on average, much longer than for other similar viruses.

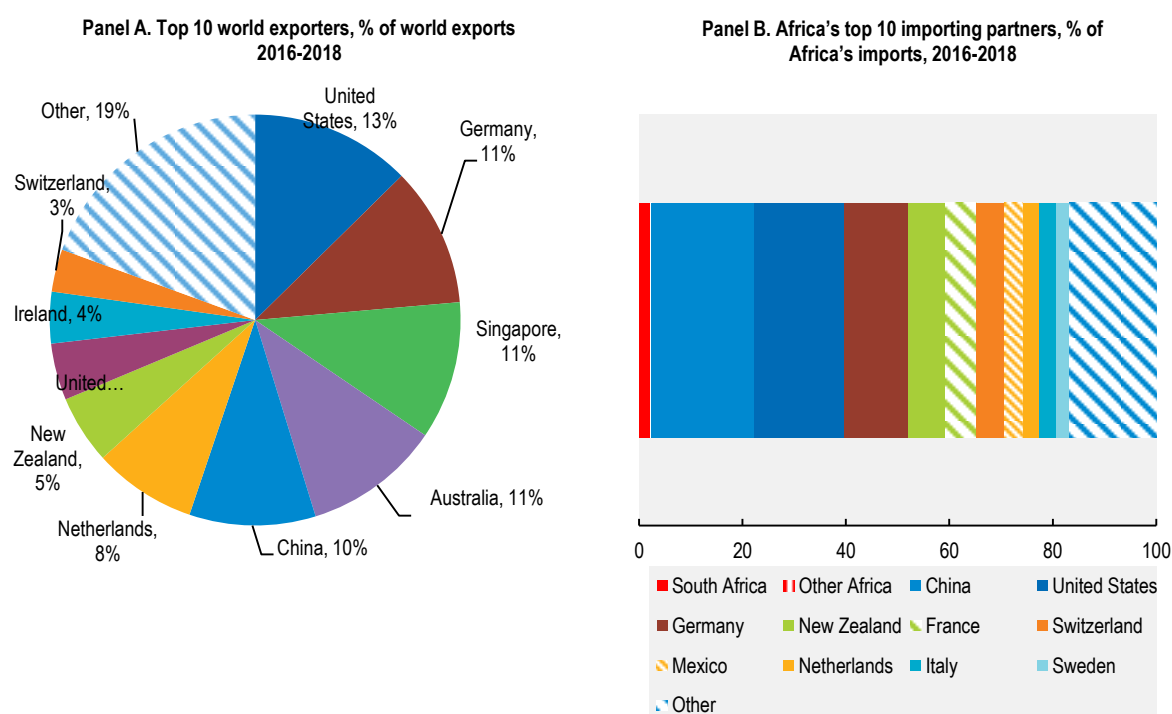
The pandemic has in fact, created a steep increase in the demand for ventilators. Bloomberg reports that the world demand for ventilators is ten times the current supply capacity (Bloomberg, 2020^[36]). It is hard to estimate the demand in Africa, but whatever it will be, it will add up to a chronic shortage in the continent. An epidemiological model developed by Imperial College of London estimates that Africa will require 30 000 ventilators in a best case scenario and 400 000 in the worst case scenario, characterised by zero mitigation measures (Imperial College, 2020^[37]). In addition, ventilators are far from affordable. Professional in-hospital ventilator prices range between USD 20 000 and USD 50 000 depending on the sophistication and technology used (Open, 2020^[38]).



The upsurge in demand calls for large increases in production but also for innovation. Existing models (e.g. traditional mono-patient usable ventilators) are not the best suited for the current needs and some hospitals are piloting double-patient ventilators. In addition, these complex devices need replaceable components, such as valves. Under normal circumstances, these are purchased from specialised suppliers, often from far away. However, national trade restrictions on medical devices, factory closures in production hubs and logistics hurdles (transport is much slower and ports are starting to suffer from container congestions) are putting strain on traditional procurement channels. Local manufacturing is therefore emerging as a critical component to address COVID-19 treatment needs.

Global exports of therapeutic respiration machines averaged at USD 6.8 billion annually during 2016-18. Five countries account for over half of total world exports. The top exporters are the United States (13%), Germany (11%), Singapore (11%), Australia (11%) and China (10%). China is the first trading partner for Africa, accounting for 20% of continental imports, followed by the United States (17%) and Germany (12%). Intra-African trade in respiration machines is 2.5% of Africa's import, with South Africa being the main continental provider (Figure 4).

Figure 4. Trade in therapeutic respiration machines, 2016-18



Note: Based on code HS 901920.

Source: Authors' analysis based on UN Comtrade, database, <https://comtrade.un.org/>

Given that these devices are more costly and complex to develop than PPE, governments worldwide are taking an active role in ensuring availability and in supporting local manufacturing (Table 4). In particular, governments are striving to ensure national availability of ventilators by:

- **securing domestic markets first.** Most countries issued temporary export bans and restrictions to ensure provision to the local market first, for PPEs and for ventilators. Even though the economies are gradually reopening, several trade restrictions prevail. For example, the United States issued in early March a permit and license requirement for exporting ventilators, which is



still in force as of mid-June according to Market Access Map information from the International Trade Centre (ITC, 2020^[10]; OECD, 2020^[39]). This approach puts importing countries, including African ones, particularly at risk of facing shortages.

