



YOJANA

MAY 2020

A DEVELOPMENT MONTHLY

₹ 22

Universal Health

LEAD ARTICLE

Benchmarking Healthcare System

Alok Kumar, Sheena Chhabra

FOCUS

COVID-19: The Novel Threat

Dr Smita Watwe

SPECIAL ARTICLE

Yoga for Stress Management

Dr Gangadhar BN and NIMHANS Team



Strengthening Health Systems

Kavita Singh

AI in Healthcare

Yogesh K Dwivedi and Team



Life in the era of COVID-19



The Prime Minister has shared few thoughts on LinkedIn, which would interest youngsters and professionals.

Following is the text-

It has been a topsy-turvy start to the third decade of this century. COVID-19 has brought with it many disruptions. Coronavirus has significantly changed the contours of professional life. These days, home is the new office. The Internet is the new meeting room. For the time being, office breaks with colleagues are history.

I have also been adapting to these changes. Most meetings, be it with minister colleagues, officials and world leaders, are now via video conferencing. In order to get ground-level feedback from various stakeholders, there have been videoconference meetings with several sections of society. There were extensive interactions with NGOs, civil society groups and community organisations. There was an interaction with Radio Jockeys too.

Besides that, I have been making numerous phone calls daily, taking feedback from different sections of society.

One is seeing the ways through which people are continuing their work in these times. There are a few creative videos by our film stars conveying a relevant message of staying home. Our singers did an online concert. Chess players played chess digitally and through that contributed to the fight against COVID-19. Quite innovative!

The work place is getting Digital First. And, why not?

After all, the most transformational impact of technology often happens in the lives of the poor. It is technology that demolishes bureaucratic hierarchies, eliminates middlemen and accelerates welfare measures.

Let me give you an example. When we got the opportunity to serve in 2014, we started connecting Indians, especially the poor with their Jan Dhan Account, Aadhar and Mobile number.

This seemingly simple connection has not only stopped corruption and rent seeking that was going on for decades, but has also enabled the Government to transfer money at the click of a button. This click of a button has replaced multiple levels of hierarchies on the file and also weeks of delay.

India has perhaps the largest such infrastructure in the world. This infrastructure has helped us tremendously in transferring money directly and immediately to the poor and needy, benefiting crores of families, during the COVID-19 situation.

Another case in point is the education sector. There are many outstanding professionals already innovating in this sector. Invigorating technology in this sector has its benefits. The Government of India has also undertaken efforts such as the DIKSHA Portal, to help teachers and boost e-learning. There is SWAYAM, aimed at improving access, equity and quality of education. E-Pathshala, which is available in many languages, enables access to various e-books and such learning material.

Today, the world is in pursuit of new business models.

India, a youthful nation known for its innovative zeal can take the lead in providing a new work culture.

I envision this new business and work culture being redefined on the following vowels.

I call them- vowels of the new normal- because like vowels in the English language, these would become essential ingredients of any business model in the post-COVID world.

Adaptability

The need of the hour is to think of business and lifestyle models that are easily adaptable.

Doing so would mean that even in a time of crisis, our offices, businesses and commerce could get moving faster, ensuring loss of life does not occur.

Embracing digital payments is a prime example of adaptability. Shop owners big and small should invest in digital tools that keep commerce connected, especially in times of crisis. India is already witnessing an encouraging surge in digital transactions.

Continued on Cover-III...



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Let noble thoughts come to us from all sides
Rig Veda

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New Layout is Appreciated

Congratulations to Yojana team for coming out with new layout like the economic survey in the preface of topic which is very helpful as it summarises the subject in brief and is interesting to read as we get a sneak peek of the subject matter. Yojana is very helpful for students preparing for competitive exams. Therefore, it is imperative to include topics affecting our policy makers, our economy, institutions, framers, weaker section etc. for in-depth awareness. I would like to suggest topics on current situation of our health care system, sickness and diseases schemes and policies touching on current epidemic and its economic loss and how government plans to bring back the economy in growth trajectory to attain the \$5 trillion dollars by 2024-2025.

– Longshithung Ngullie
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Yojana gives Clarity on Economy

Through the esteemed column of your monthly magazine, I would like to share my experience and views on the magazine. I'm not an old reader of Yojana magazine, it has been five months since I'm constantly following your magazine. It has been a quite good experience for me, I now have better clarity of Indian economy and programmes initiated by the Government of India. Coming from a science background, polity and economics had always been

Greek to me, but the comprehensive information and interpretation of the programmes and schemes in Yojana magazines have helped me gain clarity on these topics. The topics are explained extremely well and lucid. It has given me a better picture of place where I live and undoubtedly helped me to increase my knowledge.

– Sudha Kumari
sudhakumari6798@gmail.com

More Case Studies

I am a regular reader of Yojana. The work done by your team is highly stupendous in making this magazine great. It would be holistic if more case studies and listening from the beneficiaries of government schemes are included in the upcoming issues.

– PVR Harshavardhan
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Readers' Section a Welcome Step

I am regular reader of Yojana. I am delighted to find a page that has been dedicated for readers' comments. Now, readers will be able to offer their views/comments on the articles published in the magazine which obviously would bring about bond of attachment. Yojana provides authentic facts and figures as well as other information on policies, allocation of funds for various welfare schemes for people covering all segments of society. Particularly, this magazine is useful for educationists working in various capacities across the country as they can impart better education to

their students with authentic data in hand, thus enhancing their awareness on various aspects of governance and socio-economic issues. Thanks to the entire team of Yojana.

– Ravi Bhushan, Kurukshetra
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Internal Security

I am a regular reader of Yojana magazine. I appreciate the efforts of Yojana team to give insightful information on urbanisation, environment, infrastructure, and education etc in every month to fellow citizens. Union Budget 2020-21 was clearly explained by taking all sectors problems and data driven solutions by experts in their fields. I would like to suggest publishing articles on internal security matters such as conflict in Northeast, Naga issue and Assam accord issues.

– Rohith Siddalingaiah
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Digitisation

Yojana comes with very informative articles and with the official Government data. But sharing these articles online with friends is not easy. On the other hand, I travel frequently and hard copy is delivered at only my home address. It would be better if Yojana come up with a digital version. That will solve the problems.

– Mrutyunjay Joshi
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The New Health Order

World over, people are facing the worst ever pandemic in their living history. As on 25 April, 2020, there have been 28 lakh cases of the Coronavirus and close to 2 lakh people have lost their lives. COVID-19 is a novel virus, very little is known about it. That is why, currently the treatment being given is not very specific. Some antiviral, some anti-parasitic drugs are being tried. Oxford University has recently started the human trials of a possible vaccine and this raises hopes for victory in the war against this deadly virus.

Globally, social distancing and lockdown are being tried to stem the spread of this highly contagious disease. Governments around the world are also now relying more and more on use of modern technology, ubiquitous instruments, sensor and powerful algorithms. In the war against COVID-19, several governments have implemented these new surveillance tools, Internet of things (IoT) and the Artificial Intelligence (AI) technology. The outbreak of corona virus is alerting the world about global public healthcare. Now, it is time to think of building a healthcare network with national buffer and global pump house for public health services.

The challenges before the India health care case system are manifold. The National Health Policy (NHP), 2017 aims to double the government healthcare spending from the existing 1.2% of the GDP to 2.5% by 2025. The Coronavirus crises also create an opportunity of adopting E-health technologies that can create a transformational shift in Indian healthcare and can ensure efficiency in healthcare. There are potential uses of AI for the current situation created by COVID-19 and the potential exponential spread amongst the populations – the single biggest threat to the Indian people for a generation.

The war against Corona also demands to have a suitable response to the increased fear, stress and apprehension among society due to the mortality and morbidity resulting from the COVID-19 pandemic. Thus, an intervention such as yoga which reduces psychological stress may have important role to play in strengthening the immune system thereby reducing spread of infections and preventing complications.

The whole world waits with a bated breath as to when we will overcome this deadly situation. Simultaneously, the Government of India is committed to achieve a transformational shift in Indian healthcare wherein technology plays a crucial role. □



Benchmarking Healthcare System

*Alok Kumar
Sheena Chhabra*

The NITI Aayog has established the Health Index as an annual systematic tool to leverage cooperative and competitive federalism to accelerate the pace of achieving health outcomes and encourage cross-learning among states. The Health Index can be a gamechanger as it can shift the focus from budget spends, inputs and outputs to outcomes. Tracking incremental performance ensures that there is no room for complacency among historically better performing states, while at the same time providing opportunity to states that have lagged in performance to demonstrate perceptible improvement.

The right to health has so far not been accorded the status of a Fundamental Right to the Indian citizens. It is not even a statutory right, unlike education. Moreover, health is a subject which is assigned to State Governments as per our Constitution. This is reflected in the way we finance it, with about two-thirds of the total governmental expenditure on health coming from the State Governments and the balance one-third being provided by the Government of India. Despite this, it is also a reality that the Government of India has significant influence in the policy space with pathbreaking schemes such as the National Health Mission (NHM) and Ayushman Bharat, with its twin prongs of the Health and Wellness Centres to deliver comprehensive primary health care and Pradhan Mantri Jan Arogya Yojana (PM-JAY). India is also a signatory to

the 2030 Agenda for Sustainable Development, whereby it has committed as a nation to “ensure healthy lives and promote well-being for all”.

In the last decade, millions of Indians have escaped from extreme poverty because of the rapid economic growth. As would be expected of rapidly growing economy, the

health system and population level health outcomes have also improved significantly albeit at a much more gradual pace. Despite notable gains in improving life expectancy, reducing maternal and child mortality, and addressing other health priorities, our health system needs a lot of improvement judged by the rather modest benchmark of countries



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with similar levels of economic development. Furthermore, there are huge variations across States in their health outcomes and health systems' performance. It is unfortunate that by and large, health has not received the kind of political and administrative salience that this vital sector deserves.

With the federal compact among the Central and the State Governments having been clearly defined in the Constitution, the key questions that motivated the team involved in the design of Health Index were as follows:

- a. Can we develop a tool to bring health into greater political focus to ensure that what gets measured gets done?
- b. Can we benchmark the performance of the health system of various States which can be put forth in the public domain in a timely manner? Is it possible to capture the diversity and yet ensure that high performing states do not get complacent and the low performing States are not discouraged?
- c. Can appropriate instrument or incentives be put in place that can nudge the States to try and radically improve their health system performance? Can this be done in a manner that respects the federal compact and allows autonomy to individual State Governments to make policy choices to achieve the specified benchmarks?
- d. What are the parameters that could credibly capture the complex story of health system performance? Can those parameters capture outcomes at the system level rather than merely tracking inputs such as budget, number of facilities or outputs such as number of OPDs/IPDs? Is data relating to those parameters available from third party source? Is the data of reasonable quality and



available at least annually? What is the emphasis (weights) to be provided on each of the individual parameters?

The answer to these questions

It is the first-ever systematic exercise for tracking the progress on health outcomes and health systems' performance across all the States and Union Territories (UTs) in India on an annual basis. The Health Index is a weighted-composite Index based on select indicators in three domains: a) Health Outcomes; (b) Governance and Information; and (c) Key Inputs and Processes, with the health outcomes carrying the most weight across the different category of States/UTs.

