# How AI will help in fighting Covid-19 ?

**A SCALABLE HEALTH WHITE PAPER**

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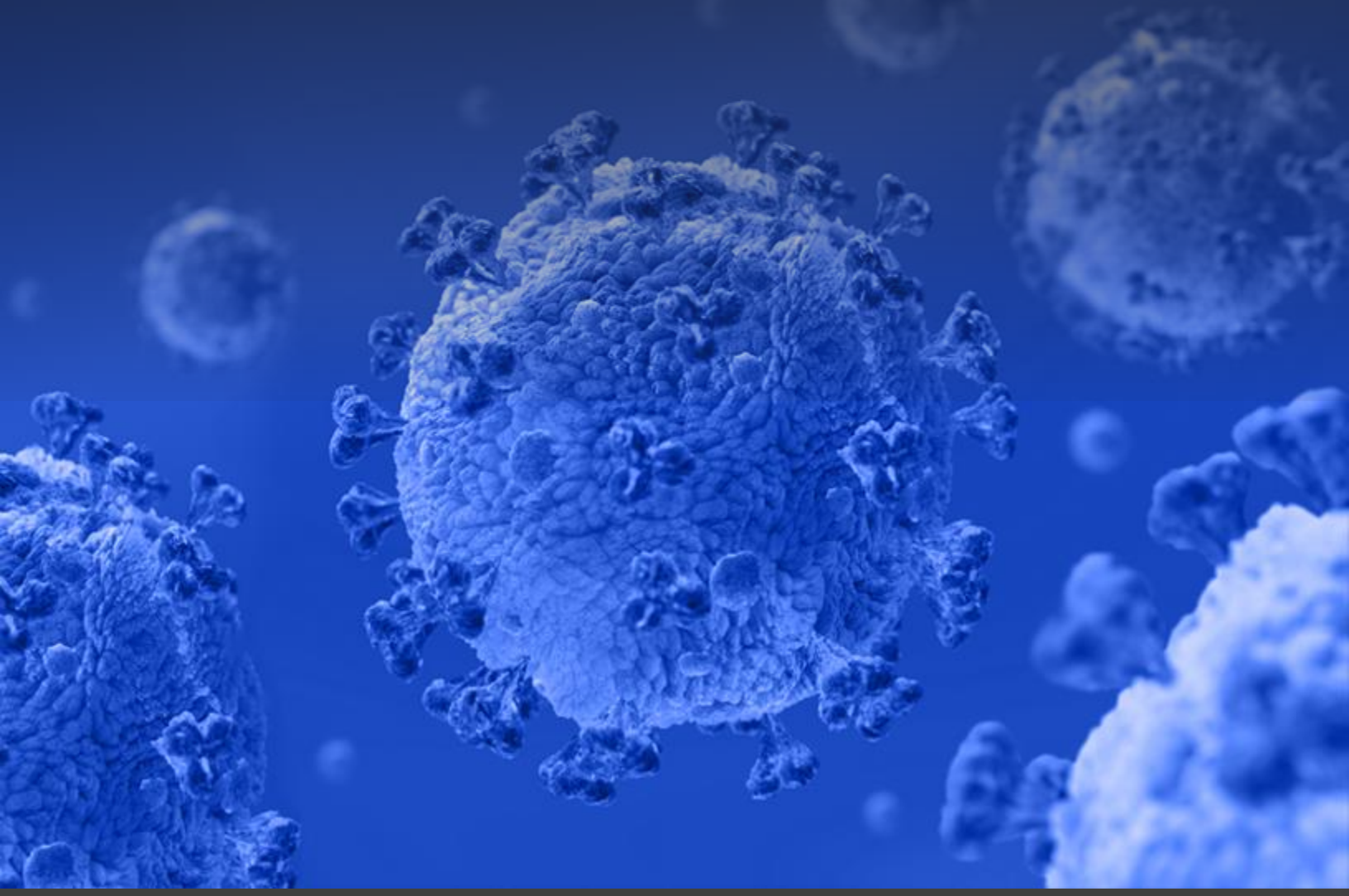
# INTRODUCTION

When the coronavirus first started taking people's lives, some began comparing it to SARS (severe acute respiratory syndrome). However, it didn't take long for the world to realize that COVID-19 was going to have a far darker impact. When you combine the total deaths of SARS (774) in 2003 and H1N1 (616) in 2013, the amount reached 1,390. As of 27th March 2020, the number of COVID-19 cases is at 549,220 and the deaths, a shocking 24,866 across 199 countries. If we insist on continuing with the comparison. Between November 2002 until March 2003. There were 8,098 cases.

