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Commentary

Surmounting inherent challenges in healthcare service delivery for effective procurement and distribution of COVID-19 vaccines; A developing country context

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The COVID-19 pandemic has led to over 111 Million infections and over 2.4 Million deaths [1,2]. The majority of these infections and deaths have been recorded in developed countries, even in those adjudged to have the best healthcare systems in the world. If having the best healthcare system in the world is anything to go by in fighting infectious diseases, then surprisingly, many countries in Africa, including Nigeria, with severely resource-constrained healthcare systems, have had the lowest burden of the COVID-19 pandemic [2]. That is, if, the statistics being captured gives a true representation of the actual number of infections and deaths. Nevertheless, there is a current surge in the number of COVID-19 cases in Nigeria, with thousands of cases being reported daily since the turn of the new year as against a few hundred daily cases over the past three months. This raises a cause for concern as a continual rise will present a significant strain on the healthcare system that is already over-burdened. The availability of vaccines against COVID-19 has brought some glimmer of hope to the fight against the global pandemic, however, there are still causes for concern for developing countries like Nigeria, including funding sources for purchasing the vaccines, vaccine availability for over 200 million people, how vaccination will be prioritized, vaccine handling and storage given weak cold chain infrastructure, and navigating corruption in the health sector.

Recently, the Nigerian Minister of Health stated that the country needs just over a Billion US Dollars to procure vaccine doses for Nigerians, an amount which he says will be enough to vaccinate 70% of Nigerians at a cost of 8 US Dollars per vaccine dose [3]. This estimated

cost per vaccine is a far cry from the current prices starting from 19.50 USD upwards [4]. Since the vaccines available require at least two shots, the estimates made by the Nigerian Ministry of Health needs a significant upward review. This review, however, seems to be the least of the problems in terms of procuring these vaccines. The major issues are: where will the country get the funds to procure these vaccines and what amount of time will it take to source for enough vaccine doses that will cover 2 shots for over 200 million people? Nigeria is currently facing its worst recession in over 30 years and currently rely on loans to fund its National budget. Worse still, over 30% of the current budget is spent on servicing existing loans. As foreign debt continues to rise, the country now resorts to taking loans from local sources to fund its budget. For instance, most recently the country borrowed over 70% from pension funds contributed by working class Nigerians planning for their retirement [5]. To fund its 2021 budget, the country is planning to borrow funds from unclaimed dividends and dormant accounts of individuals [6]. Clearly, the country seems not to have the financial capacity to procure vaccines that will ensure coverage for its citizens.

Be that as it may, there exists a facility known as COVAX which was put in place as a platform to support development of COVID-19 vaccines and negotiate their pricing to ensure equality in access to these vaccines [7]. However, current reports suggest that the COVAX facility may not be achieving its aims as wealthier countries that can self-finance vaccine procurement are bypassing the COVAX facility and going into bilateral agreements with vaccine manufacturers which is increasing the prices of

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these vaccines [8]. Furthermore, there are reports suggesting that some of these wealthier countries are hoarding vaccines, as much as 1 billion extra doses than they need, which is enough to vaccinate the entire African adult population [9]. This will put poorer countries at risk and delay their recovery from the pandemic [10], hence the need to explore alternative sources of vaccine procurement.

Beyond the issue of funding vaccine procurement is the issue of vaccine storage and handling. Some of the COVID vaccines that have been developed require storage temperatures as low as -70 Degrees Celsius. Evidence suggests that the cold chain management infrastructure in Nigeria is grossly inadequate [11]. The severe paucity of cold chain infrastructure was recently echoed by the Nigerian Institute of Medical Research [12]. According to the Director-General of the Institute, the current storage capacity can only hold hundreds to a few thousands of the vaccine. The country was expecting to take delivery of 100,000 vaccine doses required to be stored at -70 Degrees by the fourth week of January 2021 [12], however, there has been a delay in the delivery [13]. With other vaccines which require less stringent cold chain requirements available, the choice of the Nigerian government to opt for a vaccine with more stringent storage, given the inherent inadequacies in infrastructure to hold this vaccine, raises question as to the decision-making process of the government and whether evidence-based methods are employed in selecting vaccines that are most appropriate for Nigeria. There are indications to suggest that the delay might be due to the paucity of cold chain infrastructure [14], however, the Nigerian government blamed the delay on politics and logistics from the vaccine sources [13]. This might not be unconnected to the hoarding of vaccines by wealthier countries and the circumvention of the COVAX facility. Recent reports suggest that the Nigerian government is exploring other vaccines that might require less stringent cold chain requirements [15], however, issues around infrastructure for storage and distribution persist.

