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Commentary

Covid-19 pandemic, R&D, vaccines, and the urgent need of UBUNTU practice[☆]

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Covid-19 has hit more than 170 million people, with more than 3.5 million deaths [1]. It continues to evolve and spread across the planet and the SARS-CoV-2 variants of concern represent a further threat for global health security.

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This pandemic promoted uneven impact on health of populations, among countries and regions [1], with the severity and mortality being higher in poorer communities. Educational, economic, social, and other negative impacts are more significant in least developed societies, as recently showed in Brazil [2,3]. A global deployment, allocation, followed by local rollout in scale, are dimensions to be tackled aiming at achieving global control of Covid-19.

Although patient management has improved, and some medicines have been authorized for emergency use, no gold standard course of treatment for Covid-19 has been defined. Therefore, the rapid development of safe and effective vaccines has emerged as key tools to mitigate and overcome this pandemic. The 2010-2020 was to be the decade of vaccines [4], but the world is far from being close to vaccine security, and access to vaccines continue to be disproportionately inequitable [4,5], in terms of economic and geographic distribution. In this respect, a central chal-

lenge is the global access to anti-Covid-19 vaccines since asymmetries in access will further enhance inequities between Nations [5].

The Covid-19 vaccine frontrunners are those organizations that invested early in a portfolio of vaccine candidates, in countries that historically have largely invested in science. There is a convergence of a strong health productive base, an expressive effort in science, technology and innovation and a politically coordinated action to meet the demands of the society. Yet, despite pre-purchases of vaccine candidates, producers have not yet been able to deliver the doses contracted.

Differences in the control of the pandemics with unequal infection spreading and huge inequalities in vaccine rollout (within and across regions and continents) can favor the surge of new variants due to environmental selective pressure upon the virus, its continuous evolutionary path, including consequent mutations. This likely results in higher negative impact in countries with low and/or slow vaccination coverage/rollout.

The fast-track development also raised several concerns on regulation and incentives related to clinical trials as well as R&D and vaccine security [4], calling for intense collaboration [6]. So, it is urgent to discuss alternative models for vaccine R&D and production to guarantee equitable access in the current and future pandemics.

In Brazil, organizations such as the Oswaldo Cruz Foundation and the Butantan Institute have devoted efforts to guarantee access to vaccines, based on technology transfer agreements and investments for in-house and collaborative R&D. Both institutions engaged in technology transfer agreements to guarantee immediate access and sustainable self-sufficient national production of anti-Covid-19 vaccines. The existing Universal Health System (SUS - *Sistema Unico de Saúde*) entails a strong and National Immunization Program with capacity to roll out massive vaccination campaigns reaching the entire population [3].

To understand the central role of regional technological and production capabilities, as seen in the Brazilian case, the concept of Health Economical-Industrial Complex [7] should be applied. Developing countries within the same region, block or network should join efforts to build up their health scientific and technological capacity, including drugs, active pharmaceutical ingredients, essential health materials, diagnostics, equipment and sophisticated information and communication technologies needed to better cope with present and future challenges.

Technologies for new vaccine production should be incorporated in regional productive arrangements immediately as they appear. The basic science, integrated to technology and innovation are essential and mandatory to support independent technology capabilities. Obviously, the accomplishment of such major changes depends on the signature of international cooperative programs in the region.

Other pandemics will emerge. The continuous man-made changes in the environment will contribute to the appearance of yet unknown viruses that eventually will spill over and infect mammals including humans [8]. Recently, world leaders highlighted the need of a collective action to address pandemic preparedness [9], which should entails strengthening surveillance, monitoring, genomics, and a massive increase in R&D investments

in a human-centric approach [10]. This must be a State policy in each and all countries, and not fluctuate as a function of different administrations.

Finally, to push such a proposal to a global scale, the principle of humanity and solidarity among nations should prevail over competition. We all should commit to cooperate, share scientific and technological information and demand from each other investments in education, health, and science. It is unacceptable that developed countries establish export barriers, patent protection mechanisms in the pandemic context, restricting technological transfer for producers in less developed countries. The whole world must have equal access to vaccines and benefit of the transforming triad: education, science, and health, putting people first and leaving no one behind. Accordingly, it is urgent the practice of UBUNTU. This Bantu language-derived African word reflects the concept of humanity so that each and all human beings are interconnected, being part of a worldwide network of solidary behavior: "***I am because we are***".

Declaration of interests

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