- **supporting the scaling up of local manufacturing capacities.** Some countries are incentivising local manufacturing, mostly by relying on reconversion of automotive plants to exploit technological and engineering complementarities. Some countries are resorting to extraordinary measures to request domestic firms to reconvert their production lines. Reconversions are however complex and require time. In addition, lockdowns are cutting supply chains and making manufacturing of these complex devices challenging. Ventilators are made of hundreds of different components, often coming from highly specialised suppliers scattered around the world. Bottlenecks in ramping up manufacturing of these devices can come from shortages in the supply chain and from lack of key components.
- **fostering research partnerships to provide innovative solutions.** With many economic activities suspended due to lockdown measures, several governments are incentivising innovators and established manufacturers to collaborate and develop new solutions to tackle ventilator and components shortages. Some big players with capacity in mechanical engineering and technologies are collaborating with research laboratories, doctors and hospitals, to innovate and prototype new ventilators. Innovation prizes and open-source solutions, are also being used to foster the discovery of innovative solutions (OECD, 2020^[40]).

Africa lacks adequate manufacturing capabilities to meet its demand for ventilators, in quality and quantity. To ensure timely and affordable availability of these devices, all levers will matter. In particular:

- Fast-tracking imports and exports, globally and within Africa, and ensuring that trade restrictions do not harm Africa's capacity to access adequate and affordable supply.
- Enabling free movement of specialised medical personnel globally and within Africa, and supporting digital platforms for knowledge sharing between medical personnel.
- Sharing knowledge and technology, lifting IP and making use of existing flexibilities to enable local manufacturing, leveraging installed manufacturing capacities to strengthen regional production hubs in the continent.



Table 4. Scaling up availability of respiratory devices to treat patients: selected examples

<p>Scaling up existing manufacturing capability</p> <p>Italy: The government, through military engineers, partnered with SIARE, a local firm to increase production capacity from 150 per month to 500. Car manufacturer Lamborghini teamed up with SIARE to develop and produce a new prototype of breathing apparatus using 3D printing with the objectives of optimising the components and producing 18 breathing ventilators per week. (La Repubblica, 2020^[41]).</p> <p>United Kingdom: DYSON innovated and designed in 10 days a new, lighter type of ventilator, leveraging on their expertise in electrical engineering and engines (BBC, 2020^[42]).</p>
<p>Partnering to innovate and reconvert plants</p> <p>United Kingdom: Mercedes F1 is collaborating with engineers at University College of London (UCL) and with the UCL hospital to develop and prototype a new, non-invasive mechanical ventilation device, more adapted than the traditional ones to the prolonged use required by COVID-19 patients. Within one month 10 000 units were delivered and the designs have been made freely available. This partnership is part of the Pitlane project through which UK F1 leaders partner with the government to reverse engineer existing medical devices, support the scaling up of production of existing ones and design, prototype and then manufacture new devices after certification. This innovative project was enabled by the UK Ventilator Challenge, a government-led initiative to foster research and development consortia, in partnership with leading firms such as BAE Systems and Rolls-Royce (UCL, 2020^[43]; Financial Times, 2020^[44]).</p>
<p>Sharing industrial designs and knowledge to facilitate production</p> <p>Medtronic, the world's largest medical device company by annual sales, released designs for one of their ventilators and manufacturing instructions to open source for use in the COVID-19 pandemic. The company also shared technical information on component designs, fixtures, printed circuit board drawings, bills of materials and 3D CAD (computer-aided design) files (TechCrunch, 2020^[45]). A state-run company in Egypt created the first locally produced ventilator prototype using Medtronic's designs (Ahram, 2020^[46]).</p>
<p>Mobilising national public scientific infrastructure to produce ventilators</p> <p>Nigeria: The National Agency for Science and Engineering Infrastructure (NASENI) produced the first made in Nigeria ventilators. NASENI has also produced mobile sprayers, which are used to disinfect Nigerian cities and homes (Felix, 2020^[47]).</p>
<p>Getting national industries to reconvert production lines to manufacture ventilators</p> <p>United States: the US government used the Defence Production Act (DPA) to speed up GM's entry into the manufacturing of ventilators and scale up supply of other medical device producers, such as Philips. The DPA, signed into law in 1950, gives the President authorities to expand and expedite the supply of materials and services that are deemed necessary to ensure national defence, under both emergency and non-emergency conditions. It allows the Executive to intervene in the private sector to ensure national defence supply requirements are prioritised. The definition of national defence has been expanded over time to also include homeland security, responses to natural emergencies and terrorist attacks and other emergencies. A Defence Production Act Fund has been set up to carry out provision of Title III authorities (i.e. to incentivise production by domestic industry). Annual appropriations have ranged from USD 52 million to USD 224 million during 2010-2020, but the recent stimulus package injected USD 1 billion for materials to combat COVID-19 (Congressional Research Service, 2020^[48]; Federal News Network, 2020^[49]; Wall Street Journal, 2020^[50]).</p> <p>Italy: CureItaly is a EUR 50 million initiative implemented by the Italian government to provide financial support to firms that can expand or reconvert their production to PPE and ventilators. The government, through the economic development agency (Invitalia), will initially cover up to 75% of the investment with a seven years interest-free loan. Between 26 March and 1 April 400 proposals were submitted, of which 77% relate to industrial reconversion and 23% to production expansion.</p>
<p>Bottom-up innovations can support supply of replaceable components</p> <p>Isinnova, an Italian printing start-up, used 3D printing to reconstruct 100 valves for respiratory machines in 24 hours. The valves were made using a filament extrusion system and the fabrication involved pelting plastic wire and depositing layer by layer. Once tested the company freely shared the specification file for production in 3D printing (Business Insider Italia, 2020^[51]).</p>