– admittedly imperfect-was to craft a Health Index – a journey which NITI Aayog embarked upon in 2017 in collaboration with the Ministry of Health and Family Welfare (MoHFW) and the World Bank. It is the first-ever systematic exercise for tracking the progress on health outcomes and health systems' performance across all the States and Union Territories (UTs) in India on an annual basis. The Health Index is a weighted-composite Index based on select indicators in three domains: a) Health Outcomes; (b) Governance and Information; and (c) Key Inputs and Processes, with the health outcomes carrying the most weight across the different category of States/UTs. For generation of ranks, the States are classified into three categories (Larger States, Smaller States and UTs) to ensure comparability among similar entities.

A range of indicators such as the neo-natal mortality rate (deaths occurring in the first 28 days of life), full immunisation coverage, treatment success rate of confirmed tuberculosis

cases, stability of tenure of key administrators, vacancy of doctors and specialists in health facilities, and functionality of primary health centres, first referral units and cardiac care units, are included in the Index.

In February 2018, the first round of the Health Index report on ranks and scores was released which measured the annual and incremental performance of the States and UTs over the period of 2014-15 (base year) to 2015-16 (reference year). This was followed by the second round of Health Index that tracked performance for the period 2015-16 (base year) and 2017-18 (reference year). The same set of indicators and weights were used for the first two rounds. However, as the index is work in progress, some refinements for subsequent rounds are likely.

Enabling Tool

The vision behind establishing the annual systematic tool is to propel States towards undertaking multi-pronged interventions and drive efforts towards achievement of SDG Goal 3. It can be viewed as being akin to an annual health check-up diagnostic report; providing the State Governments to identify parameters in which States have improved, stagnated, or declined. The Health Index report provides the direction and magnitude of change at a composite level as well as for each

The Health Index report provides the direction and magnitude of change at a composite level as well as for each of the indicators of the Health Index. An analysis of this can help States in focusing attention on better targeting of interventions and improving the delivery of health services and also an opportunity of sharing best practices.



of the indicators of the Health Index. An analysis of this can help States in focusing attention on better targeting of interventions and improving the delivery of health services and also an opportunity of sharing best practices.

Room for Improvement

The introspection is useful for all States and UTs, as both the first and second annual Health Index report indicates that even the States and UTs that are doing comparatively well have substantial scope for improvement. For example Health Index (June 2019) report on ranks of States and UTs indicates, even Kerala, Mizoram, and Chandigarh, the “healthiest” among large states, small states and UTs respectively, all have quite a distance from the frontier and have room for improving their performance.

The Index is an innovative tool as it not only fosters competition among states by comparing similar states to each other but also nudges them to better their own performance in the previous year. For example, though Kerala remained the “healthiest state”

in 2014-15, 2015-16 as well as 2017-18, a slight decline in the composite Health Index score value was observed in each of the successive periods.

Large Gap Between the “Healthiest” and the “Ailing” States/UTs

There are wide disparities in overall performance across States and UTs. The gap between the best-performing states and the least-performing states is very wide - Kerala and Uttar Pradesh are separated by 45 points, Mizoram and Nagaland by 36 points, and Chandigarh and Daman and Diu by 22 points as indicated by the Overall Performance Scores for 2017-18 (Health Index, June 2019).

Scope for Improvement

Based on the composite Health Index scores range for the reference year (2017-18), the States are grouped into three categories: Aspirants, Achievers, and Front-runners. Aspirants are the bottom one-third States and six of the eight Empowered Action Group States¹ fall in this category. Given the substantial scope for improvement, these States require concerted efforts. Achievers represent

	Best Performing		Least Performing	
Large States	Kerala	74.01	Uttar Pradesh	28.61
Small States	Mizoram	74.97	Nagaland	38.51
UTs	Chandigarh	63.62	Daman & Diu	41.66

Health Index, June 2019

Aspirants	Achievers	Front-runners
Rajasthan Uttarakhand Madhya Pradesh Odisha Bihar Uttar Pradesh	West Bengal Haryana Chhattisgarh Jharkhand Assam	Kerala Andhra Pradesh Maharashtra Gujarat Punjab Himachal Pradesh Jammu and Kashmir Karnataka Tamil Nadu Telangana

Note: The States are categorised on the basis of Reference Year (2017-18) Index score range. Front-runners: top one-third (Index score >58.88), Achievers: middle one-third Index score between 43.74 and 58.88), Aspirants: lowest one-third (Index score <43.74)

the middle one-third States. Overall, these States have made good progress and can move to the next group with sustained efforts. Front-runners, the States falling in top one-third score range are the best performing States. Despite relatively good performance, however, even the front-runners could further benefit from improvements in certain indicators (Health Index, June 2019).

Different Levels of Momentum to Improve Performance

Only around 58% of the States and UTs had an improvement in the overall score between 2015-16 and 2017-18 (Health Index June 2019). The degree of changes in incremental performance scores differed across the three categories of States. The magnitude of changes was bigger in UTs compared to Larger and Smaller States. Andhra Pradesh and Maharashtra were the only two states that were among the top one-third States on both overall performance and incremental performance. Andhra Pradesh had the highest proportion of indicators (63 percent) among the Larger States which fell in the category of most improved or improved.

Among the UTs and Smaller States, there was a divergence in Health Index Scores from base year to reference year across States (UTs), that is, better performing States (UTs) tended to get better whereas least-performing States (UTs) tended to get worse. Among the Larger States,

there was neither divergence nor convergence in Health Index Scores over time.

Shake Complacency and Nurture Hope

It is envisaged that tracking progress on incremental performance will also help shake complacency among “Healthiest Large States” such as Kerala, Punjab, and Tamil Nadu that have historically done well. At the same time, it is expected that it will nurture hope and optimism among large states such as Haryana, historically lagged in performance but are demonstrating greater improvements in health outcomes.

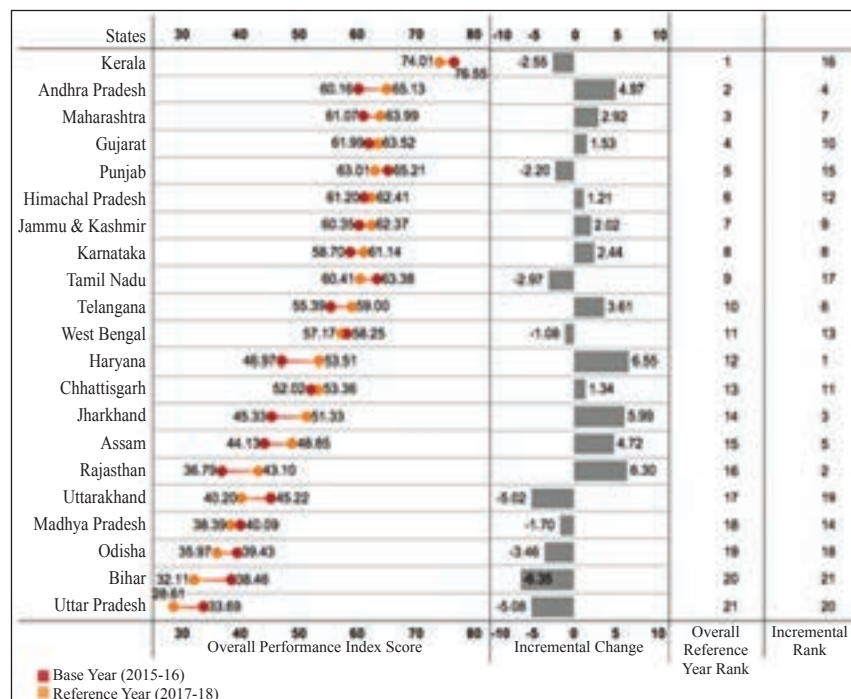
Note: West Bengal did not submit data, the overall and incremental performance scores were generated based on pre-filled indicator data for 13 indicators and for the remaining 10 indicators, the data from the base year was repeated for the Reference Year.

Variable Progress Across States Towards Achieving SDG Goals

Several States have made good progress towards achieving SDG goals included in the Index. Kerala and Tamil Nadu have already reached the 2030 SDG goal for Nuclear Magnetic Resonance (NMR), which is 12 neonatal deaths per 1000 live births. Maharashtra and Punjab are also close to achieving the goal. Kerala, Tamil Nadu, Maharashtra and Punjab have already achieved the SDG goal on Under-Five Mortality Rate (U5MR), which is 25 deaths per 1000 live births. Other States and UTs still need significant improvements to meet SDG targets.

Incentivising Incremental Performance

The Health Index has the potential to be gamechanger as it can shift the focus from budget spends, inputs and outputs to outcomes by shining the light on States that have shown most





improvement. The MoHFW's decision to link the Index to incentives under the National Health Mission sends a strong signal to States in the shift towards outcome based monitoring and performance linked incentives. In 2019-20, 40% of the incentives or INR 3200 crore of the National Health Mission (NHM), MoHFW's flagship federal initiative, was linked to the incremental performance of the states and UTs on the Health Index. In 2019-20, MoHFW has taken a decision to link 70% of the NHM incentives to the incremental performance of the states and UTs on the Health Index.

Need for Improving Data Quality

The process of Index development and implementation highlighted the large gaps in data availability on health outcomes and health systems performance. The need of the hour is to make outcome data available for smaller states and union territories more frequent and updated outcomes for non-communicable diseases,

The Index is an innovative tool as it not only fosters competition among states by comparing similar states to each other but also nudges them to better their own performance in the previous year.

financial protection, and other priority areas, and the robust programmatic data that can be used for continuous monitoring.

Conclusion

The Health Index is a useful tool to measure and compare the overall performance and incremental performance across States and UTs over time. It is an important instrument in understanding the variations and complexity of the nation's performance in health. The critical factors that contributed to the success of the Health Index include: a) Timelines of the report so that it stimulates action and

not merely academic discussions; b) Provision of financial incentives based on the annual incremental performance of states under the National Health Mission; and; c) Verification of self-reported data by states by a third-party, independent verification agency to enhance credibility. However, there are limitations to the Index as no single index can purport to comprehensively capture the complex story of evolution of health system. Also, due to constraints of availability of quality data critical areas such as non-communicable diseases, mental health, and private sector service utilisation could not be captured. Thus, the Health Index is a work in progress and continuous refinements will be made as additional quality data becomes available and data systems improve. □

Endnotes

1. EAG states include Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand.

COVID-19: The Novel Threat

Dr Smita Watwe

It is a novel virus, very little is known about it. That's why currently the treatment being given is not very specific. Some antivirals, some anti-parasitic drugs are being tried. It is a highly contagious disease. First case of this virus was identified in December 2019 from Wuhan, Hubei province of China. WHO declared the 2019-20 Corona Virus outbreak, a Public Health Emergency of International Concern on 30 January, 2020 and a pandemic on 11 March, 2020.

The World is experiencing one of the greatest pandemic in history. Every day, many more are being added to that. In today's world we have good healthcare facilities, advanced knowledge in science and various treatment modalities, but still how come a tiny particle of a few nanometers has really shaken all the powerful nations? Let us start from the basics to understand it better.

What are Viruses?

Viruses are on the borderline of living and dead beings. They are much tinier than bacteria. Their size ranges from 18 nm-400 nm, they do not grow on routine laboratory media. Because of this, specific laboratory diagnosis of viral infections is not easy. Viruses are host cell-dependent particles, they use host cell machinery to build their structure. That is why, specific antiviral drugs which don't damage host cells are very limited. Mutations occur during every viral infection, either spontaneously or may be induced with chemicals or physical agents. A hybrid or recombinant virus will have new genes and new characteristics as well.

