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Editorial

Vaccinating Saves Life, Not Vaccines in Refrigerator Shelves: Learning Lessons from Developed Countries!

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Since the first case of SARS-CoV-2 diagnosed in December 2019 in Hubei Province Wuhan, China, the world has grappled with finding the prevention and therapeutics to end the pandemic [1]. The virus has infected almost 80 million patients globally and accounted for approximately 1.8 million death globally, with the United States ad India leading the toll with 19 million and 10 million infections. (The U.S. death toll during the Spanish Flu Pandemic was 675,000; World War II was 407,000, Iraq/Afghanistan War was 6,746. For comparison, COVID-19 has taken 325,000 lives in the U.S. in less than one year) [2,3]. Initial efforts towards diagnostic testing helped diagnose and isolate infected patients with the hope of curbing down the pandemic. This served as an addition to massive education efforts regarding the use of face cloth coverings, physical distancing, hand washing, and disinfecting surfaces (only to be muddied by the politicization of public health measures leading to an ineffective public health campaign and further transmission of the virus). Therapeutics with multiple new medicines, repurpose drugs, and convalescent plasma were studied with controversial data emerging. The only steroid that is proving to be an effective drug among hospitalized patients in reducing the mortality is steroid [4]. The race for the vaccine is ongoing—there are more than 100 contenders with more than ten companies approaching the finish line.

In November, the Pfizer/BioNtech vaccine and Moderna vaccine, both messenger R.N.A. based technology, achieved Emergency Use Authorization (E.U.A.) by the Federal Drug Administration (F.D.A.). Moreover, Pfizer/BioNtech gained approval for their vaccine in the U.K a week earlier than they did in the U.S. This offered hope as the first step towards ending the global pandemic. Other vaccine makers including AstraZeneca and Johnson and Johnson were close runner ups [5,6]. Meanwhile, the Chinese and Russian vaccines have also received approval from their countries for mass vaccination along with a few countries in the Middle East [7,8]. The availability of vaccines offers hope and a light at the end of a long tunnel to end global suffering and bring life (and the economy) back to near normalcy.

Scientists have delivered the unachievable by providing the vaccine to the world in the quick span of 9 months, which would have usually taken 3-10 years. The biggest challenge is vaccinating 70% of each country and the global population in order to help achieve herd immunity and trust among the population. This trust has been muddied by controversial and political downplay along with an anti-vaccine group.

Vaccine development is progressing at a record pace with table 1 showing some key companies who are the front runners [8], are expected to be approved, or nearing approval over next 2-3 months to bring hope to developed and low middle-income countries (LMIC). Moreover, there is a lot of disparity between developed countries and LMIC, with Canada, U.S.A., United Kingdom, Australia, and European Nations leading the way with pre-ordered vaccines. These countries also have a vaccine purchasing potential of 5-9 times the number of their populations. The logic is for these countries to get enough vaccines from the first available source to stop the virus and improve the morbidity, mortality, and the economy. On the other hand, LMIC and poor countries are still struggling to get basic public health measures and therapeutics in place.

Company	Type	Doses	Effectiveness	Storage
Pfizer/BioNTech	Messenger R.N.A.	2	95%	-70°C
Moderna	Messanger RNA	2	95%	-20°C for six months; Can be stored at normal refrigerated temperature for 30 days
Oxford University/ AstraZeneca	Viral vector (genetically Modified)	2	62%-90%**	Regular refrigerated temperature
Gamaleya (Sputnik V)	Viral Vector	2	92%	Regular refrigerated temperature
Sinopharm	Inactivated Virus	2	86%***	2°C-8°C
Johnson & Johnson	Viral vector	1	In the Phase III trial	2°C-8°C
Novavax	Protein subunit	2	In the Phase III trial	2°C-8°C

Table 1: Front runner vaccines effectiveness and storage.

**: 62% efficacy in full dose followed by a booster dose in 4 weeks resulting in 62% efficacy. Half dose followed by a full booster dose resulting in the effectiveness of 90%.

***: No phase 3 data of safety and efficacy has been shared publicly.

Since two mRNA-based vaccines have received approval, the challenge has been in distributing and administering the vaccine. The most significant challenge has been with the Pfizer/BioNTech vaccine along with challenges in cold chain transport and storage with the Moderna vaccine being easier from the logistic point. The United States has the optimistic goal of vaccinating at least 20 million people by the end of 2020. So far it is likely that they will miss the target by a long shot. As of December 23rd 2020, only 1 million vaccines have been administered, while more than 9 million vaccines remain on the refrigerator shelves [9]. With every passing week, more vaccines are making their way down the chain with logistic challenges at the vaccinating sites. Public confidence has been low due to misinformation, making the process of ending the global pandemic even more challenging. Strong efforts will have to be made to go to university campuses, places of gathering, workplaces, and the mobile team to reach rural areas if we truly want to see the light at the end of the tunnel.

Globally there is an even bigger challenge. Developed countries have pre-ordered the vaccine 3-9 times their population, making the availability of the vaccine for the rest of the world more challenging. LMIC must rely on Chinese and Russian vaccines while waiting for the AstraZeneca/Oxford vaccine and multiple global labs worldwide like the Serum Institute of India to start supplying the vaccine. It is important to note that these labs have preemptively made hundreds of million of vaccine doses while awaiting the approval. More than a hundred countries have joined GAVI, which via the COVAX, is committed to supplying 20% of the vaccine to these countries to meet the need of vaccinating frontline workers and high-risk patients [10]. The COVAX has refrained from pre-ordering mRNA-based vaccines due to cost and issue with the cold chain issues and storage. This has created a challenge within LMIC populations getting the mRNA-based vaccine, with no choice but to wait for other vaccines to make their way through the approval process.

As the world celebrates the scientific feat of creating the vaccine and making a giant leap towards ending the pandemic, a question still remains, what will save lives? The vaccination or vaccinating people? Developed and developing countries need to work together in vaccinating, educating, and supporting each other, if we want to end this pandemic quickly. Otherwise, we may see the virus existing and remerging for years to come, like the common flu virus. With the SARS-CoV-2 already mutating in the U.K, with 70% more transmission capacity and 23 mutations seen in the new variant B.1.1.7, this issue is even more critical to address [11]. The decision is up to global leadership and public on how they plan to vaccinate and get vaccinated, while vaccines are still being produced and delivered.

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