Curing: getting ready to ensure affordable access to drugs and vaccine

There is no cure available for COVID-19 yet. No proven effective drug to treat it, and no vaccine to immunise the population. The race for testing the use of drug treatments and for developing a vaccine is underway. The discovery, testing, manufacturing and commercialisation of new drugs are risky and lengthy. Having multiple efforts working towards the same goal means better chances of success overall. However, it is important to ensure global co-operation on successful trials, in order to scale up production and distribution, and ensure affordable access to anybody, anywhere (OECD, 2020^[52]).

Several countries are testing the use of previously existing drugs to treat COVID-19 with mixed results (Figure 5). Some of these drugs include available treatments for malaria, influenza, Ebola, HIV and arthritis. Generalised use should not take place until clinical trials and tests are completed, to avoid nurturing false hopes, and ensure patients' safety. According to information self-reported by institutions undertaking clinical trials to ClinicalTrials.gov, a site managed by the US-based National Institute of Health, clinical trials globally to determine the effectiveness of drugs in treating COVID-19 increased by more than 3 times from 166 on 6 April to 560 on 18 May 2020. Clinical trials take time to design and deploy. The vast



majority of these efforts (305) are at the early stages, and many are not yet recruiting patients. The majority of drug trials are now taking place in the United States, which accounts for one-third of the world's total clinical trials and has surpassed China, which is second, followed by Europe. In Africa, Egypt counts 20 ongoing clinical trials, making it 7th in the world. The only other two countries in Africa with ongoing clinical trials for COVID-19 drug treatment are South Africa and Senegal, with one each.

The development of a vaccine is critical to bring COVID-19 under control. Big multinationals and top public and private laboratories are racing to develop and test the vaccines (Figure 6). However, more research is needed, and developing a vaccine and proving it is effective and safe (subject to all clinical trials and approbations needed) will take time in the best-case scenario (from one to two years, according to experts).

Figure 5. Ongoing clinical trials for COVID-19 drug treatments, number by country, 2020

Panel A. 6 April 2020

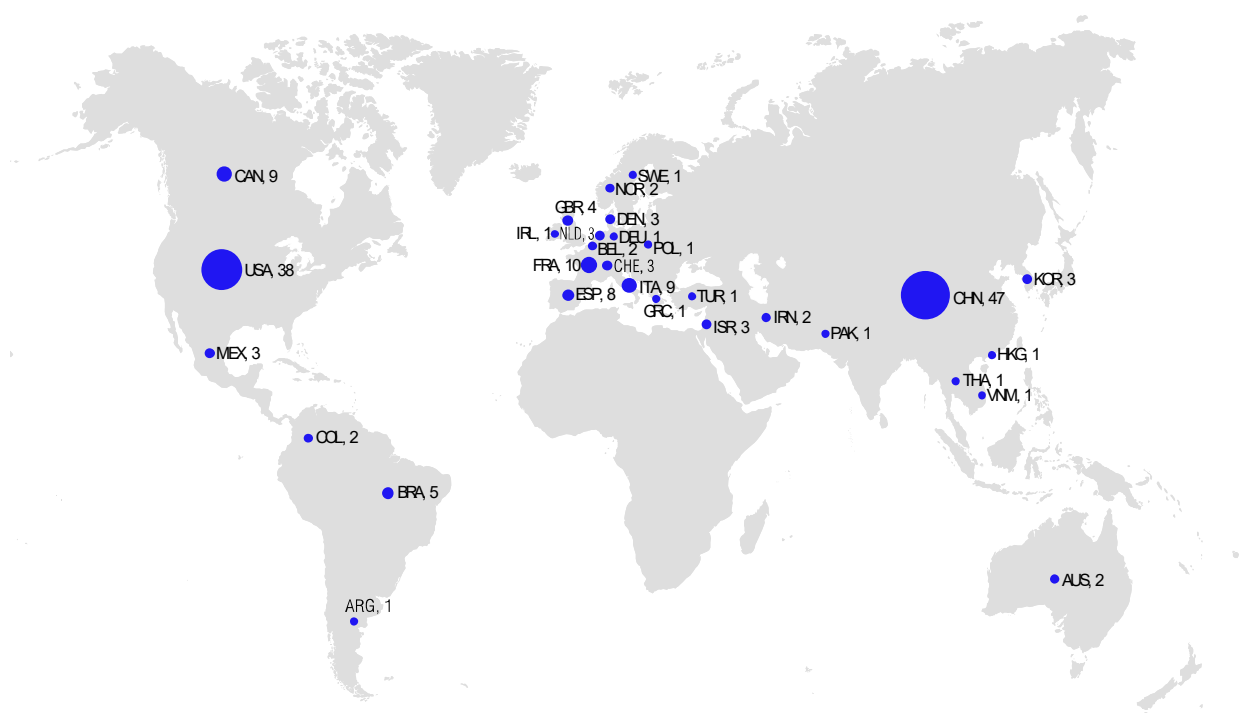
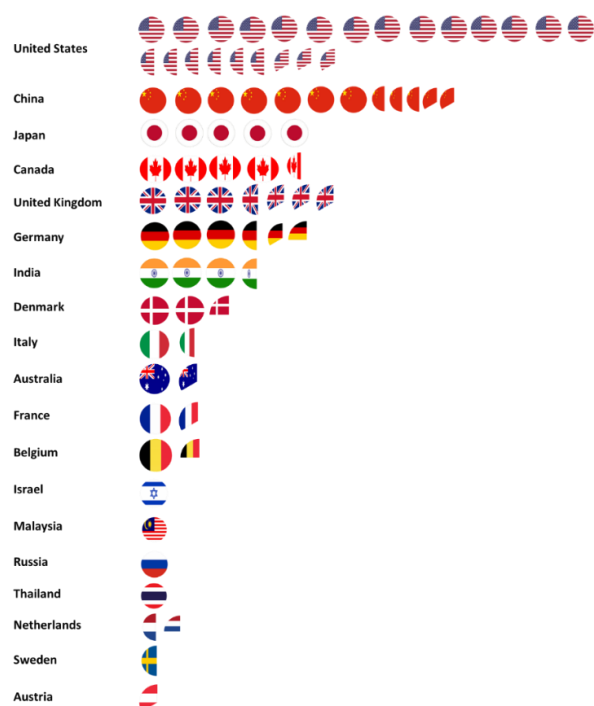


