ABSTRACT

Background: The COVID-19 pandemic has strangled the world economy and has tested the strength of all health systems—robust or fragile. Methods: A thorough review of published articles in Medline, Web of Science, Google Scholar, renowned business analysis blogs, and indexed economic journals using keywords: “novel coronavirus”, “economy”, and “healthcare systems” were carried out with particular emphasis on the healthcare systems of the United States (U.S.), United Kingdom (U.K.), China, Singapore, and Pakistan to identify the impact of COVID-19 on health system economy. While all-economy categories have been affected, the pandemic has directly affected people and possession processing services the most. For all countries analyzed, the average economic impact of -4.5% of GDP is expected. Conclusions: COVID-19 pandemic has exposed multiple fault lines in health systems regarding accessibility, adaptability, and preparedness. Our narrative review shows that a capital society based global economy needs reforms which should aim at societal uplift.

Keywords: COVID-19, Healthcare Systems, Health Policy, Global Economies

INTRODUCTION

Coronaviruses are a family of zoonotic viruses that primarily result in respiratory tract infections, ranging from mild flu-like symptoms to life-threatening multi-organ failure.[1] The first-ever human coronavirus was discovered in the early 1960s, and there have been associated with seasonal outbreaks resulting in upper respiratory tract infections on an annual basis. However, there have been three major outbreaks of severe respiratory infections associated with beta-coronavirus:

1. Severe acute respiratory syndrome (SARS)-CoV epidemic of 2003,
2. Middle Eastern Respiratory Syndrome (MERS)-Cov outbreak of 2019,
3. Novel Coronavirus 2019-nCoV which is the current pandemic believed to have originated from the Wuhan city of China and later declared a pandemic by the World Health Organization (WHO) on 12th March 2020 [2,3]

WHY THIS NARRATIVE REVIEW

Globally, at the time of writing, July 16, 2020, Worldometer reports >13.6 million cases and over 585,000 deaths worldwide (case fatality ratio: 4.28%).[4] The current COVID-19 pandemic has tested the resilience of healthcare systems around the globe. Due to the
Early detection & subsequent testing
Hospital adaptability to emergencies
Communication & collaboration between
departments within and without the healthcare
system.

concern that healthcare systems can become
overwhelmed and unable to handle the surge of
COVID-19 cases with severe infection, the idea of
“flattening the curve” quickly gained traction, and there
was a strong emphasis on “social distancing” and
“staying at home” to slow the spread of infection.[5]
Many governments imposed complete or partial
lockdowns. This strategy has worked in favor of
healthcare systems by decreasing the influx of
exposure-driven patients to the hospitals but has
adversely impacted commerce and economy.
Businesses and enterprises based on customer-
interaction models, have suffered more than online
businesses and services. In this report, we review the
impact of COVID-19 on global economies,
macroeconomic policies, trade, and travel. In this
report, we analyze how healthcare systems in selected
countries have performed and continue to perform in
handling this crisis. For highlighting the global impact
on global macro-economies, we used a “Glocal”
approach to highlight the global macroeconomic impact
and local healthcare impact [Figure 1].

METHODS
We performed a thorough literature review of published
articles in Medline, Web of Science, Google Scholar,
renowned business analysis blogs, and Pubmed
indexed economic journals using keywords: “novel
coronavirus” “n-CoV”, “COVID-19”, “SARS-CoV,
MERS-CoV, “economy” “global economies”, “first-world
economies”, “third world economies”, “healthcare
systems” with particular “United States”, “National
Health Service “United Kingdom” “China”, “Singapore”,
and “Pakistan”’. Boolean logic of “AND” “OR” “NOT”
used with keyword combinations during the database
search. We retrieved full texts of published scientific
papers from medical and economic databases
mentioned above, from these blogs such as Bangkok
Post and Business Standard. The content was then
subjectively analyzed for risk of bias by the authors.

IMPACT ON HEALTHCARE
SYSTEMS
In assessing response to the COVID pandemic and
comparing the responses of different health systems
around the world, we divide our discussion into three
broad categories as defined by Jennifer and
colleagues.[6]

1. Early detection & subsequent testing
2. Hospital adaptability to emergencies
3. Communication & collaboration between
departments within and without the healthcare
system.