Corona Viruses

All Coronaviruses are large (120-160 nm) enveloped RNA viruses which have single stranded genome. The name "coronavirus" is derived from Latin *corona*, meaning "crown" or "wreath". The virus possesses a club shaped or crown like peplomer spikes giving appearance of solar corona. High rates of genetic mutations are shown by the corona viruses. Most of these infect animals and birds. Human infection is caused by only those which can adapt

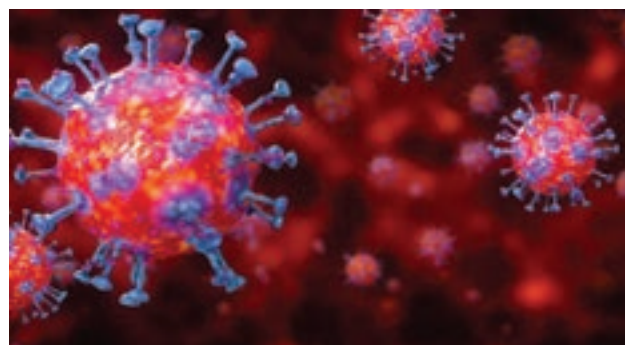
to human conditions. There are already known six corona viruses involved in human infections. Most of them are widespread, affecting people of most parts of the world and are known to produce mild upper respiratory tract infection and occasional diarrhea.

In 2003 there was an outbreak of SARS-CoV (Severe Acute Respiratory Syndrome coronavirus). It originated from China and spread to around 29 countries causing 8098 cases and 774 deaths. The source was believed to be monkeys, raccoon dogs, cats and rodents.

Another member of corona viruses, MERS-CoV (Middle East Respiratory Syndrome coronavirus) emerged in 2012. First reported from Saudi Arabia, MERS-CoV has affected more than 2143 cases and 750 deaths from 27 different countries. Here, the source was thought to be camels and bats.

COVID 19

This is the latest terminology being used as per the WHO guidelines. It represents **CO**rona **VI**rus **D**isease



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originated in 2019.

Previously used names for COVID 19 are:

- SARS-CoV-2
- 2019-nCoV acute respiratory disease
- Novel coronavirus pneumonia
- Wuhan pneumonia

First case of this virus was identified in December 2019 from Wuhan, Hubei province of China. WHO declared the 2019-20 coronavirus outbreak, a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 and a pandemic on 11 March 2020.

Challenges due to COVID 19

It is a novel virus, very little is known about it. That's why currently the treatment being given is not very specific. Some antivirals, some anti-parasitic drugs are being tried. It is a highly contagious disease. The transmission rate of SARS-CoV-2 is higher than SARS-CoV and the reason could be genetic recombination. Asymptomatic carriers as well as convalescent individuals can transmit the virus. No age group is spared. The progression of the disease is very unpredictable. Mortality rates are very high in some parts of the world compared to others.

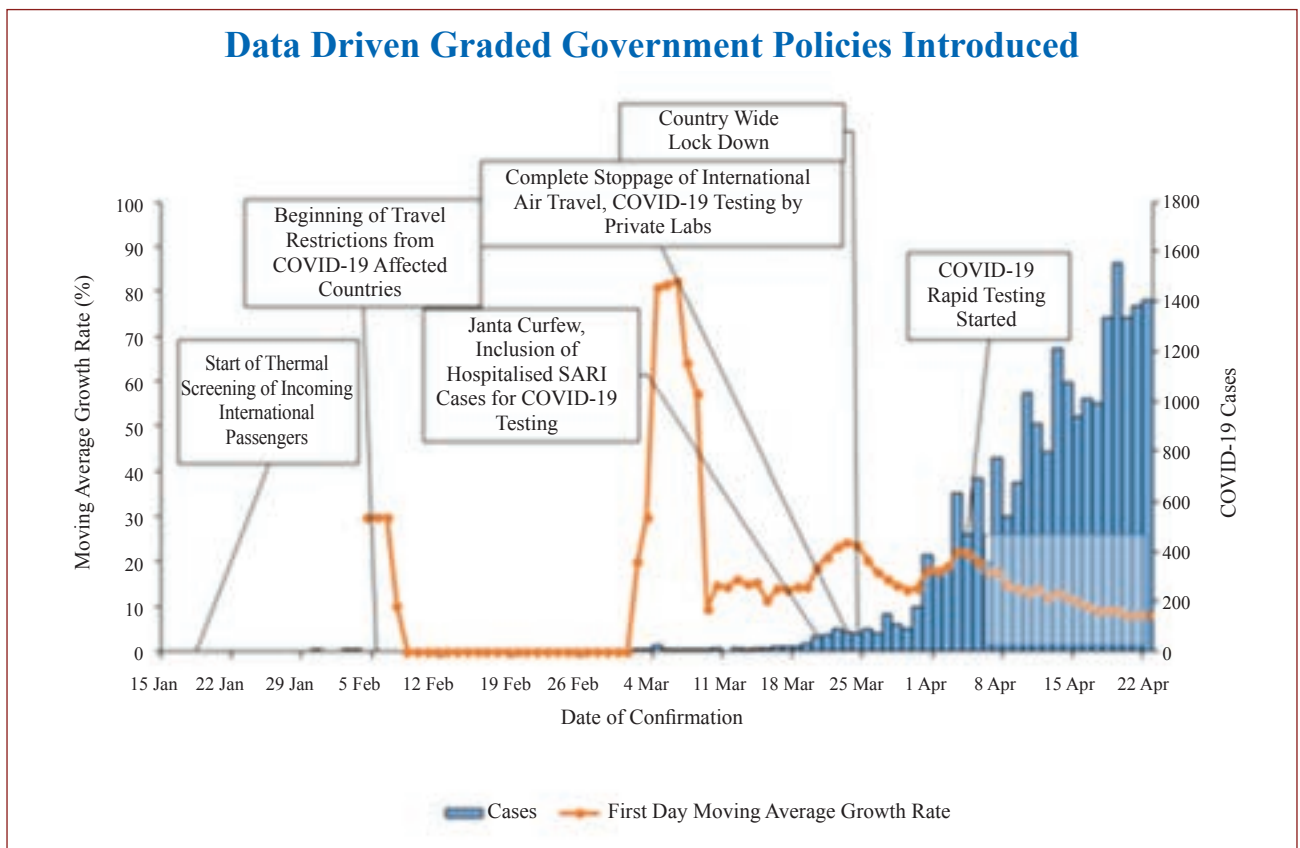
Transmission

There are two main routes of transmission of the

COVID-19 virus: respiratory and contact. The virus is mainly spread by small droplets produced by coughing, sneezing or even talking to an infected person. These droplets may also be produced during breathing; however, since the virus is large (as compared to other viruses), they rapidly fall to the ground or surfaces and are not generally spread through the air, over large distances. People may also become infected by touching a contaminated surface and then their face. The virus can survive on surfaces for a few hours to a few days, depending upon the nature of surface. It is most contagious during the first three days after onset of symptoms. Spread is possible before symptoms appear and in later stages of the disease as well. That makes it more dangerous. The time from exposure to onset of symptoms is typically around five days, but may range from two to fourteen days. There have been no reports of fecal-oral transmission of the COVID-19 virus.

Clinical Outcome

Common symptoms include fever, cough (mostly dry cough) and shortness of breath. Other symptoms may include fatigue, muscle pain, diarrhea, sore throat, loss of smell and abdominal pain. While the majority of cases result in mild symptoms (about 80%), some progress to viral pneumonia and multi-organ failure. Older people and people with other medical conditions (such as asthma, diabetes, hypertension or heart disease), are more vulnerable to becoming severely ill. Severity also depends





on pollution levels in that area. Mortality rates vary in different age groups, highest being in 80+. Some survivors show permanent lung damage. Unfortunately corona virus infections produce short and brief immunity, leaving a chance of reinfection.

Diagnosis

Early diagnosis proves beneficial in stopping further dissemination, as infected individuals are the only source of infection to others. Absence of specific symptoms makes the clinical diagnosis difficult. Laboratory testing is essential for confirmation. Real-time reverse transcriptase PCR (rRT-PCR) testing is the most useful test and currently the only reliable one. Blood antibody testing and viral antigen testing methods are being tried but are not specific.

Treatment

Currently, there is no uniform policy for treatment. Several drugs such as chloroquine, hydroxychloroquine, arbidol, remdesivir, and favipiravir are undergoing clinical studies to test their efficacy and safety in the treatment. Right now, no vaccine is available for COVID-19. Major problem with vaccine production is the genetic alterations which the virus undergoes. In the initial phase of the disease where symptoms are mild, it can be treated by supportive therapy. In case of major lung damage, ventilator support might be required. Good immunity of individual may prevent further complications.

In a recent study, it was identified that monoclonal antibody (CR3022) binds with the spike RBD of SARS-CoV-2, a structure essential for attachment of virus to the host cells. Monoclonal antibodies can be developed as a therapeutic candidate, alone or in combination with other neutralising antibodies for the prevention and treatment of COVID-19 infection. Further studies are going on.

Prevention

At this point of time, prevention is the best possible treatment.

Personal Preventive Measures in public places

- Staying home
- Covering mouth and nose with flexed elbow or tissue when coughing or sneezing

- Disposal of used tissue immediately
- Systematic washing of hands often with soap and water for at least 20 seconds OR using a hand sanitiser that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry
- Avoid touching your eyes, nose and mouth with unwashed hands
- Cleaning frequently touched surfaces and objects

Preventive Measures in Public Places

- Keep about 6 feet distance with others
- Wear a cloth face cover/mask. Do not use a facemask meant for a healthcare worker
- Clean and disinfect frequently touched surfaces daily. This includes tables, doorknobs, lift handles, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets and sinks.
- To disinfect- Most common household disinfectants like bleach solution will work. Use disinfectants appropriate for the surface.
- Effective inactivation could be achieved within 1 minute using common disinfectants, such as 70% ethanol or sodium hypochlorite
- There is no evidence about the survival of the COVID-19 virus in drinking-water or sewage, so any special treatment of water is not required.

Summary

How far this pandemic of COVID 19 damages us is solely in our hands. If we follow personal and social behavioral discipline, then the damage can be minimised. But if we ignore it, then it will prove to be the most catastrophic event in the history of the globe. So let's save ourselves and our globe. □

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Yoga for Stress Management

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Stress is fight or flight response to a demanding situation. There is increased fear, stress and apprehension among society due to the mortality and morbidity resulting from the COVID-19 pandemic. Thus, an intervention such as yoga which reduces psychological stress may have important role to play in strengthening the immune system thereby reducing spread of infections and preventing complications.

What is COVID-19?

Corona-virus Disease (COVID-19) is an infection caused by Severe Acute Respiratory Syndrome Coronavirus 2 Viruses (SARS-CoV2) that cause illness ranging from the common cold to more severe diseases (Figure 1). It primarily targets the lower respiratory tract, with dry cough, fever, fatigue as the major symptoms, others being; headache, fatigue, joint pains, breathing difficulty and diarrhoea. The clinical features from chest CT of patients with COVID-19 include: pneumonia, acute respiratory distress syndrome, acute cardiac injury and ground glass opacities. People with co-morbidities such as diabetes, hypertension and other cardio-vascular disorders appear to be more susceptible than the rest.