Figure 6. Vaccines for COVID-19: number of ongoing research projects by country, 2020

Panel A. 4 April



Panel B. 15 May



Note: This figure is based on the location of the headquarters of the listed partners. A full circle means a vaccine has been developed fully by one or more institutions based in the same country, while a half circle implies that partners were located in two different countries and so on.

Source: Authors' elaboration based on (WHO, 2020^[53]) DRAFT landscape of COVID-19 candidate vaccines – 15 May 2020 <https://www.who.int/who-documents-detail/draft-landscape-of-covid-19-candidate-vaccines>.

The race to develop a vaccine for COVID-19 is intensifying. According to the WHO, as of 15 May there were 117 ongoing COVID-19-related vaccine research programmes, twice the efforts ongoing on 4 April. The number grows by the day (WHO, 2020^[53]). An increasing number is proceeding with clinical trials, with a total of eight already in clinical evaluation, up from two at the start of April. As mentioned above, the United States is leading, with its firms and research labs involved in 35 research programmes out of the reported 116, followed by China in 15. Both the United States and China participate in more programmes now compared to early April (11 and 3 more respectively), but their combined share of the reported programmes, fell from over 55% to 43% as more countries have amplified their efforts recently. Russia increased to nine programmes (up from 1) and Canada to 13 (up from 5). Asian emerging economies are taking an active role: players from India are participating in seven programmes, and Malaysia, Thailand and Viet Nam in one each. In Latin America, Brazil is the only country participating in a research programme. Africa stands out for its absence.

Public and private actors are deploying significant efforts to develop a cure (Table 5). But the key is not only developing the vaccine, but being able to access it. At present, firms and public resources are prioritising investing in research, but getting ready for large-scale manufacturing to ensure affordable



access to drugs and vaccines when they are ready is a priority that needs to be addressed urgently. In particular, governments and businesses are:

- **mobilising funding for international co-operation in vaccine research.** Governments and investors worldwide are following different funding models. Norway, the United Kingdom and Canada are making significant pledges to the Coalition for Epidemic Preparedness Innovations (CEPI) to fund international co-operative research for the vaccine. By the end of April, CEPI had secured USD 1 billion in commitments, about half the sum it expects to be needed. Lead companies are also venturing into new forms of partnerships. On 24 April the WHO and a group of health actors (including the Bill and Melinda Gates Foundation, CEPI, GAVI, UNITAID, the Wellcome Trust and the World Bank Group) launched a global collaboration for accelerating the development and production of vaccines with equitable global access. Responding to the call, the EU together with France, Germany, the United Kingdom, Norway and Saudi Arabia launched a pledging call that raised close to EUR 7.5 billion. In early June, a USD 2 billion procurement fund was announced to ensure vaccine access for the world's poorest countries at GAVI's virtual summit hosted by the United Kingdom. The British Glaxo Smith Kline and the French Sanofi, traditionally competitors, teamed to combine expertise and facilities to develop a vaccine for COVID-19.
- **scaling up and speeding up clinical trials.** Countries with research and manufacturing capabilities in pharmaceuticals are taking the lead in expediting clinical studies. However, not all countries have the opportunity to rely on local players to advance research. Even where manufacturing capabilities in pharmaceuticals are present (e.g. in South Africa, Egypt, Morocco, Kenya and Nigeria), firms may lack the financial means or organisational capabilities to engage in these activities. The effort by the WHO to launch and co-ordinate a global clinical trial for drug effectiveness offers an opportunity for developing countries to access and contribute to frontier research. Bottom-up initiatives, driven by researchers, are also providing a space for co-ordinating clinical trial efforts, sharing expertise and expediting results.
- **getting ready for large-scale manufacturing.** Some countries are focusing on taking steps to get ready for large-scale manufacturing. The US government is collaborating with big pharmaceuticals to scale up their research and manufacturing capacities for the vaccine. Through a partnership with the government, Johnson&Johnson invested USD 1 billion for research and development, clinical trials and preparation for large-scale manufacturing for a vaccine for COVID-19. Other countries are passing bills that enable the use of flexibilities such as compulsory licensing and related intellectual property (IP) flexibilities. Some countries are putting in place emergency legislative acts to ensure that the supply of drugs to combat COVID-19 matches the demand in their country (Health Policy Watch, 2020^[54]). The flexibilities included in the WTO agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the Doha Declaration, even if they have limitations, enable countries to take steps to ensure affordable access to drugs and therapeutic methods. Article 27 of the TRIPS Agreement clarifies that members might exclude therapeutic and surgical methods for the treatment of humans and animals from patentable subject matters diagnostics. Article 31 and Article 31b clarify the conditions under which compulsory licensing – granting the use of a patent without the authorisation of the right holder – is possible. The WTO Doha Declaration on the TRIPS Agreement and Public Health clarifies, in section 5d, that countries can determine the principle of rights exhaustion that best fits their domestic policy objectives. The principle of international exhaustion of IP rights could be applied to enable parallel imports (these are products sold in a market by the patent owner, or with its consent, and then imported in a third country without the consent of the patent owner) (for more details on this point linked to COVID-19 response see (OECD, 2020^[55])).

The limited access to affordable drugs in Africa and the global scale of the pandemic, make it urgent to design both a collaborative global research effort and a global solidarity response to ensure that the continent has access to the cure, when ready. In particular, it is of utmost importance to:



- continue supporting research and development globally and in Africa
- facilitate participation of African institutions and researchers in global research efforts
- enable the use of TRIPS flexibilities to allow local manufacturing and trade with no IP infringement to ensure timely and affordable access to any COVID-19 related drug and vaccines in Africa.

Table 5. Investing in testing drugs and developing a vaccine for COVID-19: selected examples

Public-private partnerships to speed up clinical trials
<p>United States: The Biomedical Advanced Research and Development Authority (BARDA) of the Department of Health and Human Services partnered with the Jenness Pharmaceutical Companies of Johnson & Johnson to fund the creation of a vaccine. The government is co-funding the project to the tune of USD 456 million, over a total cost of about USD 1 billion. The partnership aims to accelerate clinical trials and scale up manufacturing resources. Human clinical studies should begin in September 2020. If successful, the first batches of a vaccine could be available in early 2021 (Johnson & Johnson, 2020^[56]).</p>
Issuing government acts and using flexibilities to ensure access to drugs
<p>Canada issued a COVID-19 Emergency Response Act. The Act makes it easier for the government to issue compulsory licenses. If the Ministry of Health considers that there is a public health emergency, the Commissioner of Patents can allow the state to produce, sell and use a patented invention. The patentee is to be compensated according to what the Commissioner considers an adequate remuneration, considering the circumstances. This means that Canada can go beyond article 31 of the TRIPS agreement and issue a license to a generic pharma company to produce a drug needed for COVID-19, without having to first enter negotiations with the drug companies holding the patent. The licenses issued under the Act will only be valid for a year and no new licenses will be issued beyond 30 September 2020 (Department of Finance Canada, 2020^[57]).</p> <p>Israel issued a COVID-19 related compulsory license and resorted to parallel imports. The government issued a permit, under Section 104 of the National Defence Act, to import a generic version of a patented drug currently being tested for COVID-19 treatment from India. The permit does not allow to use the drug, which is actually patented for HIV treatment, for non COVID-19 related purposes (Health Policy Watch, 2020^[54]).</p> <p>Germany passed the Prevention and Control of Infectious Diseases in Humans Act. Under this bill, the Ministry of Health enjoys extra powers including the ability to issue a compulsory license under section 13 of the patent act, a provision never been used so far. The Act allows issuing a compulsory license in the interest of public welfare and security. Licenses granted under this provision can be administratively challenged, but their use will not be suspended pending the outcome of the challenge. Any license will be automatically revoked upon expiration of the law on March 2021 and, in any case, when the public welfare and security emergency will cease.</p>
International research consortia are accelerating COVID-19 research in developing countries
<p>The COVID-19 Clinical Research Coalition is an initiative that brings together scientists, physicians, funders and policy makers from over 30 countries. It aims to share technical expertise and clinical trial capability and advance research in resource-poor settings. The Coalition identified current clinical trials that overlook the needs of developing countries, where health systems are fragile and the impact on vulnerable populations is high. It aims to facilitate rapid and joint protocol reviews by ethics committees and national regulatory agencies, and the importation of required materials, as well as to standardise the collection of key data to enable robust analysis and swift publication (COVID-19 Clinical Research Coalition, 2020^[58]).</p>
Scaling up clinical trials beyond national borders: the WHO SOLIDARITY trial
<p>The WHO and partners launched the SOLIDARITY trial which will take place in multiple countries, aimed at investigating treatment options for COVID-19. The programme will compare four treatment options that include the use of specific drugs including Remdesivir, Lopinavir, and their combined use, the interferon beta-1a and the combined use of chloroquine and hydroxychloroquine. As of 21 April 2020, over 100 countries are working together to find effective therapeutics via the trial. The initiative will provide simplified clinical trial procedures to enable hospital staff to participate easily. By increasing the scale of the trials, the WHO estimates that the time taken to design and conduct randomised clinical trials, which normally last for years, will be reduced by 80%. To ensure that trials have access to the drugs needed, the WHO is co-ordinating donations from manufacturers (WHO, 2020^[59]).</p>

