

Review Article

**Better Prepare for Future COVIDs**

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**ABSTRACT**

Lock Down, Quarantine, Social Distancing, Building Hospitals at War Footing, Bringing Army for the Burial, Converting Naval Ships into Hospitals, Race against time to develop a Vaccine are inevitable when the magnitude of the crisis is such enormous. But is that what we would like to do every time some evil virus appears from some corner of the world and the whole world just goes standstill, helpless, millions infected, hundred thousands died, economy doomed and a big uncertainty on everyone's face.

It has also opened another angel for the world to contemplate – A miniscule virus has thoroughly proved that whatever investments and progress world has made on any other sector has no significance and stormed in the importance of healthcare and medicine.

**Keywords: Lock Down, COVID, Economy**

**1. INTRODUCTION:**

During this period, social channels across the world has made it a mystery for common people whether COVID-19 is a virus jump from wild animal to human or a virus originated from a lab. The gossips compelled common people to believe that there are sophisticated biological warfare capabilities like genetic targeting wherein deadly viruses can be designed & created using genetic editing techniques like CRISPR specifically targeted for people from a particular ethnic background. These designed viruses use genetic marker to scan through host DNA for the right marker to match and attack those targets only leaving aside all others uninfected even if they come in its contact.

Also, genetically engineered viruses known to be resistant to drugs and vaccines and that's why much more devastating than any virus jumped from animals; those used to be relatively easier to manage with available drugs.

Leaving all those speculations aside, however, COVID-19 is a wakeup call not only for the governments and medical fraternity but for all of us to prepare the world for future Pandemics and Biological Attacks that can come as a surprise at any time. Because technically the preparation against a pandemic from an unknown virus is no different than the preparation against biological weapons.

As we live in a highly interconnected and increasingly globalized world, any disease can travel from one corner to the other corner of the world in a matter for few hours. Technology can help understanding force of transmission and route of transmission of epidemic or pandemic. The control measures of an epidemic outbreak could be multilateral approach. Conventional techniques such as areal spray of disinfectants, environmental measures to control the source, vaccination if available, implementing infection control measures like lock down and quarantine, promoting behavioral changes among the citizens like social distancing, maintaining hygiene and other public awareness measures like travel advisory etc. But

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how our existing technologies can be better leveraged to arrest such epidemic to become pandemic or minimize the spread and adversities should be the prime focus, and it's very much possible. We already have technologies available that can help us doing so. This time, in particular during COVID-19 we were not equipped with tools leveraging those existing technologies to deal with such situation in a rapid manner. Otherwise the adversities that we are facing helplessly could have been minimized by many folds.

Empower Public Health Departments – Once thing essential for each country is the public health departments and workers should be empowered with lot more advanced tools and techniques. Using latest technologies, it is possible to develop applications which will help identifying infection chains precisely which can be detached effectively among the population to large extent. We can easily trace information digitally of an infected person like which all places he or she had travelled, by flights, trains, buses; whom all he or she met during the incubation period of the virus etc. Such information can be used to take a decision to isolate the already infected people or lock down the locality accordingly. This can also help avoiding widespread lockdown and can only lock down hot spots. China also circulated a mobile app for the citizens to pin point infected, quarantine people and sending alert if somebody comes near to known infected.

Also, by analyzing the seasonality of the data from hospitals especially outdoor patients – like increase in common cough and flu cases in OPD, increase in the serious and ICU cases or even increase in deaths can be an indicator. In such cases advisory can be sent to hospitals and labs for investigation on onset of any new virus or disease. Also, it is very much possible to monitor the behavior of people in the society and groups very closely through social channels. If utilized well this can help authorities and healthcare professionals to monitor which areas are most affected, where from infections are spreading, where all cleaning and disinfectant activities are required. Which all roads and public places to be locked down, which all areas to be alerted, where all more medical staffs and facilities to be deployed and many more such crucial decisions can be taken real time. As a precautionary measure travel advisory bulletin boards from authentic sources should be displayed in every airports, harbors, bus and train stations. Checking travel history data especially for overseas travel should be mandatory not only during pandemic but even during peace.

It is seen from the past experiences, one of the most important factors that can attribute confining such diseases is availability of portable and cheap testing kits. Today it is only because the testing of COVID-19 is so cumbersome across the globe, due to which we landed up in such a terrible situation. Just imagine a hypothetical scenario – if we have COVID-19 testing kit available in each one of our mobile devices, we can confine this pandemic from spreading in less than 10 days. Some Singapore based firm has created a portable device but its still in a very early stage to made available for public. Another effective

technique to deal with epidemics proved from ancient times is Social Engineering which we term as Lock Down and Social Distancing in modern terms. These techniques have been adopted during Black Death, Spanish Flu and other past pandemics. We can encourage social distancing and monitor whether it has been followed properly. With the help of technologies by trapping into cellular networks, today it is very much possible for the authorities to get notified and locate people gathering. It is also possible to send notifications to evacuate if overcrowded or send early alert to avoid such places. Some applications are already in use to pinpoint the location of identified infected person and alert others nearby to avoid contact.