Stress and Immunity

Considering the rapid spread and its impact on individual's health, the World Health Organisation has declared COVID-19 as a global pandemic. Stress is fight or flight response to a demanding situation. There is increased fear, stress and apprehension among society due to the mortality and morbidity resulting from this pandemic. Immunity and lifestyle factors are closely

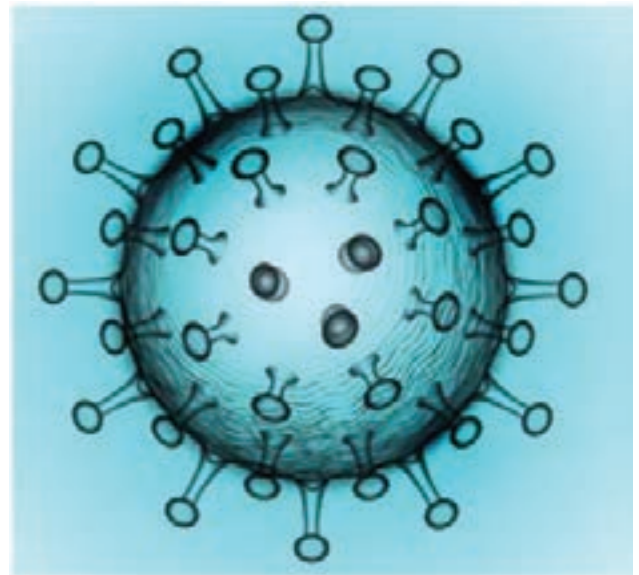


Figure 1: Corona-virus

interlinked. A meta-analysis of 300 studies concluded that chronic stressors reduce both cell mediated and humoral immunity of the host. It means that when we are under stressful demanding situations our immune system starts

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getting compromised and we become prone to infections. Thus, an intervention such as yoga which reduces psychological stress may have an important role to play in strengthening the immune system thereby reducing spread of infections and preventing complications.

Introduction to Lifestyle

Yoga-based lifestyle involves lifestyle modification based on the concepts of right living from Indian ancient scriptures. According to yoga principles, there are four components of the lifestyle namely- diet, physical activity, habits and emotional well-being. Irregularity of these lifestyle factors is considered as a major cause which affects the integrity of the immune system and increases the risk for infections. The lack of adherence to proper lifestyle (junk food consumption, physical inactivity, improper sleep-wake cycle, addictions) is all traceable to the speed of thought patterns in the mind. Hence, the entire concept of yoga-based lifestyle is to reduce the speed of mind (by the practices of physical postures with mindfulness, breath regulation, chantings, and relaxation techniques) and thus, manage it efficiently so that the individual is able to adhere to a proper lifestyle. Calming down of the mind provides deep rest and rejuvenation to the system which enhances homeostasis and immunity.

Tentative Yoga Module for Stress Management and Control of COVID-19

Consistent practice of yogic breathing techniques (*pranayama*) increases the lung's airflow, air capacity, stamina and efficiency. A study assessed blood oxygen saturation before, during and after two yoga breathing techniques; high frequency yoga breathing (*Kapalabhati*) and breath awareness in 29 healthy young male volunteers. They observed a significant increase in oxygen saturation during the 33 min session of high frequency yoga breathing. Another study compared oxygen consumption during the short *kumbhaka* (timed breath holding) varieties of *Ujjayi pranayama*, and the other long *kumbhaka* varieties of *Ujjayi pranayama* in ten healthy volunteers. The duration of *kumbhaka* phase was on an average 22.2% of the respiratory cycle in the short *kumbhaka* group, and 50.4% in the long *kumbhaka* group. It was observed that short *kumbhakapranayamic* breathing caused a statistically significant increase (52%) in the oxygen consumption (and metabolic rate) compared to the pre-pranayamic baseline period of breathing. In contrast to the above, the long *kumbhaka* pranayamic breathing caused a statistically significant lowering of the oxygen consumption (by 19%) and metabolic rate). Another yogic breathing technique called *Sudarshan kriya* (SK), which involves breathing in three different rhythms (including *Ujjayi* and *Bhasrika* practices), has

been shown to lower blood lactate levels, provide better antioxidant defence and improve Natural Killer (NK) cell counts. Yoga-based breathing practices have been reported to improve gas exchange in patients with chronic heart failure and in participants exposed to high-altitude hypoxia, it has also been used for increasing oxygenation in patients suffering from chronic obstructive pulmonary diseases. Another study found that oscillating airflow produced by humming bee breath (*Bhramari pranayama*) enhanced sinus ventilation and thereby increased nasal nitric oxide levels (by 15-fold) in ten healthy subjects. A recent study on the effect of yoga in patients with HIV has demonstrated that regular practice of integrated yoga (joint loosening, sun salutations, breathing practices, pranayama and relaxation techniques) for a month could boost immunity and psychological health. Yoga had been beneficial as an adjunct to anti tuberculosis treatment in pulmonary tuberculosis patients by reducing the symptom scores, sputum conversion on microscopy, improvement in lung capacity and radiographic pictures.

Apart from this, yoga may also help manage the risk factors such as type 2 diabetes, hypertension and heart diseases. These evidences highlight the possible role of yoga in preventing infection, controlling virulence of the pathogen and improving symptoms in the infected individual, suggesting its application to the present pandemic.

Following is a brief 30-minute yoga protocol for stress management during COVID-19 pandemic that has been deduced from the existing literature (both modern and ancient) on yoga for maintaining respiratory health and improving immunity:

A. Breathing techniques - Sitting Position (*Prānāyāma*, total ~ 20-minute session)

- i. Hands in and out breathing (Figure 2): Breath in and spread your hands wide; breath out and close.

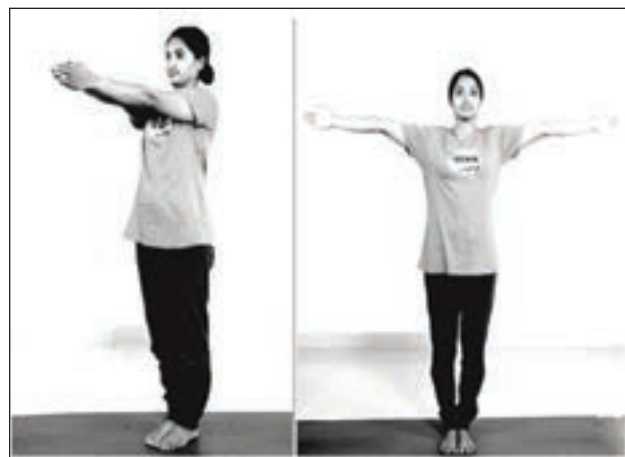


Figure 2: Hands in and out breathing



Figure 3: Hand Stretch Breathing

Synchronise hand movements with your breath. Perform 10 rounds.

ii. Hand-stretch breathing (Figure 3): Interlock your fingers and keep them on your chest. Breathe in stretch the hands out with keeping the fingers interlocked, breathe-out and come back. Do the same practice again at 135 degrees and 180 degrees above the head. Repeat each for 10 counts.

iii. Vibhagiya pranayama (Sectional or Square breathing; 3:3:3:3; Figure 4): Deep breathing with awareness on the natural respiratory movements of the lower, middle and upper chest. Inhale deeply for 3 counts, hold the breath for 3 counts. Now, slowly exhale or 3 counts and retain emptiness of breath for 3 counts. Repeat this cycle for 9 rounds.

iv. Kapalabhati Kriya (Skull shining breath): Flapping of abdomen with active exhalation and passive

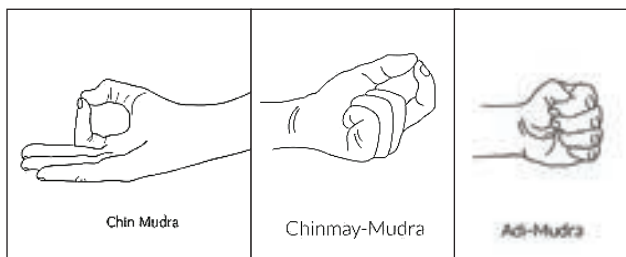


Figure 4: Different mudras in VibhagiyaPranayama

inhalation (those with blocked nose should perform with mouth wide open); 80-120 strokes per minute for 2 minutes followed by gap of 1 minute and repeat the cycle one more time.

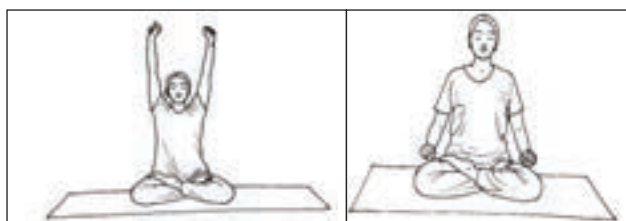


Figure 5: Bhastrika Pranayama

v. Bhastrika Breathing (Bellows breath; Figure 5): Forceful and rapid inhalation and exhalation. This has to be practiced for 3 cycles, each of 20 strokes. One inhalation and exhalation make one stroke. 20 strokes followed by gap of 30 seconds.



Figure 6: Nadishuddhi Pranayama

vi. Nadishuddhi (Alternate nostril breathing; Figure 7): Inhale slowly from left nostril, exhale from right; then inhale from right and exhale from left. This makes 1 cycle: 9 cycles.

vii. Ujjayi breathing (Victorious breath): Inhale and exhale deeply while constricting your throat such that a sound of friction of air in the throat region is heard during inhalation as well as exhalation. Try to make exhalation longer than the inhalation. Repeat this for 9 rounds

viii. Bhamari (Humming bee breath): Inhale deeply, keep the mouth closed, gently touch the tip of the tongue to the upper palate and produce humming sound. Try to make exhalation longer than the inhalation. Repeat this for 9 rounds. Keep the eyes closed during the practice and feel the vibrations in the head region. 9 rounds 1 cycle.

B. Relaxation (for ~ 10 minutes):

i. Deep abdominal breathing at the rate of 6 breaths per minute {Inhalation (abdominal goes out): Exhalation (abdomen sinks in) =1:2; 10 counts} (3 minutes)



Figure 7: Nadanusandhana Practice

ii. Nadanusandhana (Figure 7): Relaxing the joints and muscles consciously from toes to head with chanting of the sounds AAA (with awareness on abdomen), UUU (awareness on chest and back) and MMM (awareness on head region)- 9 rounds each sound (5 minutes)

iii. Silence with awareness of the present moment (listening to the neutral sounds in surrounding without judging) (1 minute)

iv. Positive resolve in the mind: "I am completely healthy" 9 rounds; (1 minute) □

Strengthening Health Systems

Kavita Singh

Enhancing healthcare finance and to realign the allocation to emerging priorities, fulfilling its commitment to UHC and SDG; rising trends in disease burden of non-communicable diseases; continued challenges in poor maternal and child health especially in Empowered Action Group and North East states, unfinished agenda of Millennium Development Goals for communicable diseases, especially TB and Malaria; and phenomenal rise in health care costs, the Government of India and the State Governments have to substantially raise spending on healthcare in India. The National Health Policy, 2017 aims to double the government healthcare spending from the existing 1.2% of the GDP to 2.5% by 2025.

Over the past seven decades, since independence, India has made a phenomenal progress in access and availability of health services adding a network of 1,58,417 Sub-Centres (SCs), 25,743 Primary Health Centres (PHCs) and 5624 Community Health Centres (CHCs). More than 30,000 SCs and PHCs have been up scaled to Health and Wellness Centres (HWC) to provide comprehensive primary health care since 2018. India has achieved reduction in infant mortality rate (IMR) from 74 per 1000 live birth in 1994 to 33 in 2017; maternal mortality ratio (MMR) from 600 per one lakh live births to 122 per one lakh live births in 2015-2017 and crude death rate (CDR) and crude birth rate (CBR) declined to 6.3 and 20.2 per 1000 population. The life expectancy at birth has increased from 58 years to 69 years from 1990 to 2017.