Our paper discusses the healthcare systems in the

USA, U.K., Singapore, China, and Pakistan
(representing a spectrum of low, middle, and high-
income countries)

Section A Early Detection &
Subsequent Testing
Early detection of cases would require, as a
prerequisite, being alert and receptive to the reality of
the problem. While this may not strictly be a health
system’s purview, many governments have been
criticized for not realizing the magnitude of the threat
early enough, delaying the activation of their public
health systems. The President of the United States and
the British premier downplayed the effects of the
pandemic and were slow to implement the mitigation
strategies, sometimes disregarding dire warning and
modeling by healthcare experts.
The U.K.’s first cases were identified in late January,
but it broadcasted its official “Coronavirus Action Plan”
on February 28. On March 13 2020, a lockdown went
into effect, with the federal government announcing the
closure of schools, universities and a suspension of
international flights. The medical students were allowed
to graduate early, and doctors who retired were
requested to rejoin the NHS. Medical professionals
working in education, research, and inspection were
encouraged to return to clinical duties, and within
hospitals, the clinical staff was redeployed to areas of
greatest need with additional training provided rapidly.

Having pronounced COVID 19 as a pandemic on
March 11, a week later, the WHO Director-General
urged all affected countries to “test, test, and test”.[7]
China and Singapore have tested widely – which has
been the key to their success in the containment of the
virus. In Singapore, SARS-CoV-2 RT-PCR laboratory
testing capacity was scaled up rapidly to all public
hospitals and can handle 2,200 tests a day for a
population of 5.7 million.

Figure 1: The Glocal approach to correlate the impact
of the global pandemic on the global economies and
local healthcare systems, and their interchanging
effects.
Glocal: Presenting global knowledge with a local
context

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The U.S. detected its first case on January 12, 2020. A month and a half later, it had only conducted 426 nation-wide tests (1.3 tests per million, for a population of 328 million), even when the importance of wide-spread testing was being underscored by the WHO. Pakistan registered its first two cases on February 26, 2020, and, as of April 15, has conducted only 73,349 tests for a population of over 210 million. Even as the country seeks to ramp up its testing capacity, the testing numbers remain low.[8,9] A better metric in evaluating Pakistan’s response would be the positive tests: total tests ratio –because it indicates the efficiency of contact tracing, identification of clusters, and if the lack of testing capacity is being supplemented with judicious use of the available tests. Khyber Pakhtunkhwa (KPK) province had a significantly higher ratio than other provinces (20.2%), compared to Punjab (6.9%), Sindh (10.4%) and Baluchistan (6.5%). The collaboration between the public and private sector is proving indispensable. Testing capacity is not only subject to the availability of kits but also depends on factors which include, but are not restricted to, organized data, effective transport, technical staff, and trained healthcare professionals. Similarly, the availability of PPE plays a major role in determining how efficiently the healthcare workforce responds to the crisis, and manages patients effectively. For these reasons and more, including Pakistan’s much larger land area, it would be wholly unrealistic to expect a Singapore-esque response.

Section B Hospital Adaptability to Emergencies

Hospital adaptability is largely a matter of emergency preparedness. Following the SARS outbreak, Singapore armed itself with the health infrastructure necessary to respond to pandemics. It had generated a network of more than 800 Public Health Preparedness Clinics (PHPCs), which were activated to enhance the management of respiratory infections in the primary care setting, with subsidies extending to Singapore residents to incentivize them in seeking care at these PHPCs. Singapore had also built the National Centre for Infectious Diseases (NCID), which is a 330-bed hospital built specifically for the management of infectious diseases and has an “integrated clinical, laboratory, and epidemiologic functions” to better enable the healthcare system to battle situations such as COVID-19.