Five priority actions to speed-up Africa's response

African governments have acted fast and together to confront the pandemic. The African Union Joint Continental Strategy includes specific provisions to address gaps in testing capacities, from pooled procurement and warehousing to standardisation, and mechanisms to channel financing where it is needed the most (Box 1).



Box 1. The Africa Joint Continental Strategy for the COVID-19 Outbreak

African governments are working together to co-ordinate their response to COVID-19 and to solidify continental supply chains.

The Africa Joint Continental Strategy for COVID-19 Outbreak, developed by the African Union and the Africa Centres for Disease Control and Prevention (Africa CDC) of the African Union Commission, is implemented through two major operational units: the Africa Task Force for Coronavirus (AFTCOR), and Africa CDC's Incident Management System.

The Partnership to Accelerate COVID-19 Testing (PACT), which is directed by the Bureau of AU Heads of State and Government, is working with existing supply chain systems to step up functioning regional lab referral networks to help countries without diagnostic capacity find a suitable, timely option for testing. It encompasses three important objectives (AU, 2020^[60]):

1. Establishing warehousing and distribution hubs across Africa, in partnership with organisations like the World Food Programme and Ethiopian Airlines
2. Co-ordination of pooled procurement of diagnostics and other medical commodities for distribution across the continent
3. Standardisation and deployment of common technology platforms to boost public trust in testing data, epidemiological models and critical health forecasting techniques as part of the economic recovery and reopening agenda.

In addition, the continent can leverage the African Continental Free Trade Area (AfCFTA). The AfCFTA is an unmissable opportunity to connect the response to the crisis with the long-term agenda of transforming Africa. Boosting intra-African trade can serve as a stimulus package to get Africa back on track post COVID-19. The pandemic has strengthened the case for developing intra-African regional value chains and unlocking the continent's business potential. A rapid and ambitious implementation of the AfCFTA will go a long way in hastening the recovery from COVID-19 impacts, while inoculating Africa against future adverse effects of global shocks related to health, food security and climate change. AfCFTA negotiations should continue online, utilising the secure electronic platform offered by the AfroChampions. The AfCFTA design should incorporate the response to the pandemic – and to the economic crisis at large. The delay of implementation from 1 July 2020 to 1 January 2021 offers a window of opportunity for creative thinking on how the AfCFTA can be reconfigured to reflect new realities and risks. As member states finalise their tariff schedules, it will be important that essential “survival” goods such as medicines, ventilators, PPE and food staples (e.g. grains, vegetables and meat) are not included under sensitive or exclusion lists. The pandemic has highlighted the importance of digital trade and connectivity and supportive regulatory and governance frameworks. Policy makers should revisit the AfCFTA's built-in agenda to introduce a new ambitious work programme of simultaneous negotiations on phase 2 (intellectual property rights, competition policy, investment) and phase 3 (e-commerce) issues, as well as prioritising the liberalisation of health and education services in 2021-22. The reaction to COVID-19 has accelerated technology adoption and the shift to industry 4.0 in a way that is likely to persist. AfCFTA can provide the basis for leveraging on the opportunities of e-commerce and digitalisation to industrialise in a new way. In this respect, participating in multilateral discussions, including at WTO, is an important step in enabling the continent to take an active stance and participating in the creation of the rules that will shape the digital economy of tomorrow (Primi and Toselli, 2020^[61]).

Continental and national development finance institutions have also stepped in to provide additional financing to mitigate the impacts of the pandemic (Box 2).