India has successfully eliminated diseases like small pox, guineaworm, neonatal tetanus and polio, and effectively controlled many communicable diseases like

leprosy, malaria, filariasis, kala-azar and progressing well towards ending tuberculosis by 2025. Deaths due to infectious and communicable diseases have also been significantly reduced. The challenge is to overcome the growing incidence of non-communicable and lifestyle diseases like cancer, diabetes, chronic kidney diseases, cardiovascular diseases,

chronic lung diseases and mental health disorders etc., as well as to achieve the universal health coverage with indigenous, affordable and cost-effective innovations.

Changing lifestyle and risk of behavior like smoking, alcohol consumption, unhealthy diet and inadequate physical activity are attributed to high Non-Communicable



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Disease (NCD) burden. Increasing proportion of ageing population due to concurrent demographic transition has further contributed to NCD burden. NCDs account for 55.4% of the diseases burden and 62% of death in India and is expected to rise further to over 70%. The approaches for reducing NCD mortality and morbidity are very different than India's health system had been implementing for prevention and control of communicable diseases, and strategies for reducing maternal and child mortality. While the emerging new challenge of NCDs and the challenge of fighting malnutrition and communicable disease still continue, India is facing double disease burden.

India has largely achieved Millennium Development Goals (MDGs) and is committed to Universal Health Coverage (UHC) which is one of the targets of Sustainable Development Goals (SDG) by 2030. The SDG 3 targets to achieve UHC, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality and affordable essential medicines and vaccines for all.

Health Financing in India

To address the entire game of disease burden, the public expenditure on health accounts for nearly one-third of the total expenditure at 1.2% of the GDP and remaining is met by Out-of-Pocket expenditure (OOPE) by the households which is exorbitant and puts extra pressure on low socio-economic population as almost 10 crore population goes below poverty line due to high OOPE. According to the latest National Health Accounts Estimates (2016-2017), the total spending on health in India is 3.8% of the GDP which has reduced from 4.2% in 2004-05. The Government health spending has remained almost static around an average of 1% of GDP and the State health spending is around 2% of SGDP on average with variations across the States. The Total Health Expenditure (THE) per capita has increased more than three times from 2004-05 to 2016-17. Out of THE, 32.4% is Government Health Expenditure (GHE), 58.7%

household as OOPE, 7.3% social security insurance and 4.7% private health insurance. The proportion of GHE has increased from 22.5% in 2004-05 to 32.4% in 2016-17. The external donors/funding accounted for 2.3% in 2004-05 has reduced to 0.6% in 2016-17.

A sum of 45% of the total current health expenditure is spent on primary health care followed by 36% for secondary care, and 13.9% for tertiary care. 52% primary health care is supported by government as compared to primary sector (41%). The government share on secondary tertiary (10.8%) care is lower than the private sector (42.4% and 15.6% respectively). Among the providers of health care, the Government hospitals contribute to 14% of the current health expenditures, whereas the contribution of the private sector is significantly higher at 26%.

Reports of several National Sample Survey Organisation (NSSO) Rounds (Round 60-2004, Round 71-2014 and Round 75th – 2017-18), show that the households largely depend on private providers for healthcare services but this dependence on private healthcare is declining. Average medical expenditure on inpatient care has increased almost three times (Rs. 5695 in 2004 to Rs. 16676 in 2017-18) in rural and (Rs.

8851 in 2004 to Rs. 26475 in 2017-18) urban areas from 2004-05 to 2017-18. The average expenditure for hospitalisation in private institutes is much higher (3.4 times) as compared to government facilities (2.9 times). In 2017-18, the average expenditure in public facilities stood at Rs. 4290 in rural areas as compared to Rs. 27,347 in private facilities which is 6.4 times higher. On the other hand, in urban areas, the average expenditure in private facilities has increased from Rs. 4837 to Rs. 38,822 which is 8 times higher, though the public spending has not increased to expected levels but the average expenditure on inpatient care has declined in public facilities of rural areas from Rs. 5636 in 2014 to Rs. 4290 in 2017-18, and urban areas from Rs. 7670 in 2014 to Rs. 4837 in 2017-18.

Catastrophic health expenditures have increased significantly in both rural and urban areas. There is an indication of reduction of hardship financing over the 10 years as household's reliance on borrowing from money lenders, friends etc. to finance health care has declined steadily in both rural and urban areas. Households are now relying on income and savings to meet their healthcare expenses.

Government Commitments

Enhancing healthcare finance and to realign the allocation to emerging priorities, fulfilling its commitment to UHC and SDG; rising trends in disease burden of non-communicable diseases; continued challenges in poor maternal and child health especially in Empowered Action Group (EAG) and North East (NE) states, unfinished agenda of Millennium Development Goals (MDGs) for communicable diseases, especially TB and Malaria; and phenomenal rise in health care costs, the Government of India and the State Governments have to substantially raise spending on healthcare in India. The National Health Policy (NHP), 2017 aims to double the government healthcare spending from the existing 1.2% of the GDP to 2.5% by 2025.

India has largely achieved Millennium Development Goals and is committed to Universal Health Coverage (UHC) which is one of the targets of Sustainable Development Goals (SDG) by 2030. The SDG 3 targets to achieve UHC, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality and affordable essential medicines and vaccines for all.

Table 1: Projections of Health expenditure to achieve 2.5% of GDP

(Rs. in Lakh Crore)

Year	Expenditure on Health as a percentage of GDP	GDP (assuming growth @ 7.5% at current prices over baseline of 2017-18)	GDP with Rate of Inflation @ 4% only	Expenditure on Health	35% of Expend. for Centre	65% of Expend. for State
1	2	3	4	5=4*2	7	8
2018-19	1.40	178.75	185.90	2.60	0.91	1.69
2019-20	1.40	199.83	207.84	2.91	1.02	1.89
2020-21	1.58	223.42	232.36	3.67	1.28	2.39
2021-22	1.76	249.79	259.78	4.57	1.60	2.97
2022-23	1.98	279.26	290.43	5.75	2.01	3.74
2023-24	2.22	312.22	324.70	7.21	2.52	4.68
2024-25	2.50	349.06	363.02	9.07	3.17	5.90

Source: Govt. health expenditure as 1.4% of GDP, in Economic Survey, 2017-18

It would mean increasing the current budgetary allocation of Rs. 69,000 crore in 2020-21 to about 4.6 times, meaning Rs.3.17 lakh crore by 2025 (Table 1). However, to achieve the goals of Universal Health Coverage, the Government should aim to raise healthcare spending to the level of 4-5% of the GDP over a period of 7 to 8 years from 2019. Further, there is a need to enhance allocative efficiency of budget and finance to achieve major impact on health status and wellbeing.

Though the central health budget has increased in absolute terms from Rs. 57,732 crore in 2018-19 to Rs. 66,500 crore in 2019-20 and Rs. 69,000 crore in 2020-21, it is still short by Rs. 1.28 lakh crore as the projected budgetary requirements to reach 2.5% of GDP. India would need Rs. 3.21 lakh crore whereas actual allocation is Rs. 1.93 lakh crore. Even in the past, against the 12th Plan approved outlay of Rs. 2.68 lakh crore, Rs. 1.29 lakh crore (48.09%) was allocated.

In case of second commitment of NHP to ensure increase of state health spending to more than 8% of their budget by 2020, the average of last five years shows that none of the State spent the defined amount (Figure - 1)

In case of the third commitment to ensure primary health expenditure to be 2/3rd of the total health expenditure, National Health Account (NHA) 2016-17 shows that the share is only 45%.

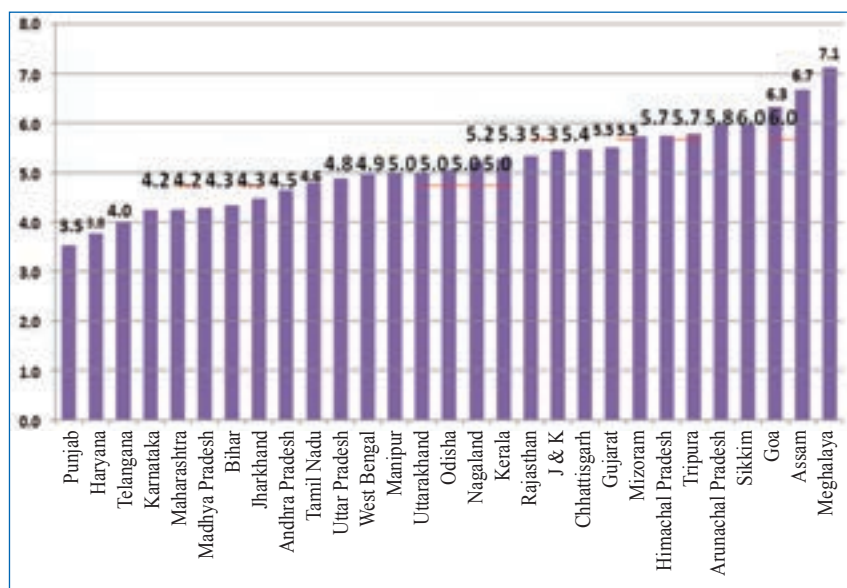
What is the Rationale for Spending on Health, especially Public Health?

“Sarvebhavantusukhinah, sarvesan-tuniramaya”

It is widely acknowledged that health is not only a goal in itself, but also vital for improved developmental outcomes. It is known that better health improves productivity and reduces loss due to premature deaths, prolonged disability and early retirement. Health and nutrition also directly impact the scholastic achievements which have bearing on productivity and income.

Health outcomes and financial protection depend on public spending on health. In 2014, India ranks low on life expectancy (125/183). In 2014, India had highest OPE (62.4%), almost double of China (32%) and 4.5 times of Japan. In case of Sweden, Japan, Germany, Thailand, USA, UK and France, the OPE was less than 25%. A study by Public Health Foundation of India (PHFI) has estimated that about 55 million Indians are pushed into poverty in a single year because of catastrophic health expenditure. The study, published in

Figure 1: Percentage of State Health Expenditure to Total Health Expenditure (Average of Five years-2015-16 to 2019-20)



Source: Statement 27 State Finances: A study of Budgets of 2019-20

British medical journal reveals that non-communicable diseases like cancer, heart diseases and diabetes account for the largest chunk of spending by household on health. The Study also concluded that among non-communicable diseases, cancer causes highest catastrophic expenditure on health for a household.

Government health spending in India was 30% in 2014 which is 2.8 times and 1.9 times lower than Japan and China.

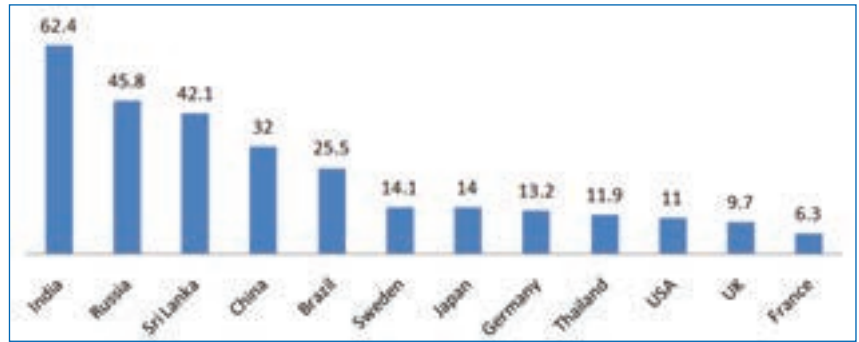
In 2014, India spent 5% of total government expenditure on health which is less than half of China, less than one-third of UK and Denmark.