This was not the case for Pakistan, where the pandemic caught an already dilapidated public health system by surprise and in distress. Despite this, Pakistan rose to the challenge and established emergency quarantine centers all across the country. The number of acute care providers and ventilators quickly became a cause of concern. National Disaster Management Authority (NDMA) chairman remarked in April 2020 that “there were more than 3,800 ventilators in the country of which 2,200 were owned by the public sector”. China exported more than 500 ventilators to Pakistan and skilled professionals to train Pakistani health care professionals.[11-13] Pakistan has taken initiative to start biomedical manufacturing and SafeVent SP100 was launched by the in July 2020. The collaboration between the public and private sector is proving indispensable. Testing and quarantine facilities are available in public as well as private sector. Trough and colleagues discussed the scarcity of resources and healthcare equipment in the USA, with patients needing ventilation ranging between 1.4 and 31 patients per ventilator. They advocated rationing during this time and mobilizing resources for patients who have a higher chance of survival.[16] However, this rationing approach is not without ethical and moral concerns. Triaging and prioritizing patient care have been recommended around the world; however, the altered standard of care being offered will likely be lower in a developing country than elsewhere. While public health systems and health-earmarked taxation is often lauded, systems that embody this ethos, like the national health services (NHS), have also collapsed when confronted with the pandemic. Many have blamed this on budget cuts, but the fact remains that the U.K. remains low on human and material resources. Hospitals lack tests to screen frontline staff, with about 20 to 25 percent of NHS doctors and nurses on sick leave or self-isolating,[17] “Medical beds and critical care capacity have required substantial expansion, which is being enabled by canceling elective procedures, repurposing operating theatres, and commissioning the use of private facilities”.[10]

Section C Communication & collaboration between departments within & without healthcare systems:

The health systems cannot function in isolation, and their success and resilience is suffused with that of governmental policy, the communication of that policy, and its implementation. Countries have needed powerful measures beyond hospitals, mainly to reduce the burden on hospitals, including wide-spread social distancing and border closures. In this section, we will explore how various institutions and departments within the same country collaborated in mounting an effective healthcare response to the global pandemic.

- Not every country has the capacity to complete
such labor-intensive projects so quickly.

- The level of compliance found within the Chinese population is unlikely to be found everywhere.
- Poorer economies will not be able to withstand the costs of continued economic disruption.

1. **China:** In China, aggressive measures such as a complete lockdown and surveillance measures have shown to be effective but not easily replicable. From case identification to isolation of contacts, China has taken the lead. Officials are being sent to patient’s homes for quarantine of cases. has also built hospitals over a week and ensured the stringent implementation of mandatory quarantine of 50 million people in the Hubei province. There are three main reasons why the China model cannot be the go-to paradigm everywhere.[18] To weigh the consequences of economic fallout against those of an unmitigated outbreak of SARS-CoV-2 is beyond the scope of this paper.

2. **Singapore:** Singapore sought to minimize the COVID 19 infodemic by sharing detailed anonymized information on COVID19 cases publicly to prevent speculationIn our view, this has highlighted the need for strong centralization in disseminating policy – one certified authority that issues and maintains official figures so that there is no ambivalence and that the public does not have so much difficulty separating signal from noise. This model seems the most viable. Underlying Singapore’s response is their preparedness which is un-paralled Singapore had set up a Multi-Ministry Task Force before it had its first case. Notably, Singapore has not implemented school closures or other major social distancing measures because it acted early and so there is no evidence of widespread community transmission, and rates of COVID-19 infection among children remain low.[20]

3. **United States:** The United States Homeland Security department has issued guidelines to ensure the safety of U.S. citizens during COVID-19. As of July 9, 2020, Customs and Border Protection had referred 419,725 travelers at the 15 funneling airports to Countering Weapons of Mass Destruction (CWMD) for enhanced health screening. As of July 10, Federal Emergency Management Agency (FEMA) and Health and Human Services (HHS) have obligated $133.6 billion in support of COVID-19 efforts and have coordinated the delivery of 102.9 million N95 respirators, 159.3 million surgical masks, 16.9 million face shields, 74.5 million surgical gowns/coveralls, and 139.4 million gloves [25]. In the United States, many healthcare-related departments have collaborated to ensure the social well-being of citizens during this pandemic. On March 27, 2020, the President signed the Coronavirus Aid, Relief, and Economic Security (CARES) Act. This includes $6.3 billion in additional funding for Administration for Children & Families (ACF) to respond to coronavirus-related needs.[22] Similarly, Administration for Community Living has made sure to formulate guidelines to better enable older adults & people with disabilities and their caregivers to stay safe, prevent exposure, and stay connected using smart technologies—such as video and digital communication.[23][24] has announced to cover the costs for lab tests for COVID-19, FDA-authorized COVID-19 antibody (or “serology”) tests, and all medically necessary hospitalizations—ensuring that the citizens do not have to pay out of the pockets. Similarly, Medicare pays for the Tele clinic ‘virtual check-ins’ and online patient portals so that the elderly can communicate with their doctors without going to meet them in-person.