Scientists have already attempted to forecast spread of EBOLA with satellite imagery to pinpoint where from EBOLA virus has originated. It was probably not that successful but was a noble attempt and such researches should be taken forward for other pandemics. Any early indication, even with acceptable level of errors is crucial to fight against any pandemics because early forecast is the key.

BlueDot, a Canadian firm specialized in public data mining in the field of healthcare and medicine predicted the COVID-19 outbreak much earlier than the Govt. officials of China releases the information to the world. They forecasted by acquiring information from various online sources, social media and local news etc. and processed information using AI algorithms. They also predicted the spread of the disease into different countries just by processing data pertaining booking of flight tickets to and from province of Wuhan, China. It was reveal that such information was shared with WHO well in advance but unfortunately WHO took enough time to comprehend the severity of the disease.

Technologies like Artificial Intelligence can also be used for the control of infection and the spread of epidemics/pandemics by making real-time information available to public and authorities so that they can take control measures. Also, through use of simulation it is possible to predict the future spread and adversities to help in decision making and control.

AI is already in use for the diagnosis and treatment of COVID-19 patients at hospitals, many of the equipment used for patient care in the hospitals are already AI powered. Disinfectant robots are in use for patient care, thus reduces the risk of infection of healthcare workers. Also, drones taking stoke of quarantine localities, public gatherings, spreading disinfectants in the infected areas and residential places.

Scientist all over the world has using AI and other cutting-edge technologies for the discovery and research of drugs to treat COVID-19 patients. Few of the drug research companies has already made some progress on the same. One startup in China has claimed that it has developed an AI algorithm that can detect COVID-19 cases from CT Scan in just matter of seconds with an accuracy of more than 96%. It can also detect how

severe the case is by calculating the lesion created by the virus in the lung. A research group of Michigan State University has published a paper that AI can really help drug researchers to identify the COVID-19 drug comparatively in lesser time than with conventional method. Insilicon Medicine has also published that they have used AI to search for a potential medicine for COVID-19, the algorithm did different permutations to identify couple of molecules from past experiences of MARS and SARS that could be a candidate for treating the disease. The challenge here is the time taken for different trials like animal and human trails before it can be released to the market to prescribe to the patients.

Also, using AI it will be possible to understand the genetic sequence of a virus and predict how it is going to transform itself over a period of time and what all behavior it will acquire in future. Hence it will also be possible to find what all drugs will be effective treating it.

Vaccine development, clinical trial, commercialization of the vaccines can be extremely simplified and accelerated using AI and other digital technologies. By analyzing the protein structures and similarities of previously developed vaccines, the development time and clinical trial time can be significantly reduced that has already been done by the vaccine research companies during COVID19.

Some Govts also developed AI applications for self-diagnosis of COVID-19 by assessing the degree and exposure to risk someone is carrying using mobile location data, travel history of the person etc. Similarly, AI powered portable devices are also been tried for diagnosis of the disease.

Among few positive developments, many of the government and non-government agencies of some countries have already released COVID-19 related different datasets public for the data scientists and researchers to analyze the data and come up with valuable inferences. Some have declared prizemoney and awards as well so that developers can take it sportingly.

Availability of adequate patient care equipment, ventilator machines, intensive care units, other medical equipment, equipment for contagious disease care for healthcare and medical staffs is very essential in epidemic time.

Like China every country should be in a position to build hospitals in few days with all required facilities to deal with such pandemics. This is possible if they are ready to curtail a small portion of their defense budget and put that fund into healthcare and medicine.

Create outbreak control team for investigation and control from professionals from different government and industry verticals. And each small locality should have such epidemic control centers equipped with all amenities to control such outbreaks in that locality itself as much possible.

Training military personals for pandemics, biological warfare and Bio Terrorism in simulated environment, bringing awareness among civilians and train them how they can protect themselves from such possibilities also needs to be addressed rigorously. Performing outbreak drill run time to time in schools, colleges and in defense establishments in a simulated environment will enhance the preparedness to deal with such pandemics.

Use advanced analytics for predicting the adversity of any outbreak by creating simulated epidemic conditions like case control study and COHORT study. AI powered applications can help creating exact Hit Map of epidemic or pandemic which can indicate most affected areas, communities and the wave of the direction of its spread in near real time.

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