The coronavirus epidemic has become the biggest concern in the world.

As the world is scrambling to adapt to the new world of COVID-19 and brace for the impact on hospitals and providers, there has been a massive effort to add capacity to the healthcare system rapidly.

Hundreds of hospitals are mapping out how they can manage care and equipment in order to save the greatest number of lives possible, while also maintaining their inventory of other critical medical supplies like personal protective equipment.



# COVID-19 GLOBAL IMPACT

As the coronavirus continues its march around the world, governments have turned to increasingly stringent containment measures, encouraging "social distancing" to physically disrupt the contagion.

Measures introduced to deal with the pandemic could save lives but are having wide-ranging economic effects, leading to major short-term declines in GDP for many major economies, according to new OECD projections.

According to the latest OECD estimates, the lockdown has a direct impact on several sectors adding up to one-third of GDP in the major economies. Each month of containment, adds another 2-percent loss in the annual GDP growth.

The International Monetary Fund has reassessed the prospect for growth for this year as well as for the next year, declaring that we have entered a recession – at least as bad as the one from 2008.

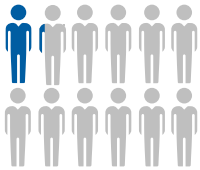
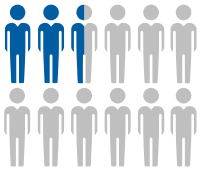
COVID-19 generated both demand and supply shocks reverberating across the global economy. It impacts the economy both from the supply and demand side, whether through the interruption of production or the loss of income and profitability due to higher unemployment and increased difficulty in paying debt service agreements.

## THE DANGERS OF COVID-19

There are three things that scientists will take into consideration when considering the risk of a virus. The Transmission Rate (Ro) is the number of new infections from one case. The Case Fatality Rate (CFR) is the percentage of cases that result in death. Finally, it must be determined whether the asymptomatic transmission is possible, carriers of COVID-19 who don't show symptoms.

Studies are not yet complete, but when looking at some of the statistics of how rapidly the disease spreads, WHO estimated that the Ro was between 1.4 and 2.5. So, for each new person who became infected, there could be 2.5 others contracting the virus. This figure was released on January 23rd. Other studies have put the Ro at between 3.6 and 4. For the common flu, it is 1.3, and SARS had a Ro of 2.

## How seasonal flu and Covid-19 compare

| | FLU | COVID-19 |
|---|---|---|
| **RO number**<br>Estimate of how many people will be infected by an average individual With the disease |  <br>**1.3** |  <br>**2-2.5** |
| **Incubation time**<br>The time from exposure to first symptoms |  <br>**1 - 4 days** |  <br>**1 - 14 days** |
| **Hospitalization rate**<br>Average percentage for total cases | **2%** | **19%** |
| **Cases Fatality rate**<br>Average percentage for total cases | **.1% or less** | **1-3.4%** |

# WHAT CAN AI DO FOR THE HEALTH CARE SYSTEM DURING EPIDEMICS/PANDEMICS

**Using AI to Predict Epidemics**

Artificial Intelligence has superior abilities at handling massive amounts of data. If you have been keeping up with the news, you will see that there is new information continuously. Information can be taken from health organizations, livestock reports, climate data, the press, and endless sources. It's impossible for humans to be able to analyze this data efficiently and extract insightful conclusions.

AI can help scientists understand the spread of a virus as well as how it can be managed and contained. Additionally, AI can do this quicker and cheaper than humans can. There is far less room for human error when making predictions, but we do have to assume that the data is accurate.

**AI Can Speed Up the Discovery and Development of Drugs**

When you look at how quickly this coronavirus is spreading and the fact that there is no known effective treatment, AI is even more critical as it can identify, develop, and scale new therapies and vaccines, faster than we have ever been able to.

Chief Executive Professor Andrew Hopkins stated that AI could be used in the fight against COVID-19 by:

- Rapidly developing antibodies and vaccines
- Checking to see if existing drugs could be repurposed
- Designing a drug that combats this coronavirus and future strains of coronavirus

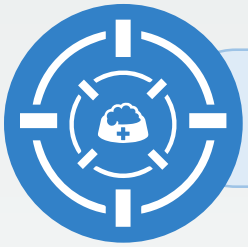
To develop an effective vaccine, scientists must build a copy of the virus by recreating its genome sequence. AI systems can distinguish thousands of molecules that could be used in potential treatments in just a matter of days.