5. **Pakistan:** An idea we identified as being of importance, and one that could be replicated elsewhere, was that of “cluster lockdowns. Cluster lockdowns involve identifying a potential disease hotspot after a case is discovered, and others in the locality have tested positive. The area is then sealed, preventing entry and exit to that area. The provincial government has successfully carried this out in Manga, a village in the Mardan district. Manga is now being gradually de-sealed.[19]. The reason this strategy may work in low-resource settings—and possibly work better than absolutist, indefinite nation-wide lockdowns—is because of two reasons: (1) it allows stricter shutdown enforcement, given the small perimeter, and contains confirmed cases and almost all their potential local contacts, (2) it helps reduce the scale of the economic and food crisis that follows. Union Council Manga was supplied food and necessities via utility-carrying trucks, and because the size of the locked-down area was small and more manageable, door-to-door distribution was more efficient. Naturally, this lockdown was less taxing than shutting down the province in a similarly stringent manner would have been. Once an incubating disease town has been pinpointed, the chance of wasting testing kits that are already scarce is reduced.[19] In Pakistan, there has been a rigorous national awareness campaign, pioneered by Digital Pakistan, employing the use of radio, telephone networks, television, and social
IMPACT ON GLOBAL ECONOMIES

The world economy runs on two major industries, the service industry, and the product industry. This article addresses the impact COVID-19 is expected to have on various aspects of both. While the world tries to manage and cope with this medical and economic tragedy, The Bretton Woods Institutions (World Bank and the International Monetary Fund – IMF) have accelerated their response and commitment to assist many developing countries. This involves “calling on all official bilateral creditors to suspend debt payments from the International Development Association countries that have requested forbearance”. [26]

Services Industry

Almost 70% of the world’s economy is based on the service industry [27]. The service industry can be broadly divided into four categories:

1. People Processing Services
2. Information Processing Services
3. Possession Processing Services
4. Mental Stimulation Services

While all categories have been affected by COVID-19, the direct effect has been most severe on people processing services, as they are highly dependent on direct customer contact. Possession processing services are also affected as viruses can persist on materials and surfaces, and hence people may not want their possessions coming in contact with other individuals. COVID-19 has caused a hurdle for the air cargo industry that falls under possession processing. In a press release, IATA warned that “The disruptions from [COVID-19] will negatively impact air cargo developments across all of the key international trade lanes”. [28] “Thousands of air flights have been canceled due to outbreak, which makes the idea of air cargo unsteady,” IATA added.

Since COVID-19 originated in China, the “manufacturing hub of the world for electronics, footwear, apparel, and other non-food products,” companies working in the consumer products sector are facing serious shortages in the provision of raw materials, essential components, and finished goods. A surge in consumer demand is predicted in certain industrial sectors once the situation starts to normalize. However, an “economic recession looms as consumer spending is expected to decrease in the medium term. Consumers will continue to shift to online sales, which will require consumer products companies to revisit their business-to-consumer (B2C) strategies”.

China's Impact on Global Economy

Wuhan is China’s principal transportation center.[29] There have been strict restrictions on transport in Wuhan specifically and in Hubei generally, which is expected to affect trade adversely. The tourism and entertainment industries are expected to face the worst effects. Around 70,000 movie theatres have been closed down in China, airlines have canceled both cargo and passenger flights, which has affected not only travel but also other business activities [30-32]. Wuhan is an important trade center, in addition to being the headquarters for the country’s major local steel and vehicle makers [29]. The city is also home to 300 plus factories of the world’s best 500 companies, including Microsoft, German software company SAP, and French carmaker Group PSA [33]. After the accelerating spread of the virus in Wuhan, many companies have evacuated their workers and halted their business activities. The retail industry is expected to be the most negatively affected.

