

# Chapter 6

## Science, Technology, and Innovation Response to the COVID–19 Pandemic: The Egyptian Case

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### **ABSTRACT**

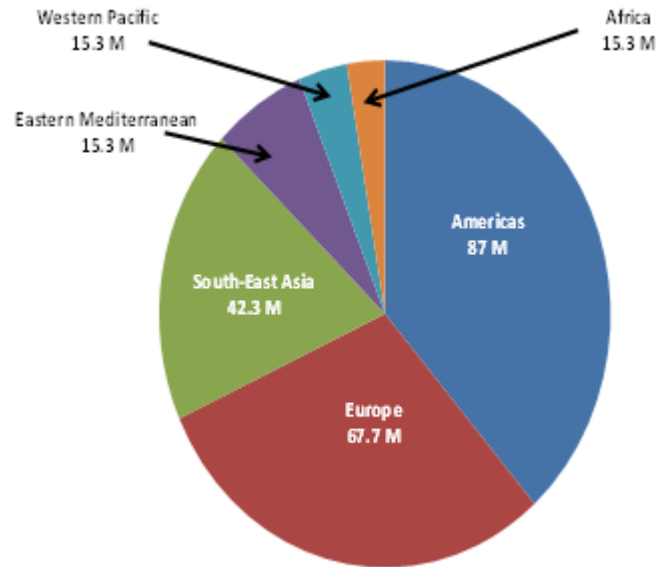
*The COVID-19 pandemic has caused deep changes all over the world. Great efforts to stop the spread of the contagious are still under actions in economy, social works, STI through many activities. The study highlights the Egyptian efforts in the STI sector for facing the pandemic effects. Conceptual and methodology framework of the study is built up and discussed. Egyptian government emergency response package greatly minimized its effects. Also, HEI's policies suggested an innovation framework to strengthen the Egyptian market. STI institutions in both MOHESR and MOHP worked on the effects of drugs clinical trials, vaccine manufacturing, and therapeutic approaches. Internationally recognized publications in Egyptian top universities and research centers focused on many topics including the effect of drugs and antibiotics on the infected patients with the virus for efficient therapy, the genetic development of the virus in Egypt, monitoring of the extent possibilities for the formation of collective immunity in Egyptians, the movement of antibodies in their bodies, and many other activities.*

### **INTRODUCTION**

The coronavirus COVID-19 pandemic is still continuing worldwide that is known to be caused by a severe acute respiratory syndrome coronavirus 2(SARS-CoV-2). The virus was first identified in December 2019 in Wuhan, China (Ben Hu et al., 2021). A public health emergency of international concern was

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*Figure 1. Global distribution of Coronavirus infected cases as of September 16<sup>th</sup>, 2021 (WHO Coronavirus (COVID-19) Dashboard, n.d.)*



declared regarding coronavirus, COVID-19 on January 30<sup>th</sup>, 2020 and after about 40 days on March 11<sup>th</sup>, 2020, it is considered as a global pandemic. Globally, as of September 16<sup>th</sup>, 2021, there are more than 229million cases have been confirmed, with more than 4.6million deaths attributed to the pandemic, making it one of the deadliest such pandemics in history (Coronavirus World Meter, n.d.).

Cases are rising daily with the higher ratio in Europe, then in North America, Latin America, Asia and finally in Africa and MENA Countries in a wave behavior. Figure 1 shows the distribution of the infected cases all over different regions in the world (WHO Coronavirus (COVID-19) Dashboard, n.d.).

Figure 2 illustrates the Worldwide and Egypt daily infected new cases of the COVID-19 patients from the starting of the pandemic up to September 22, 2021. Globally, it is clearly that there are 5 waves of the pandemic, where the first wave was during March-April 2020, the second wave was during June-July 2020, the third wave (broad) was during October 2020-January 2021, the fourth wave was during March-April 2021 (highest infected people) and the last fifth wave (July-September 2021). In Egypt, only four waves are recorded with a shift from the global waves with the missing of the 2020 summer wave. In 2021, the fourth wave is started earlier in September 2021 and the peak of the wave is expected to be either in October or the beginning of November 2021. The highest peak was for the first one in July 2020, which may mean that a major of people was herd immunity partially gained although a small part of people is vaccinated as will be explained below.

There are great efforts all over the world to slow down the spread of the contagious disease via more tests, treating patients with various protocols, tracing of the contact persons, developing vaccines, travel restrictions, quarantine citizens as well as preventing intense gatherings and meetings such as schools, universities, sports and concerts.

SARS-CoV-2 has four structural proteins, which are “S” for spike, “E” for envelope, “M” for membrane, and “N” for nucleocapsid, which encapsulates single-stranded viral RNA as shown in Figure 3. The Spike protein is cleaved into S1 and S2 by the host cell protease, one of which is trans-membrane

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