HOW HEALTHCARE TECHNOLOGY IN 2020 CHANGES THE WAY THAT THE WORLD CAN DEAL WITH A PANDEMIC

COVID-19 has Highlighted How Healthcare Stakeholders Around the World Leveraged Healthcare Technology to Mitigate the Pandemic's Threat

A pandemic is upon us. The Coronavirus Disease 2019, COVID-19, has taken a grip on the world and as of March 30, 2020, it has impacted 199 countries and territories and 2 international conveyances (cruise ships), infected 735,041 persons, and claimed 34,806 lives. Governments worldwide are scrambling to battle the disease. Healthcare systems are buckling under the pressure and some frontline healthcare workers are feeling despair.

Despite the panic being caused by COVID-19, and although it may not look that way to the common man, healthcare is in a much better position to handle this pandemic than it was in previous outbreaks of infectious diseases. For one, we have learned lessons from previous outbreaks such as severe acute respiratory syndrome (SARS) that have helped us to prepare, and there is a tool in our arsenal that wasn't so readily available before, healthcare technology.

Past Outbreaks and the Availability of Healthcare Technology

We are no stranger to outbreaks of infectious diseases. Disease outbreaks are a natural part of human existence and there have been many outbreaks throughout history that have significantly impacted human life, at times wiping out an entire civilization or changing the course of history. There have been many notable epidemics and pandemics dating back to the middle ages. The Spanish Flu of 1918-1920 has the unenviable title of being the most deadly pandemic in human history. It is estimated to have infected a third of the world's population and killed at least 50 million people.

The SARS epidemic hit the world in 2003 and ended with a reported 8,096 probable cases and 744 deaths, according to data from the World Health Organization (WHO). In 2009-2010, a new strain of the H1N1 virus caused the swine flu, leading to a pandemic which infected 1.4 billion people across the globe and according to CDC estimates, killed between 151,700 and 575,400 people. Ebola raised its head in Guinea in December 2013 and by 2016, it had ravaged West African countries reportedly infecting 28,600 persons and causing 11,325 deaths.

One can only imagine that in the Spanish Flu outbreak healthcare technology was next to non-existent. That might very well have been a big contributor to why the disease was able to infect and kill so many people. By the time SARS came around, healthcare technology was more available and was utilized to help monitor and control the spread of the disease. Companies promoted electronic health (eHealth) solutions that could reportedly aggregate data from patients who supplied daily temperature readings by telephone, fax, or the internet, and use this data to predict symptoms of SARS. Singapore used electronic tracking systems inside hospitals

to facilitate rapid contact tracing in the event that a worker or visitor to the hospital developed SARS.

Global collaboration and information exchange were greatly facilitated by information technology during the SARS epidemic. Spurred by the WHO, 11 laboratories in 9 countries were able to collaborate to conduct a multi-center research project on SARS diagnosis, sharing information through e-mail and a secure WHO website in real-time. The Internet significantly facilitated rapid dissemination of information on SARS through both journal articles and other publications enabling countries and healthcare stakeholders to understand the disease and prepare ahead of time. According to the WHO, its Global Public Health Intelligence Network (GPHIN), provided early detection of SARS. The GPHIN "is a customized search engine that continuously scans world Internet communications for rumors and reports of suspicious disease events."

Lessons from the Past Helping us in the Future

SARS provided healthcare stakeholders with some valuable lessons to prepare for future epidemics and pandemics:

- **Preparedness**: this is extremely important for fighting any disease. The higher the level of preparedness, the higher the likelihood of preventing and/or controlling the spread of a disease. Following SARS, many countries developed national action plans for quick activation and implementation in the event of a disease outbreak. Healthcare stakeholders developed their own plans and built capacity to be able to handle future outbreaks.
- **Global surveillance and alert systems**: SARS showed healthcare stakeholders the value of reporting to surveillance systems and acting upon the alerts generated in a timely manner.
- **Political commitment**: commitment from governments at the highest level plays a major role in successfully curtailing the spread of infectious diseases.
- **Use of technology**: eHealth applications, wireless devices, email, the Internet, and other technologies were praised for enabling early detection and fostering global collaboration and information exchange during the SARS epidemic. Following SARS, companies went on to invest and further develop technological solutions that monitor for and predict future disease outbreaks.