IHS-Markit Automotive reports that the eleven Chinese provinces that are on lockdown account for more than two-thirds of the vehicle production of the country. They also supply auto parts to carmakers in the U.S., Europe, and South Korea. Experts believe that the production loss has been almost 1.7 billion units [27]. Carmakers around the world have already started expressing concerns over the shortage of auto parts that were to be supplied from China, and Hyundai has shut down its domestic factories because they ran out of parts from China [34]. Companies all over the globe, irrespective of the size, that are dependent upon inputs from China have started experiencing contractions in production. With limitations in transport and restrictions of trade among countries, global economic activities have greatly slowed down. Moreover, the pandemic has generated a degree of panic among companies and consumers, resulting in “unusual consumption patterns” and “market anomalies.” The authors believe that “global financial markets have also been responsive to the changes and global stock indices have plunged” [37].

Prediction of Economic Growth

According to Fernandes and colleagues [38], if the lockdown situation declines and May becomes the recovery month, the economic impact may range from 3.5 to 6% depending on the country. In the USA, the crisis is expected to cost nearly 4% of its GDP. Overall, for all countries analyzed, the average economic impact of -4.5% of GDP is expected (median = -4.4%). The model takes into account the different compositions of GDP in different countries. However, if
As seen in the global trends above, Pakistan, too, suffered adversely in terms of economic growth. According to the statistics from the Asian Development Bank (ADB), Pakistan's GDP growth rate is expected to decline significantly in 2020. This sudden decline to -0.4% does not reflect on the government's policies, rather shows how COVID-19 has halted the economic growth of the country. Interestingly, the ADB predicts an increase of Pakistan's GDP to 2.0% in the year 2021. As compared to other Asian countries, Pakistan is

The lockdown persists longer than May, the growth in GDP can be visualized in Table 1.

| Country          | Growth (lockdown persists to May) | Growth (lockdown persists to July) | Growth (lockdown persists to September) |
|------------------|-----------------------------------|-----------------------------------|----------------------------------------|
| Argentina        | -5.0%                              | -8.5%                             | -12.4%                                 |
| Australia        | -2.2%                              | -5.8%                             | -9.8%                                  |
| Austria          | -3.8%                              | -8.1%                             | -13.1%                                 |
| Belgium          | -3.0%                              | -6.8%                             | -11.3%                                 |
| Brazil           | -1.9%                              | -5.2%                             | -8.8%                                  |
| Canada           | -2.1%                              | -5.5%                             | -9.2%                                  |
| China            | +1.6%                              | -1.9%                             | -5.8%                                  |
| Czech Republic   | -2.0%                              | -5.9%                             | -10.6%                                 |
| France           | -3.0%                              | -6.6%                             | -10.6%                                 |
| Germany          | -3.5%                              | -7.4%                             | -11.9%                                 |
| Greece           | -3.9%                              | -8.6%                             | -13.8%                                 |
| India            | +3.1%                              | -0.2%                             | -3.8%                                  |
| Ireland          | -1.3%                              | -5.5%                             | -10.8%                                 |
| Italy            | -4.5%                              | -8.4%                             | -12.9%                                 |
| Japan            | -3.1%                              | -6.3%                             | -9.7%                                  |
| Mexico           | -4.1%                              | -8.3%                             | -13.0%                                 |
| Netherlands      | -2.6%                              | -6.3%                             | -10.8%                                 |
| Norway           | -2.0%                              | -5.7%                             | -9.9%                                  |
| Poland           | -0.8%                              | -4.2%                             | -8.2%                                  |
| Portugal         | -4.3%                              | -8.8%                             | -14.0%                                 |
| Russian Federation | -1.7%                             | -4.9%                             | -8.5%                                  |
| Saudi Arabia     | -2.2%                              | -5.9%                             | -10.0%                                 |
| South Africa     | -3.2%                              | -6.8%                             | -10.8%                                 |
| South Korea      | -1.6%                              | -4.9%                             | -8.7%                                  |
| Spain            | -3.4%                              | -7.5%                             | -12.1%                                 |
| Sweden           | -3.1%                              | -6.8%                             | -11.2%                                 |
| Switzerland      | -3.3%                              | -7.2%                             | -11.8%                                 |
| Turkey           | -1.7%                              | -5.4%                             | -9.6%                                  |
| United Kingdom   | -3.1%                              | -6.8%                             | -11.0%                                 |
| United States    | -1.7%                              | -5.0%                             | -8.5%                                  |