India's tax collection to GDP in 2015 was 16.6%, much lower than China, UK and Denmark. Thus, already India needs to expand its tax base and specific tax and cess for the social sector.

Studies have indicated that even benefit to cost ratio for key healthcare interventions is 10:1; one extra year of life expectancy raises GDP per capita by 4%. Investment in health creates millions of jobs, largely for women, through the much needed expansion of the health workforce. The UN High Level Commission has stated in year 2016, that "investment in job creation in the health and social sectors will make a critical positive contribution to inclusive economic growth and least likely to be affected by automation".

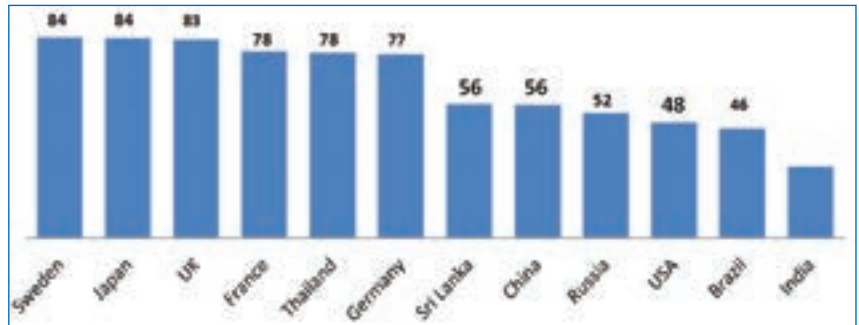
Public health care system in India needs to address the issue of critical regulation systems on food, drugs and diagnostic etc; life saving vaccines and drugs like TB; preventive, promotive, palliative and rehabilitative health care; implementation of clinical establishment rules; gaps in medical, dental, nursing and pharmacy institutions which will not be addressed by market forces requires government interventions. The private market will not address inequity of healthcare delivery systems. Primary healthcare can potentially deal with 90% of healthcare demands. Investment in primary healthcare including prevention and health promotion

Figure 2: Out of Pocket Expenditure as % of Total Health Expenditure, 2014



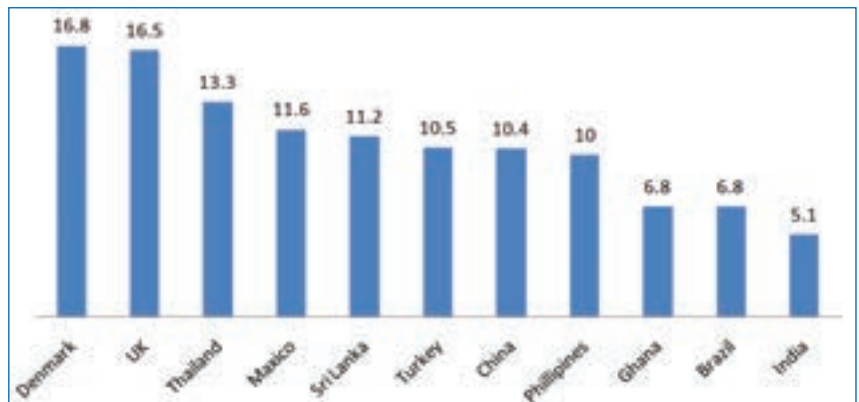
Source : Global Health Expenditure data base WHO

Figure 3: Government Health Expenditure as % of Total Health Expenditure



Source : Global Health Expenditure data base WHO

Figure 4: Health Expenditure Out of Total Government Expenditure (%), 2014



Source : Global Health Expenditure data base WHO

Figure 5: Tax to GDP Ratio (%) in Selected Countries, 2015



Source : Global Health Expenditure data base WHO

proves better health & developmental outcomes at a much lower cost – it helps to reduce the need for more costly, complex care by preventing illness and promoting general health. There is global evidence that primary health care is critical to improving health outcomes. It plays an improvement role in prevention of several disease conditions, including non-communicable diseases. Comprehensive primary health care reduces morbidity and mortality at much lower costs and significantly reduces the need for secondary and tertiary care. It also addresses preventive, promotive curative rehabilitative and palliative aspects of care.

Need for Reprioritisation

In India, to generate more resources for health commodities that harm health have been suitably taxed but taxes need to be earmarked for preventive and promotive healthcare. In India, as per 2020-21 budget Rs. 2.28 lakh crore of government spending is earmarked for subsidies for food, fertilizers and petroleum etc. which have direct and indirect health effects. The subsidies are more than the central, state and local budget on health; hence subsidies need to be reviewed periodically. Raising taxes on harmful commodities may not only improve health but can generate more fiscal space for health. In case of India, taxes on alcohol, tobacco, salt and sugar will not only generate additional resources but would be preventing non-communicable diseases and contribute to easing burden on health systems. At present, non-communicable diseases cause more than 60 percent deaths, hence, the revenue generated through tobacco and other harmful products need to be earmarked for health sector to deal with cancer and cardiovascular diseases and for agriculture sector to shift farmers from tobacco cultivation to other crops which yield high returns and are sustainable ecologically.

Similarly, taxes generated from alcohol, may also be used for health. No doubt taxes generated from tobacco, alcohol and unhealthy food

play an important role in economy but epidemiology transition has brought the society at a juncture where more than 60% of deaths due to non-communicable diseases and the risk factors attributed are tobacco use, harmful use of alcohol, high blood pressure due to high salt intake, obesity, unhealthy diets like sugar sweetened beverages and physical inactivity.

Subsidies on commodities such as sugar, diesel, kerosene and coal should be reviewed and savings diverted to nutritious food and clean renewable energy sources. The Government needs to subsidise LPG heavily instead of diesel, kerosene and coal for cooking and fruits, dairy products and protein sources should be promoted for healthy lifestyle.

The Government has levied taxes on tobacco, alcohol, unhealthy diets and sugar contained beverages to generate revenues but this need to enhance to the level where struggling of these items doesn't happen and their availability goes beyond the reach of people. Turning point in the era of taxation would be when these taxes, labeled sin tax, are levied to move towards assuring healthy behavior which act as preventive health providers, save society from non-communicable diseases, protect human resources from disability at a juncture when India is at an advantage of demographic surplus which in a way would get converted into demographic dividend. Ethically, it is inhuman to generate revenue from tobacco and alcohol for investment in developmental activities and construct cancer hospitals and palliative and rehabilitative centres simultaneously.

At the policy level, marginal increase in taxes may not yield desired outcomes. Therefore, increase in taxes need to be substantial to achieve the desired changes in consumption and move towards phasing it out from life. In a country like India, inflation suppresses small increases; hence inflation needs to be adjusted to avoid tax ineffectiveness. Planning of such taxation would yield outcomes if a mechanism of strict adherence of regulation at centre and State is

in place to avoid non-compliance on grounds of loopholes especially against smuggling and bootlegging as large tax collection allures pilferages. Formulation of a policy on raised taxes may not achieve defined results unless its implementation and enforcement is monitored effectively and coordinated till it yields desired outcomes to reduce transport and trade illegally. Raised taxes on tobacco, alcohol, salt and sugar and unhealthy products are justified not only to address the bad effects on society from the abuse of these substances but also to enhance collection of government revenue. Revenue raising on these products should be as high as the component that mitigate the bad effects of consumption abuse. The design of taxes must take into account all products leading to obesity and further diabetes and cardiovascular disease. Adolescents and adults respond most to price increases on unhealthy foods and beverages, tobacco and alcohol.

For the productive utilisation of tax resources, part of tax collection could be earmarked to preventive and promotive healthcare, improvement for air and water quality, nutrition and treatment of diabetes, cardiovascular diseases, cancer and chronic obstructive pulmonary diseases (COPD).

In a similar way, another front of resources mobilisation is review of subsidies which is a burden on growing economics and may provide some fiscal space. Food substances that contribute to obesity including refined grains such as white flour and white rice are highly subsidised and these subsidies need to be reviewed and reoriented towards improving the nutritional content of subsidised food. Production and consumption of pulses have stagnated in India while the output of food grains and sugar has increased. Whereas the food subsidy can be used towards subsidies on pulses, fruits, vegetables and milk which will have a far more beneficial impact on nutrition. It is not only what consumers eat, drink or smoke that can harm health and whose

effects can be modified by taxes or subsidies. India subsidises coal, gasoline and their fossil fuels which are the leading products of particulate matter which causes lower respiratory tract infections, COPDs, cancers, heart diseases and exacerbates the risk of tuberculosis. According to a 2015 IMF report, government spent 6.5 percent of the world's GDP to subsidise energy and energy subsidies exceeded public spending on health and education. Re-allocating fuel subsidies towards clean fuels and eliminating subsidies on those items which have direct harmful effect on health is necessary to improve health and save scarce resources. Review of subsidies and later removal or reduction and imposition of heavy taxes may not favour political agenda but the health and economic burden of tobacco and alcohol use falls heaviest on the poor. Heart disease and stroke are the leading causes of catastrophic expenditure in India and the main reasons of families falling below the poverty line trap into poverty.

A second concern is that, removal of agricultural subsidies would adversely affect farmers and small scale manufactures including those who make bidis and other tobacco products. Farmers of tobacco and sugarcane do well as these crops are cash crops in India but they should be assisted to switch over to such crops that are not harmful to human health and just a substitute of their livelihood by allocating part of earmarked revenue collected through taxes for the orientation of these farmers for smooth transition from these cash crops to other crops without putting them into financial hardship. Policy makers need to document explicitly pros and cons of these reforms of reorienting tax revenue and subsidies and explain provision on how the losers from these changes would be compensated to ensure that their livelihood are not compromised.

Taxes should be imposed on specific industrial commodities causing air water and soil pollution- other than the taxes on tobacco,

Subsidies on commodities such as sugar, diesel, kerosene and coal should be reviewed and savings diverted to nutritious food and clean renewable energy sources. The Government needs to subsidise LPG heavily instead of diesel, kerosene and coal for cooking and fruits, dairy products and protein sources should be promoted for healthy lifestyle.

alcohol and foods having negative impact on health and taxes on polluting industries.

Like health and education cess where 1% is exclusively for health, pollution cess should also be levied as it has direct negative impact on health since public health system in India is ax finances, increasing tax revenue/base can benefit health sector by introducing new forms of taxation like inheritance tax or by increasing the tax rates on wealth, property, capital gains etc.

Time for “More Health for Money”

Health budget during 2020-21 has increased by 4.1% from 2019-20. Till now, the health sector had been focusing on “more money for health and more health for money” but in the current year, the health sector needs to focus on “more health for money” turning towards innovative financing by striving to do more with less. The health sector has tremendous potential to use digital technology using application of machine learning, artificial intelligence, internet of things and virtual reality in making quality healthcare accessible and affordable to the people.

Studies have indicated that the health sector in India is facing shortage of infrastructure and manpower especially specialists. It is a right time to use the power of

technology in the re-organisation of healthcare and evolve a new class of care delivery models.