Box 2. Development banks are stepping in to tackle COVID-19 in Africa

- The South African Industrial Development Corporation has put a package together with the Department of Trade and Industry of more than ZAR 3 billion for industrial funding to address the situation of vulnerable firms and to fast-track financing for firms' critical efforts to fight COVID-19 and its economic impact.
- AFREXIMBANK introduced a USD 3 billion facility: the Pandemic Trade Impact Mitigation Facility (PATIMFA). It provides financing to assist African countries to adjust to the financial, economic and health service shocks caused by the COVID-19 pandemic, in an orderly manner. It is expected that the facility will also provide financing for the scaling up of manufacturing of COVID-19 requirements that can be produced in Africa and sent across borders.
- The African Development Bank (AfDB) raised USD 3 billion in a three-year bond to help alleviate the economic and social impact of the pandemic on Africa. The Fight COVID-19 social bond is the largest dollar denominated social bond ever launched in international capital markets to date, and the largest US dollar benchmark ever issued by the bank. The bond issuance underpins AfDB's move to provide flexible responses aimed at lessening the severe economic and social impact of the pandemic on its regional member countries and Africa's private sector. In addition, the AfDB launched a USD 10 billion COVID-19 Response Facility to assist regional member countries in fighting the pandemic. The total amount disbursed by the AfDB (USD 13 billion), is equal to 6.5% of the subscribed capital of the bank and compares well with similar efforts in other regions. The Inter-American Development Bank, for example, has made available USD 16.3 billion (9% of capital subscribed) to support the fight against COVID-19 in Latin America and the Caribbean, the Asian Development Bank is deploying a USD 20 billion package to address the needs of its developing member countries in Asia-Pacific, and the European Bank for Reconstruction and Development is channelling USD 1.3 billion (2.3% of subscribed capital) in Europe.

But African governments cannot act alone. A renewed form of global solidarity is needed to enable Africa and the world, to overcome this health emergency, and transform this crisis into a development accelerator for the continent. The international community has a crucial role to play. The recent G20 endorsement of a debt payment moratorium for the poorest nations is a positive sign, but it is not up to the needs. ECA is calling for USD 100 billion through budget support to deal with health, social safety net and economic stimulus across Africa. Donations have been a vital source of much-needed equipment in Africa. They need to be co-ordinated to reach the most vulnerable, and they could be essential in ensuring access to new manufactured devices more adapted to specific conditions in Africa (e.g. portable, lighter ventilators could work better in countries with limited or unreliable electricity access).

A new global intellectual property solidarity deal is needed, to make medical supply, treatment and vaccines available and affordable to all. This is essential, for Africa, and for the world. The flexibilities of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement and the Doha Declaration enable national governments to exclude medical supplies from patent subject matter, grant patent use without the consent of the patent holder, and recur to parallel imports by establishing international exhaustion of intellectual property rights in response to domestic policy objectives. Some countries like Canada, Germany and Israel have already enacted laws of this type, enabling compulsory licensing and parallel imports even beyond what is allowed by the international agreements. South Africa, Egypt, Morocco, Kenya and Nigeria possess pharmaceutical capabilities that could be scaled up to supply the continent, in conjunction with parallel imports from India and others. But getting ready to manufacture a vaccine is not easy and cannot be done overnight. It is essential to act fast and enable African countries to prepare to manufacture, through access to knowledge and technology. This is the only way to get an affordable vaccine available to anyone, anywhere, as fast as possible. It is also a precondition to transform the reaction to this emergency into a development accelerator that unlocks industrialisation and economic integration in Africa.

A comprehensive strategy to address the COVID-19 health emergency must address gaps in testing, protecting, treating and curing (TPTC). To do so, five priority areas for action stand out for governments



and businesses in Africa, and for the international community from a trade, industrial and intellectual property policy perspective: 1) facilitating trade and the movement of medical supplies and skilled medical personnel; 2) scaling up local manufacturing capabilities; 3) acting together to leverage opportunities of the AfCFTA; 4) bridging short- and long-term financing gaps; and 5) ensuring affordable access to all pandemic related medical supplies, including the vaccine. Table 6 lists priority actions for each of the five areas.

An effective response on these fronts will go beyond strengthening the capacities of healthcare systems in Africa in TPTC. If strategically managed, this response could set the continent on a renewed, job-rich and sustainable development pattern. It could do so by enabling industrialisation and home-grown innovation leveraging the immense unexploited opportunities of continental integration enabled by AfCFTA. This reaction could go beyond strengthening resilience. It could jumpstart a deep economic transformation in the continent by prioritising green and sustainable development, by opening up new opportunities for local businesses and by creating new and better jobs. In doing so, the trade, manufacturing and intellectual property policy response to the emergency, could be a game changer for the continent and ignite a much-needed structural change that is the key enabler to overcome the biggest development hurdles of the continent: Africa's persistent and high poverty and inequality.

Table 6. Five priority actions from a trade, industrial and intellectual property perspective to tackle COVID-19 in Africa

1. Fast-track imports, exports and movement of skilled personnel within Africa and globally

Ensure free and fast cross-border movement of critical health and technical experts by implementing visa waivers.

Facilitate imports and exports by:

- Allowing import and export consortia to match critical mass and obtain better prices.
- Urgently suspending tariffs on essential COVID-19 imports.
- Creating customs "Green Lanes" to fast-track clearance of medical supplies.
- Co-ordinating diplomacy against the imposition of export limits on essential COVID-19 medical supplies.