So far in this outbreak of COVID-19, some countries are faring better at containment than others. The USA, Italy, and Spain have now surpassed China, the original epicenter of the virus, in the number of cases of COVID-19. Italy and Spain also now out-number China in the number of COVID-19 related deaths. Some schools of thought attribute this to more preparation in countries such as China, Hong Kong, and Singapore, to handle such an outbreak. It is believed that having experienced previous outbreaks, the countries were more prepared to act quickly

and probably more importantly, people were quicker to take the pandemic seriously and follow the directives of the government and healthcare stakeholders.

Leveraging Healthcare Technology to Fight COVID-19

COVID-19 has come at a time when there is an abundance of healthcare technologies and healthcare stakeholders are leveraging these technologies to help mitigate the spread and find innovative solutions to handle the disease. Artificial intelligence (AI), remote patient monitoring systems, patient generated health data, and telemedicine are some of the healthcare technology that were either not available or as developed in previous pandemics that are being utilized to help us fight the current pandemic.

Artificial intelligence is arguably the leader in the healthcare technologies that are helping the fight against COVID-19. Data science and machine learning are helping to gather and analyze data to help track the outbreak, diagnose patients, and speed up the process of finding a cure for COVID-19. The Toronto-based company [BlueDot](#) which uses AI to conduct outbreak risk surveillance and provide a global early warning system for infectious diseases, was among the first in the world to identify the emerging risk from COVID-19 in Hubei province. BlueDot uses AI models to predict the global spread of the disease and provides real-time insights into movements of the disease such as which cities risked transmitting COVID-19 despite having no official cases. As such, BlueDot's AI can predict the start of an epidemic and also forecast how it will spread.

There have been other [applications of AI](#) in the fight against COVID-19 including:

- Cameras equipped with computer vision and infrared sensors that predict people's temperatures in public areas.
- Health apps with chatbots.
- Robots powered by AI.
- An AI system that can [detect coronavirus in chest CT scans](#).
- Deep learning used to find new information about the structure of proteins associated with COVID-19, an important step in fast-tracking drug research and development.
- An [interactive online tool](#) that helps hospitals and other health-care providers estimate their capacity to manage new cases of COVID-19.

Healthcare technology that allows for **remote patient monitoring** is playing a big role in combatting COVID-19. This is very important in an infectious disease outbreak as it helps to reduce contact and exposure to infectious persons or persons at risk while still monitoring their condition. The US Food and Drug Administration (FDA) has even issued a [guidance](#) providing a policy to help expand the availability and capability of non-invasive remote monitoring devices for this purpose.

One provider of data solutions for remote monitoring, [Validic](#), has launched a real-time [remote monitoring solution for COVID-19](#) that employers and healthcare organizations can use to

monitor employees, patients, and other individuals at scale for emerging symptoms of COVID-19. The solution monitors critical symptoms – body temperature, oxygen saturation, difficulty breathing, cough frequency – analyze the data in real-time and escalate as necessary by sending alerts to human resources or the care management team.

Robots are playing a role too. In one Washington hospital in the US, doctors used a device called Vici to communicate with a COVID-19 positive patient. In China, a robot called Little Peanut was used to deliver food to people under quarantine in a hotel. A hospital in China used robots to deliver medicine and collect bed sheets and rubbish from patients to prevent contact with healthcare providers. The robots are also capable of disinfecting themselves and there are germ-killing robots that can sanitize surfaces and the surrounding air.

Telemedicine is another important healthcare technology that can be utilized now that COVID-19 is upon us. People can use text, telephone, web chats, and video calls to communicate with healthcare providers. Additionally, healthcare providers can use videoconferencing to communicate with colleagues to share knowledge and expertise with each other as they treat patients stricken with the disease.

Some other innovations that are making a difference in the COVID-19 battle include:

- 3D printing.
- Drones which can be used to deliver medical supplies and food to remote or quarantined areas.
- Blockchain for possible healthcare supply chain management.
- Technologies that facilitate telework which are allowing companies to close offices while employees work from home.

Global travel, urbanization, and climate change are some of the factors that are increasing the possibility of outbreaks of infectious diseases. As we work to get a handle on the present pandemic, the world must look to learn all the lessons being taught and use them to better prepare to handle the next outbreak. Healthcare technology is and will continue to play a major role in how we all manage epidemics and pandemics moving forward.