The Indian health care system has a huge growth potential; initiations such as liability gap funding for setting up hospitals under PPP mode in aspirational districts offer an opportunity to innovate limited health allocation; will push the sector “to do more with less” adopting innovations and replicating existing best practices. Proceeds from tax on medical devices to be used for funding government hospitals; converting existing district hospitals to medical colleges through PPP mode and attaching a medical college with district hospital in the PPP mode are some innovations in Union Budget 2020-21 to address the shortage of doctors and infrastructure.

Health cess of about 1% on direct tax, raising funds of approximately Rs. 10,000 each year need to be diverted to health. There is a need to develop partnership with the private health sector for co-financing secondary and tertiary health care, and with the corporate sector for allocating CSR funds in health care.

Health insurance to finance hospitalisation to reduce OoPE and catastrophic health expenditure can also be introduced. Ayushman Bharat has a great promise but the coverage should be extended to the whole population. People contributing towards their annual premiums may also be thought of.

A fairly large proportion of the allocated budget remains, unutilised within the health system on account of poor absorption capacity of States, delays in funds flows, inefficient implementation of activities and weak governance. Improving efficient budget utilisation and health systems performance would make available massive unspent funds for all envisaged growth plans. Removing bottlenecks in allocation, disbursement and timely flow of funds would also enhance utilisation of allocated funds. □

Artificial Intelligence in Healthcare

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The article outlines the opportunities for Artificial Intelligence (AI) technology within the Indian healthcare context whilst illustrating some of the many challenges from the wider adoption of AI based solutions. It further elucidates the use of AI for the current COVID-19 situation and the potential exponential spread amongst the population. It discusses some of the lessons on use of AI within Wuhan province and Beijing to inform the government on how these can be used to model the infection trajectory and speed up diagnosis of symptoms in India.

As the Artificial Intelligence revolution permeates through societies at a global level, its role in shaping India with its sixth of the world's population, could be substantial (Kalyanakrishnan et al., 2008). India's ratio 0.8 doctors per one thousand head of population (UK: 2.8, Australia: 5, China: ~ 4), the inability to meet World Health Organisation (WHO) guidelines for ratio of skilled healthcare workers (Weber, 2019), and resulting average patient-to-doctor face-to-face contact of just two minutes; illustrates the challenges of extremely heavy workloads on Indian doctors and opportunities for AI-based solutions to make a difference (Duan et al., 2019; Dwivedi et al., 2020; Kumar and Paul, 2018). Healthcare systems in many developing countries are bursting at the seams with as much as 77% of a doctor's time spent on preventive services that could be safely delegated to non-clinicians. With the ubiquitous reach of mobile technology within rural areas, opportunities exist for AI to help in the achievement of good health and well-being within remote communities where access to healthcare and skilled medical professionals are in short supply.

Opportunities and Applications

The modern era of global connectivity and high levels of mobile usage in India presents significant opportunities for access to AI technology focused healthcare within the following areas:



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AI in Assistance to Physicians

One of the ways in which AI can enhance healthcare delivery in India is to relieve highly-skilled medical professionals from routine activities, freeing up doctors to concentrate on the higher-value cognitive application of medical practice, truly connect with patients and positively impact cases of medical errors and misdiagnosis.

Given the resource constraints and stress on the healthcare system, a significant part of a doctor's workload could be safely offloaded to carefully-designed AI systems, reserving the serious cases for more detailed physician's attention.

AI-based technologies can offer improvements with speedy diagnosis and therapy selection, reducing medical errors, improving productivity, assessing and modelling risk and stratifying disease (He et al., 2019). Researchers have highlighted the success for AI in healthcare using Machine Learning (ML) image-interpretation methods within radiology, pathology, dermatology, using AI in ophthalmology, diagnosis of atrial fibrillation in cardiology, identifying the best available treatment in oncology and interpreting subtle cues from online communications within mental health with greater efficiency over human medical practitioners.

AI in Diagnostics

One of the key healthcare challenges in India is acute shortage of radiologists. AI based diagnosis can be especially helpful for radiology, pathology, skin diseases, and ophthalmology. For example, Aravind Eye Care Systems and Sankara Nethralaya have developed and validated an AI-based algorithm for diabetic retinopathy, which assists the ophthalmologists in screening for diabetic retinopathy on the basis of images of retina set to the doctor from peripheral centres (Gulshan et al., 2016). While CT scan, MRI and X-ray facilities have proliferated in India, there are only about 10,000 radiologists available. This is where AI can be of great assistance. The Tamil Nadu e-Governance Agency is helping the health department

with the shortage of radiologists by developing an AI-based system to read CT brain scans and grade them for further interventions.

AI for Optimising Treatment Plans

AI can also be used for assisting doctors and patients to choose an optimal treatment protocol. ML can be used to mine not only doctor's notes and patient's lab reports, but also link to the extant medical literature to provide optimal treatment options. (Wahl et al., 2018). Such technology is in use in India, China and Thailand to provide appropriate recommendation plans for cancer treatment using patient's details linked to medical literature¹.

AI for Monitoring/Ensuring Compliance

The potential for AI application in remote monitoring has enhanced manifolds via the use of wearables. These can be used for monitoring various aspects such as movements, physiological parameters, temperature and alerts that can be communicated to healthcare professionals. Devices can be used for helping people exercise and adopt healthy eating. While these aspects have largely been used for chronic disease management (diabetes, stroke, epilepsy) and for elderly people, specific aspects can also be designed for monitoring during epidemics.

AI in the COVID-19 Epidemic

The COVID-19 epidemic highlights the need for an AI based epidemic monitoring system that can model and predict outbreaks and help optimise scarce resources. Researchers from Imperial College, London have identified scenarios of up to 40 million deaths in 2020 from COVID-19 if measures are not taken to address the pandemic but highlight that over 38 million lives could be saved if countries across the globe implement high levels of testing, enforced isolation and wider social distancing. AI can help fight the virus via Machine Learning-based applications including population screening, notifications of when to seek medical help and tracking how infection spreads across swathes of the population. A Chinese tech firm uses AI systems to flag anyone who has a temperature above 37.3 degrees within Beijing's Qinghe Railway Station using cameras equipped with computer vision and infrared sensors to predict people's temperatures. The system can screen up to 200 people per minute and detect their temperature within a range of 0.5 degrees Celsius. AI was also used for tracking individuals in China and contacts² by combining face recognition technology, GPS tracking and a network of cameras covering the public places.

A Canada-based firm uses an AI-based platform that tracks infectious diseases around the world using Natural Language Processing (NLP) and machine-learning algorithms to peruse information for early signs of infectious epidemics. The AI algorithms can help home in

on key data relating to the spread of the virus and identify correlations such as the movement patterns of people living in the areas most affected by the virus. Another AI-based start-up is offering similar technology to governments and corporations which can trace the contacts of a COVID-19 patient on proprietary software and CCTV footages³.

Challenges and Controversies

The major challenges for India to deliver the benefits to its citizens from the adoption of AI technology within healthcare are significant. Leveraging AI in a meaningful way to enhance healthcare in India; needs emphasis across the healthcare industry to address technological, socio-cultural, regulatory, legal and ethical issues.

Healthcare Industry Issues

Due to the nature of the industry as well as people dynamics, the healthcare industry has been slow to adopt technological innovations. The challenges of migrating to an AI-technology-based healthcare infrastructure are numerous as medical professionals attempt to transition to new ways of working and adopt new systems and processes. Traditional healthcare personnel may resist new innovations, doctors may not trust AI systems, patients may question AI-based decision-making and medical staff could view the changes as disenfranchising them from their key roles and decision-making powers.

The changes required to realise the benefits of AI systems must be centred around clinicians and the problems they face, to enhance, not replace the need for highly-skilled medical practitioners. The required transformation to an AI-centric healthcare system requires trust from medical professionals, but also from patients unaccustomed to new ways of diagnosis and decision-making. The key challenge for policy makers is the engendering of confidence in the outcomes and trust that a human medical practitioner has an active role within the AI system.

The future role of doctors and other medical professionals is likely to change within an era where AI is integrated within diagnosis and disease forecasting.

Given the resource constraints and stress on the healthcare system, a significant part of a doctor's workload could be safely offloaded to carefully-designed AI systems, reserving the serious cases for more detailed physician's attention. AI-based technologies can offer improvements with speedy diagnosis and therapy selection, reducing medical errors, improving productivity, assessing and modelling risk and stratifying disease.

The challenge for the training of doctors is to address the transformational nature of AI-based healthcare, whilst not elongating the period for learning and qualification to integrate these new systems alongside everyday working practices.

Technology-related Issues

AI systems and the underlying algorithms are reliant on the quality of data to enable the ML elements to perform the necessary processing and decision-making. The challenge within India is the disparate nature of healthcare-related data. Each state has its own system and working process. Initiatives are needed at state and national government levels to ensure shared data standards, data security and exchange processes are incorporated within healthcare systems. This is complicated by the mass-worker migration between states, but highlights the need for solutions at a national level.

Socio-cultural Issues in Technology Implementation

Although India is seeing significant development and positive societal change over the last decade or so, the country has a long road ahead in the context of nationwide technological development and adoption. Although, policy makers have tended to view successful ideas from other countries and naturally assume these can be transplanted to India, researchers have warned of the inefficiency, even danger of such an approach. Studies have advocated that decisions are made to take account of cultural context and existing social conditions. (Kalyanakrishnan, 2018). Within India, access to the internet is primarily undertaken via mobile phones. While the penetration of mobile phones would at face value seem to be a positive factor for the adoption of AI, it could inadvertently amplify the gender disadvantage. Research highlights that women in South Asia are 38% less likely to own a mobile phone than men and when overlaid with patriarchal and misogynistic social factors, the real access figure could be less. Without positive action from policy makers the resulting outcomes for AI adoption are likely to become segmented along gender lines. (Dwivedi et al., 2019; Kalyanakrishna et al., 2018).

Solutions need to take account of the Indian context where pockets of the population are socially and educationally challenged, culturally marginalised and economically disadvantaged. Decision-makers need to ensure that public sector healthcare organisations benefit from AI technology rather than default to the private sector reaping the rewards for investment. (Kasthuri, 2018). Lessons can be learned from other countries that have undertaken this technological transformation.

Regulatory and Ethical issues

There are several ethical and regulatory challenges in implementation of AI in healthcare in India. Data security



and privacy is especially important with the increasing use of wearables which can potentially cause identity theft through hacking of devices and data. AI is set to alter the traditional relationship between the doctor and the patient as technology plays the role of a third substantial actor. Under these circumstances, the regulators need to provide clear and concise user agreement and privacy policies to enhance widespread and safe adoption of these devices.

Recommendations

The emerging nature of AI-based healthcare has the potential to offer significant benefits to the Indian people and present realistic solutions to the low levels of skilled medical resources throughout the country. The current COVID-19 pandemic and the forced migration of workers back to their rural villages due to the shutdown of major cities, illustrates the challenges faced within India and the logistical complexities in managing the current crisis. The changes needed to realise the benefits of AI technology within healthcare are significant but investment in this area has the potential to greatly benefit the health and well-being of the Indian people. Some recommendations for practice and policy are outlined below:

- To enhance the adoption of technology by healthcare providers, AI and its applications should be incorporated within the curriculum for medical and paramedical training.
- Technology should be recognised as socio-culturally embedded; hence the technology design and implementation should take into account cultural practices and address the gender divide in India.
- Ethical guidelines regarding security and privacy of data should be protected, especially as more and more the data is available through wearables and IOT. The data should be strictly used for clinical purposes only.
- AI systems when used for healthcare would have to be tested against all 7 DEEP-MAX parameters.
- *The AI system must be explainable and auditable.* All decisions made in the context of diagnosis or recommendations can impact on human lives. As such the underlying algorithms must be transparent and explainable to ensure ease of audit rather than acting

as a black-box based system.