Grant fair access to essential goods by enabling national and regional public procurement and by establishing price control mechanisms to avoid speculations.

2. Scale up local manufacturing capacities

Enable local manufacturing

- African standards bodies should pool and share resources.
- Standards for medical supplies should be freely available.
- For those elements that can be produced by 3D printing: fostering mobilisation of 3D printers in the continent for the required use and sharing of codes and files, to enable decentralised production in compliance with safety standards.
- Fostering technical knowledge and information sharing through open access platforms.
- Launching emergency public-private partnerships for medical supplies. Lack of access to finance, key inputs and capabilities constrain African producers with existing or potential capacity for manufacturing COVID-19 medical supplies. Co-operation with the public sector is needed to ensure expedited access to imported parts, and expertise and insurance.

Support effective industrial reconversions

- African standards bodies should pool and share resources.
- Standards for medical supplies should be freely available.
- For those elements that can be produced by 3D printing: fostering mobilisation of 3D printers across the continent for the required use and sharing of codes and files, to enable decentralised production in compliance with safety standards.
- Fostering technical knowledge and information sharing through open access platforms.
- Launching emergency public-private partnerships for medical supplies. Lack of access to finance, key inputs and capabilities constrain African producers with existing or potential capacity for manufacturing COVID-19 medical supplies. As in the case of scaling up local manufacturing capabilities, co-operation with the public sector is needed to ensure expedited access to imported parts and expertise and insurance.

3. Act united

Co-ordinate at the continental level, leveraging on Regional Economic Communities

- Co-ordinating at the continental level to leverage on continental manufacturing hotspots.
- Facilitating and fast-tracking intra-African trade of supplies to reach areas where local manufacturing is not possible, or too costly.



- Regional Economic Communities should set up joint reporting mechanisms on the availability of supplies and production facilities. These can be accompanied by commitments to expand production with clear mutual agreements to export to each other.

Implement a co-ordinated continental approach, leveraging on the Africa Union Commission AFTCOR, and in particular, support the Task Force in:

- Providing technical assistance, supplies, or other means that require scaling up.
- Building a stockpile and managing supply chains for shared continental resources such as personnel protective equipment, laboratory supplies and equipment, and if necessary, medical countermeasures.
- Building and managing relationships with reliable manufacturers, and connecting Member States who either have depleted stockpiles or who are anticipating meaningful needs given positive cases.

Manage supply chains effectively

- Pooling together resources to expand air cargo logistics.
- Humanitarian corridors can be effectively used to move medical supplies and medical workers safely across borders and to reach remote areas.
- Mobilising existing capabilities to secure logistics. Africa hosts operations of several global players and multinational companies (MNCs): these companies can make their logistics capacities and networks available for African countries to face COVID-19. Some MNCs are already doing this for their home economies – they should step in for Africa too.

4. Bridge short- and long-term financing gaps

Fast-track financing for companies involved in providing COVID-19 related solutions.

Strengthen national development banks' capacities to channel financing for companies involved in COVID-19 related solutions, including digital services and agro-food, and setting up a special mechanism to support industrial activities impacted by social distancing measures and lockdown.

Mobilise international and regional development finance to cushion the impact of COVID-19 (Box 1).

Channel donations to the most vulnerable and in need.

5. Ensure affordable access to technology, knowledge, drugs and vaccines

Facilitate technical knowledge sharing through digital technologies among doctors, health professionals and businesses to speed up the learning process.

Achieve a global deal to make intellectual property work to ensure fast and affordable access to drugs, medical equipment and COVID-19 related technologies

- Lift intellectual property (IP) protection on patented drugs under testing and/or found to be safely used for COVID-19.
- Make use of compulsory licensing and related Intellectual Property TRIPS (Trade Related Aspects of Intellectual Property Rights) flexibilities to manufacture and import patented supplies and technologies needed to face COVID-19 from third parties. The flexibilities included in the TRIPS agreement and the Doha Declaration, even if they have limitations, enable countries to take steps to ensure affordable access to drugs and therapeutic methods. In particular:
 - Article 27 of the TRIPS clarifies that members might exclude therapeutic and surgical methods for the treatment of human and animals from patentable subject matters diagnostics.
 - Article 31 of the TRIPS agreement clarifies the conditions under which use of a patent can be granted without the authorisation of the right holder (a practice commonly known as compulsory licensing).
 - The principle of international exhaustion of IP rights could also be applied to enable parallel imports (these are products sold in a market by the patent owner, or with its consent, and then imported in a third country without the consent of the patent owner). The Doha Declaration (5d) clarifies that countries can determine the principle of rights exhaustion that best fits their domestic policy objectives.

Fast-track testing and clinical trials

- Pooling and sharing medical quality standards and resources for the rapid approval of new medical products.

Track and ban counterfeited drugs and medical equipment

Sustain research and development in Africa

- Funding research and development in Africa.
- Leveraging local research capacities in Africa and involving star scientist and laboratories in international research groups.
- Fostering participation of local research centres in international research partnerships.
- Activate mechanisms for sharing timely and adequate information to support decentralised research.

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