Computational Drug Repurposing

Computational Drug Repurposing is a method that considers the potential benefits of already existing drugs. Drug libraries will be virtually screened. Focusing on molecular similarity while implementing homology modeling, suitable drug-targets will be found. Computational Drug Repurposing was used to identify potential drugs for other viral infections like SARS, ZIKA, and Ebola.

The same method is being used for COVID-19, and so far, four molecule drugs have been detected as potential. These drugs, Prulifloxacin, Bictegravir, Nelfinavir, and Tegobuvi, have a high binding capacity with SASA's main protease.

# Traditional Drug Development



1 **Identify therapeutic target for disease of interest.**

2 **Develop potential drug candidates.**

Design and Synthesis

Cell Culture Assays

Animal Testing

3 **Test drug in human clinical trials.**

Drug successful in the laboratory

Phase I → Phase II → Phase III → Drugs approved for clinical use

| Phase I | Phase II | Phase III |
|---|---|---|
| unsafe / safe | ineffective / effective | denied / approved |

## Computational Drug Repurposing

Phase III ← Phase II ← 2 Test drug for new treatment application in human clinical trials. ← 1 Use rational tools to determine new uses for pre-approved drugs.

| Phase III | Phase II |
|---|---|
| approved / denied | effective / ineffective |

Drugs approved for new clinical use

# AI can be used to identify non-compliance or infected people

### FACIAL RECOGNITION AND TEMPERATURE DETECTION

Surveillance system's screened and detected faces in a crowd that had a high temperature. Fever is one of the predominant symptoms, and using this in airports, train stations, and other areas of high traffic, this detection does not require body contact and therefore reduces cross-infection.

### HEALTH CODE

A monitoring system that used the travel history of people through their phone. Color codes were issued depending on the time amount of time people spent in virus hotspots.

### GEOTRACKING

Thanks to mobile phones, scientists can determine exactly where an infected patient has been. Tracing the path of the infected person makes it possible to see who and what they have been in contact with.

### RETAIL DRUGSTORES

This may not be the most scientific method, but when used in conjunction with others, it can still be beneficial. AI systems can monitor the sales of nonprescriptive fever drugs. This is a good way to track cluster cases. The use of smartphones will be critical in countries that do not have sophisticated technology.

### CT SCANS

CT scans will often contain complex information, and it is possible that the human eye can miss some of these details. Healthcare systems are flooded at the moment, and here isn't enough time for doctors to analyze CT Scans. AI can detect potential COVID-19 cases, and the system will then prompt the medical professional to review the case.

# CAN BIG DATA ANALYTICS HAVE A POSITIVE IMPACT?


Big data analytics can assist health care providers in identifying populations that are at greater risk of COVID-19. There are certain social determinants of health (SDOH), such as underlying health issues that put patients at a greater risk. This information can be used in planning and resource allocation as well as enabling hospitals to prioritize or even for patients to avoid hospitals completely.

AI is being used to create lists of vulnerable people. With the help of analytics, we can evaluate patients and compare them against a set of 5,000 variables. This way, we can identify people and communities that are at high risk by looking at things like medical histories, lifestyle, and socioeconomic factors (housing and transportation). Based on information from hospitals and even small medical centers, lists were created of people who were vulnerable.

**Using AI in an Attempt to Minimize Fatalities While Enhancing Disease Management**

AI has another advantage over people, and that is the lack of human contact. If we can control the number of cases, there will be less burden on hospitals and health care providers, freeing them up to focus on critical patients. AI can help speed up diagnostics and patient monitoring while in quarantine. While one side of AI is being used with pharmaceutical companies to search for treatments, another element is allowing patient care to be carried out at a distance and reducing the spread of this global crisis we are fighting against.

## CONCLUSION

If we contemplate the recent data, if the coronavirus will lead to 1,000,000 people needing hospitalization out of which 200,000 people requiring critical care, the capacity of the ICUs in the United States will be exceeded.