The distribution system for medicines in Nigeria are complex and difficult-to-navigate. The infrastructure to distribute vaccines without compromising their quality are simply lacking. Many hospitals, clinics and primary healthcare centers do not have any form of cold chain equipment. Does this mean that those in rural areas will be left out in the vaccination drive? Hence, the issue of prioritizing vaccine administration also comes into play. Over the years, priority setting in the healthcare system in Nigeria has been weak. The current pandemic has further buttressed this. To put this into context, a taskforce was set up by the President of Nigeria to, amongst other things, provide guidance and leadership in the fight against the pandemic. The Secretary to the Government of the Federation was appointed as the chair of this taskforce. After assessing Nigeria's current healthcare system, he stated that he did not know the Nigerian healthcare infrastructure was in such a deplorable state [16]. Despite this revelation, it seems resource allocation for healthcare is still not being prioritized. There is still a paucity of infrastructure needed to curb the spread of the disease in addition to non-payment of allowances to medical personnel working in the front-lines to curb the pandemic in Nigeria which has led to strike actions that have hampered the fight against the pandemic.

Furthermore, corruption and weak healthcare leadership and governance is implicated and its deleterious effects on the Nigerian healthcare system is well documented with hoarding and diversion of vaccines and medicine supplies for private and other uses reported [17]. Even food palliatives meant to sustain poor Nigerians during the periods of lock down were hoarded and diverted by various State Governments and individuals in government and there are no indications yet that this will not be the case for the COVID vaccines when they become available in-country.

Despite the grim situation, it is not yet all gloom and doom. There are still strategies Nigeria and other developing countries facing similar challenges can deploy to enhance COVID-19 vaccine procurement, distribution, and use. Indeed, the COVID-19 pandemic did not only expose the obvious frailties in the healthcare system of developing countries but

has also shown that even the most developed of healthcare systems are vulnerable. Hence, coordination and collaboration are key. It may be imperative to create regional-based vaccine procurement and financing mechanisms as evidence suggests that such mechanisms can work [18]. Even though the COVAX facility might resemble this recommendation, it brings all countries under one umbrella which may hamper cooperation. This is already happening as wealthier countries are bypassing it, which portrays a lack of commitment and less concern for other countries that do not have the financial strength to compete. Hence, a regional-based approach to the COVAX facility will ensure that the clusters are much smaller and since it is based on regions, might improve coordination and cooperation as regions already have common ties to leverage on. Additionally, this might lead to effective pooling of management and technical capacity, funding and resource mobilization, purchasing power and access to international credit needed to aid procurement, storage and distribution of COVID vaccines.

Furthermore, countries that have weak cold chain infrastructure might need to start prioritizing and setting up in-country cold chain infrastructure in regional clusters for effective supply chain segmentation and distribution. In the African region, for instance, with current regional collaborations such as the African Continental Free Trade Area, already underway, and the Africa Medicines Agency Treaty inching forward, countries can begin to leverage on each other's strengths and capabilities to develop healthcare infrastructures that transcend national boundaries. This might also enhance distribution and tracking of vaccines and make it easier to detect any efforts to divert or hoard vaccines. While establishing regional clusters for infrastructure, creating, and training a robust and knowledgeable network/workforce pooled from already-established health service provision support networks and medical and allied health professionals' associations and councils can be pursued. This should increase the strength of in-country skilled workforce that can be called to action as vaccines become available for distribution and administration. Looking inwards for other context-specific solutions that can aid vaccine distribution and administration is important. Countries in the African region can also begin to explore the possibility of using community pharmacies as vaccination centers since they have been adjudged to be the first port of call and the most accessible center of healthcare service provision to the public [19]. This might improve vaccine coverage and make it easier to educate more people about the vaccine and improve vaccine acceptance since people in the community already have established trust in their community pharmacists.

Efficient plans require commitment, investments, judicious use of available resources, multi-partner collaboration and effective communication. With these in place, ensuring vaccine coverage to mitigate the spread and burden of COVID-19 can be achieved.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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