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Achieving the Public Health Potential of COVID-19 Vaccines

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Despite remarkable progress on developing viable coronavirus vaccines, several factors could undermine the public health value of this effort.

COVID-19 represents the biggest public health crisis in generations, and vaccines are a key component of preparedness and response. The spread of the pandemic continues to threaten public health worldwide with severe consequences for individuals, societies, economies, and global health. Vaccines will be essential public health tools to control the present pandemic and protect against future outbreaks.

According to the World Health Organization, as of October 29, there were 45 COVID-19 candidate vaccines in clinical evaluation and an additional 156 in preclinical evaluation. This represents a remarkable achievement by researchers and funders resulting from unprecedented collaboration and innovation across the public and private sectors globally. Yet there is more to a successful vaccine than good research.

To ensure that the results, if successful, achieve optimal public health benefits, the entire process of COVID-19 vaccine development, assessment, and eventual availability, distribution, and uptake must be understood and appropriately implemented. The

InterAcademy Partnership (IAP), the global network of more than 140 academies of science, engineering, and medicine, launched its own COVID-19 Expert Group in August to examine a broad range of health, social, environmental, and other direct and indirect consequences of the pandemic.

In September, IAP published a Communique on the development and distribution of vaccines against COVID-19. It raised three main concerns that could undermine the public health value of the collective vaccine effort. We highlight those concerns here.

To achieve optimal public health benefits, the entire process of COVID-19 vaccine development, assessment, and eventual availability, distribution, and uptake must be understood and appropriately implemented.

First, despite widespread agreement to accelerate progress in development to the greatest degree possible, it would be counterproductive to cut corners in assessing the efficacy and safety of any candidate vaccine. Early evidence of success for a growing number of vaccine candidates is encouraging, but undue haste in vaccine approval is a threat to public health. Not only might it jeopardize the health and safety of recipients, but it could undermine the willingness of individuals to take what they perceive as an inadequately studied vaccine, compromising the very opportunity the vaccine would offer to control COVID-19.

Moreover, should problems with the vaccines arise, it could elicit more broadly a large, dangerous backlash against the use of established vaccines. There is much still to learn about the SARS-CoV-2 virus, which causes COVID-19, and the human response to infection. Vaccine development, including innovation in clinical trial design and in early scale-up and manufacturing, has to proceed at a pace that enables the necessary scientific understanding to unfold, such that durable safety and efficacy are demonstrated with appropriate rigor.

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The recent commitment by major commercial vaccine producers to maintain standards and follow tried-and-tested protocols—for example, by pausing trials while anomalous

reactions among test subjects are investigated—is welcome, but must be accompanied by increasing transparency in disclosing data. Clinical trials must include appropriately diverse populations, including members of populations at risk who will ultimately need to receive the vaccine. In addition, conducting trials in many regions of the world is vital and can both help ensure vaccine assessment in those regions and help build capacity for ongoing and future clinical research studies.

For example, there is a promising opportunity in Africa, a region where vaccine clinical trial infrastructure has been limited, as there is momentum by academies and others to involve African scientists in COVID-19 research and development. There is also the need to develop vaccines that can be used in the conditions prevalent in many low- and middle-income countries where, for example, a temperature-controlled supply chain, or cold chain, is absent, or where the pandemic creates additional incentives to develop the required cold chains.

Second, concerted effort must be made to oppose the misinformation, distrust, and denial promulgated by anti-vaccine lobbies, which are often highly organized and have vested interests. But this is not enough. It is also imperative to communicate the benefits and any potential risks to those who are vaccine-hesitant, in particular the most vulnerable due to socioeconomic status, education level, or ethnicity. These responsibilities require scientific voices to engage widely in order to build trust in vaccine development and in health care services, while also addressing the environmental and social factors that are conducive to conspiracy and misinformation. Such communication efforts must include the engagement of trusted leaders and messengers in the communities of concern.

Additionally, given the current lack of clarity about the duration of the immune response to SARS-Cov-2, scientists must counsel realism in the face of the high expectations for a panacea promoted by some politicians. Thus, there is pressing need to put the latest knowledge about behavioral change, as well as social values and practices, into action for communication and health services initiatives on COVID-19 vaccination.

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Third, individual safety depends on collective immunity; therefore, any successful vaccine must be made available equitably, according to public health needs. Access should be

provided to those most vulnerable, impoverished, and disenfranchised worldwide. A limited, nation-based approach to vaccine procurement and stockpiling is both unethical and will likely be ineffective in an interconnected world. IAP, as a participant in the Sustainable Health Equity Movement, welcomes *The Lancet* COVID-19 Commission's efforts to drive global, lasting solutions to the pandemic, and urges all its member academies and other national science and health institutions to insist that their governments become involved in international efforts, including the Access to COVID-19 Tools (ACT) Accelerator, which is being spearheaded by WHO, the Global Alliance for Vaccines and Immunisation (GAVI), and the Coalition for Epidemic Preparedness Innovations (CEPI) to promote equitable access to vaccines.

A fourth critical issue is the current disruption of childhood immunization and other health services by the pandemic where, according to WHO analysis, many countries are experiencing problems related to both vaccine delivery and demand. Modeling indicates that COVID-19 disruption of measles vaccination, for example, will increase child mortality, especially in low- and middle-income countries. An unprecedented worldwide commitment to COVID-19-specific research and development must be accompanied by renewed efforts to strengthen health services to deal with all challenges resulting from COVID-19.

Academies of science, working at the national and regional level, are well placed to identify, research, and address problems locally, rather than reinforcing the historical dependency of many nations on external sources of innovation and development. In responding to COVID-19, the strengths of national academies, individually or together as members of IAP or its regional networks, are well placed to help mobilize and integrate scientific resources across a broad array of disciplines and expertise worldwide, to support innovation and implement good practice in bringing this pandemic under control everywhere. These efforts can help to assure effective policies and practices across all dimensions of the vaccine development and distribution endeavor.

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