Table 1: Growth in GDP in different lockdown situations [38]
still predicted to do better than the rest. The following statistics from the ADB have been shown in Figure 2. [39]

**Effect of COVID-19 on Singapore's GDP growth**

According to an official release from the Singaporean government, their country’s economy contracted by 2.2% in the first quarter of 2020, reversing the 1.0% growth in the preceding quarter. Comparing industrial growth, the manufacturing industry’s GDP declined by -0.5%, the construction industry by -4.3%, and the services-producing industry by -3.1%. [40]

**Effect on Trade**

The million-dollar question, perhaps, is: is a massive restriction of mobility desirable? And second, is it feasible at all? It is time to introduce smart policies and weigh the costs and benefits of uninhibited exchanges of people and goods. If global stakeholders can afford an outbreak every few years to reap the benefits of globalization, it is imperative to ponder whether future epidemics might get worse. “The free exchange of goods and capital does not have to be restricted since only a count few diseases are transmitted by contaminated goods. The free movement of people itself also contributes to the advantages of globalization, but it is far less important for production. Restrictions may well be desirable and justifiable, bringing to an end a half-century of ever-increasing individual mobility”, Voth says. [41] The authors believe that halting global trade in the face of avoiding another healthcare crisis is not a feasible idea—given how export-driven economies have been adversely affected. Instead, ensuring that the transport of goods and people is carried out whilst minimizing the risks of infection transfer can prove to be a better strategy.

**Developing Economies**

Loayza and colleagues suggest that in times of such crisis, the short-term goal should be to “avoid mass layoffs and bankruptcies, and the medium-term goal involves monetary and fiscal stimulus.” [42] However, in developing economies, the stimulus may be less effective because monetary transmission is weak and fiscal space and fiscal multipliers are often small. The authors suggest that in such situations, the viable goal should be to “avoid procyclicality, ensuring the continuity of public services for the economy, and supporting the vulnerable.”

**PAKISTAN'S EHSAAST PROGRAM**

The premier of Pakistan- Imran Khan, on April 1, announced the Ehsaas Emergency Cash (EEC) program. This initiative was planned to uplift and provide relief to daily and weekly wagers in the face of economic hardships during COVID-19. In collaboration with the Poverty Alleviation Division, the Government of Pakistan designed a simple and easy roll-out program to distribute Rs. One hundred forty-four billion to 12 million families across the country. The entire cohort was divided into two categories, namely Category 1 and 2. The former allowed the government to give Rs. 3000 every month for up to 4 months, and the latter received a one-time lump sum amount of Rs. 12000. Biometric powered Point of Sales (POS) centers were installed all over the country, and all cash transfers were made after biometric verification of each beneficiary through National Database and Registration Authority (NADRA). [43]

**CONCLUSION**

The coronavirus outbreak has both strangled the world economy and tested the resilience of all healthcare systems —robust or fragile. The authors are of the view that COVID-19 has been both an equalizer and an eye-opener —it has not broken our systems, but in fact, tested their fault lines, exposing how broken they already were. It has pointed us towards what needs to be improved in our health systems —affordability, access, adaptability, emergency response preparedness. However, no one size will fit all, and context-less comparisons between small and large, rich, and poor countries do not help the fight. Also, success cannot be achieved without a strong partnership between governments and the public. The economic impact has been dire, and while not part of our discussion, it is for this reason that even a Low & Middle-Income Countries like Pakistan has rolled out the largest welfare handout program in its history, called “Ehsaas” (“Care”). Lastly, the economic impact of the COVID-19 pandemic has made it clear that a global economy that is centered on the principle of capital accumulation and not societal uplift is not sustainable through times of crises.
LIMITATIONS

The limitations of our paper are as follows:

- Due to the scarcity of data, a fair comparison of discussed nations could not be made. Instead, surrogate markers have been used to draw similarities and differences in policies and outcomes.
- Because of a rapidly evolving situation, statistics and number quoted might be outdated by the time the manuscript makes to the readers.
- Since there is no set tool to judge bias of presented information on government and non-government websites, the authors had to retort to subject risk bias assessment.

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