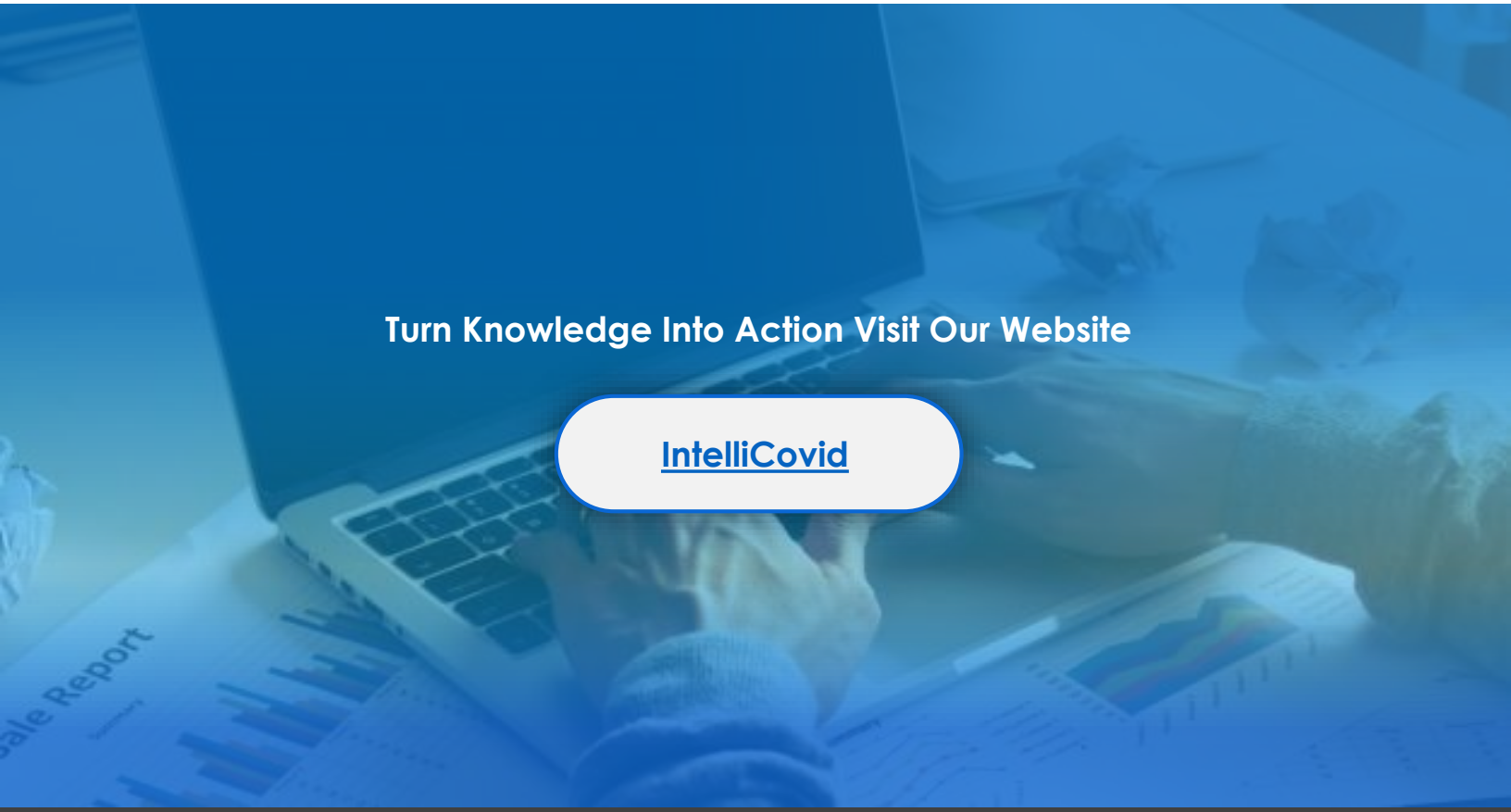
If the current flood of COVID-19 cases can be tamed down so we can prevent health systems from being overwhelmed, mortality from COVID-19 will be significantly lower. The development of clinically validated treatments could offer a similar advantage,

but the emerging evidence on that front is mixed, thus far.

The key is speed, and the faster things can get done, the less chance there is of the virus spreading. Each case above shows how AI can bring about reliable results much faster than traditional testing methods.

**Scalable Health Solutions:**

- Covid Patient Management Platform
- Pandemic Analytics
- Covid Risk Stratification Analytics
- Supply Chain Analytics
- Operation and workforce optimization analytics



## About Scalable Health

Scalable Health is healthcare division of Scalable Systems focused on providing innovative products and solutions in healthcare and life sciences market.
www.scalablehealth.com

## About Scalable Systems

Scalable Systems is a Data, Analytics & Digital Transformation Company focused on vertical specific innovative solutions. By providing next generation technology solutions and services, we help organizations to identify risks & opportunities, achieve sales and operational excellence to gain an innovative edge.
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