- *AI systems should not exhibit bias.* The algorithms developed for the AI system must not exhibit any racial, gender or Pincode-based decision-making that disenfranchise or favour any population groups.
- *AI healthcare systems must conform to human values and ethics.* Regulatory bodies must ensure that human ethical values are an integral element of AI algorithms and resulting decision-making.
- *Adoption of AI based healthcare must be benefits-driven.* The migration toward greater levels of technology use may not be universally accepted or trusted by the medical staff within healthcare institutions. The impact and change in working practices must not be underestimated by policy makers, who need to ensure that changes are geared to the benefits to patients and the overall healthcare of the Indian people.
- Pilot initiatives should be developed within key states to trial the impact that AI systems could have on existing healthcare systems and infrastructure. Lessons should be learned from these initiatives before, wider rollout at a national level. □

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The changes required to realise the benefits of AI systems must be centred around clinicians and the problems they face, to enhance, not replace the need for highly-skilled medical practitioners. The required transformation to an AI-centric healthcare system requires trust from medical professionals, but also from patients unaccustomed to new ways of diagnosis and decision-making. The key challenge for policy makers is the engendering of confidence in the outcomes and trust that a human medical practitioner has an active role within the AI system.

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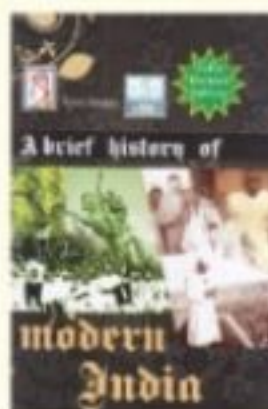
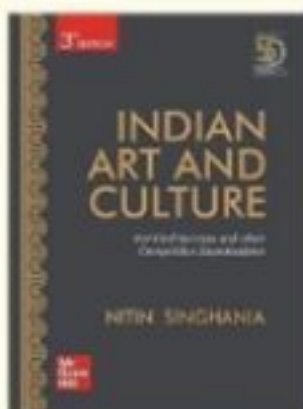
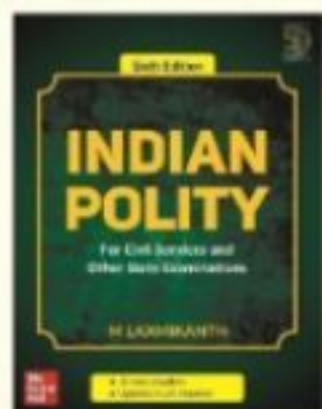
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Digital and Remote Technologies

In the midst of the current virus outbreak, a dramatic boost in the use of digital and remote technologies is observed. Videoconferencing is now ubiquitous, which helps with social distancing while keeping businesses running. This has often triggered organisations to adapt new technologies faster than they had planned – schools are conducting video-classes, and even religious gatherings are conducted online. The usage of personal remote monitoring devices or apps for instance, Hong Kong has issued wrist bands for passengers with a high-risk profile, while Singapore has a monitoring app for those on Stay Home Notice. In places like Singapore, temperature measurement at the entrances of almost all public buildings is being carried out since weeks. The connecting apps report their data into a central instance for real time analysis. That's a classic IoT scenario. The COVID-19 outbreak has shown the new emerging benefits of smart manufacturing, saying Industry 4.0 drives capabilities for remote operations, monitoring and maintenance of production lines and manufacturing plants.



IoT in Hospitals

Connecting health systems together can reduce a huge amount of manual admin tasks by consolidating EMRs (electronic medical records), scheduling systems, and patient monitoring into one place. As all hospital resources are being stretched, having a tool to monitor patients all around the hospital and ensure that medication is delivered effectively will be a massive help. Apart from the many cases of corona virus sectioning off parts of hospitals and taking up a huge proportion of hospital staff's time and attention, other high-risk patients still require the same levels of care. Devices that monitor glucose levels for diabetic patients keep track of blood pressure and heart rate levels and alert to issues can allow hospital staff to take care of these patients

IoT sensors can be used to ensure that the vehicle was driven in a safe manner without breaking key vials and that the correct temperature/humidity range was adhered to at all times, ensuring the safety of a vaccine or medicine.

remotely while in another section of the hospital. Devices for patients at home can also connect to EMRs so that chronically ill patients do not necessarily have to visit the hospital or medical centre while still being attended by medical staff.

Connected Medication & Home Care

Medical IoT devices for patients staying at home are already being used to improve out-patient care and reduce recurring appointments and these devices are beneficial even during a crisis. Glucose and blood pressure monitoring devices can be used by patients at home to make sure their care goes uninterrupted. This includes things like reminders to exercise and medication alerts, and direct connection with medical devices to make sure that critical events like a heart irregularity or diabetic attack can be responded to immediately. Connected medication is another way to reduce strain on medical staff. By giving patients regular alerts to take their medication and encouraging them to stick to the full course, doctors and caregivers have a real-time record of patients taking medication and can track the patient's progress by connecting with other medical records. This is especially crucial for at-risk patients or those suffering from Alzheimer's

disease or dementia who may struggle to keep track of medication without regular at-home visits. Adhering to a regular course of medication is vital at any time, but when medical resources are stretched to their limits, ensuring that patients at home do not require any extra assistance is paramount.

Apart from reducing the burden on medical services, using connected medication could also help to develop a vaccine faster. By measuring patient progress and the effects of new drugs in real-time, researchers could conduct dispersed remote trials and potentially speed up development of a vaccine that would work on a wider base of individuals.

Maximising Output and Minimising Stress

Nothing is certain about this current health crisis; we don't know when it will be over or what the fallout will look like. But we do know that we have the tools available to reduce the risk as much as possible and help to alleviate healthcare services when they need it the most. Simply by maximising the number of patients that can be attended to by doctors in the hospitals, and reducing the number of people that need to come into the hospital for regular appointments, IoT could take a huge weight off the shoulders of medical staff.

The Department of Science and Technology under the Ministry of Science and Technology, Government of India has set up a COVID-19 task force for mapping of technologies to fund nearly market-ready solutions in the area of diagnostics, testing, healthcare delivery solutions and equipment supplies.

IoT to Manage Patient Care

The scalability of IoT also comes in handy for monitoring all the patients who are high-risk enough to warrant quarantine but not serious enough to warrant in-hospital care. Right now, the daily check-up of the patients is done manually by healthcare workers who go door-to-door. In one reported instance, a healthcare worker had patients standing in their apartment balconies, so that he could fly a drone up to take their temperatures with an infrared thermometer. With IoT, the patients can have their temperatures taken and upload the data with their mobile devices to the cloud for analysis. This way, healthcare workers can not only collect more

data using less time but also reduce the chance for cross-infection with the patients. In addition, IoT can provide relief to the overworked staff at the hospital. IoT has already been used in the remote monitoring of in-home patients with chronic conditions such as hypertension or diabetes. In hospitals, telemetry, the transmission of biometric measurements like heartbeat and blood pressure from wearable, wireless instruments on patients to the central monitoring has been used to monitor a large number of patients with minimal staff. Here, IoT can be used to reduce the workload and increase the efficiency of the medical staff, all the while reducing the exposure of healthcare workers to infection.

Mapping of Technologies

The Department of Science and Technology (DST) under the Ministry of Science and Technology, Government of India has set up a COVID-19 task force for mapping of technologies to fund nearly market-ready solutions in the area of diagnostics, testing, healthcare delivery solutions and equipment supplies. The task force will map technologies from research and development labs, academic institutions, start-ups, and Micro, Small and Medium Enterprises (MSMEs). Some of these solutions are masks and other protective gear, sanitizers and affordable kits for screening for the corona virus. Ventilators, oxygenators, data analytics for tracking, monitoring and controlling the spread of the virus through artificial intelligence are also being mapped. The capacity mapping group consists of representatives from DST, Department of Biotechnology (DBT), Indian Council for Medical Research (ICMR), Ministry of Electronics and Information Technology, and Council for Scientific and Industrial Research (CSIR). It also has representative from the Atal Innovation Mission (AIM), Startup India and All India





Development Board (TDB), to support scientific solutions and commercial manufacturing of both new and existing solutions.

Conclusion

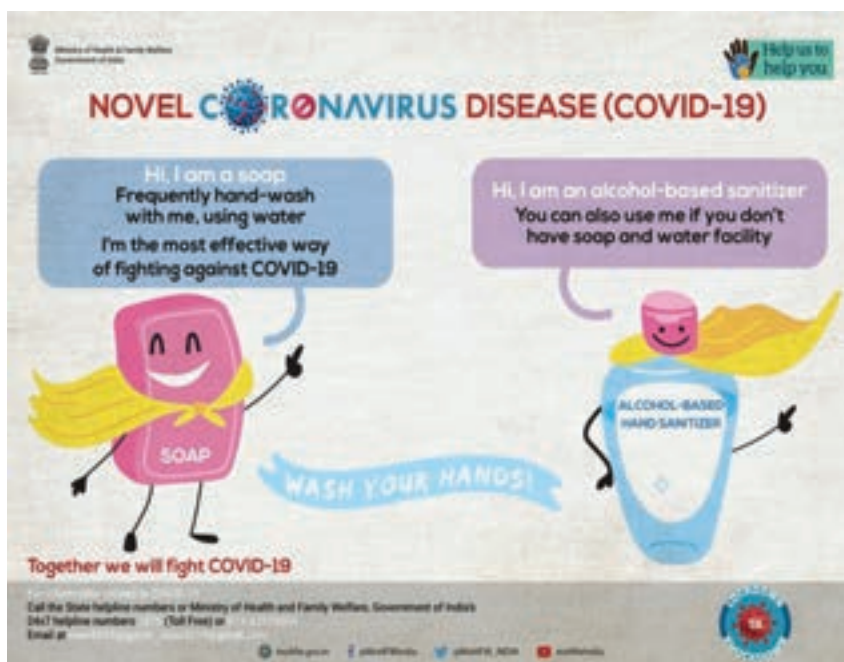
It is now the moment for countries to fast-track the construction of new digital infrastructure, such as IoT along with AI, in addition to the hastening of vital projects and major infrastructure construction that's already included in countries' financial stimulus plans. The year 2020 should have been the start of an exciting decade in medicine and science, with the development and maturation of several digital technologies that can be applied to tackle major clinical problems and diseases. These digital technologies include the internet of things (IoT) with next-generation big-data analytics, artificial intelligence (AI) that use deep learning and blockchain technology. They are highly inter-related: the proliferation of the IoT (e.g., devices and instruments) in hospitals and clinics facilitates the establishment of a highly interconnected digital ecosystem, enabling real-time data collection at scale, which could then be used by AI and deep learning systems to understand healthcare trends, model risk associations and predict outcomes. This is enhanced by blockchain technology, a back-linked database with cryptographic protocols and a network of distributed computers in different organisations, integrating peer-to-peer networks to ensure that data is copied in multiple physical locations, with modified algorithms to ensure it is secured but traceable.

The need of the hour is that all citizens of India should accept responsibility to encourage and successfully implement all the efforts taken by the Government of India to effectively utilise the IoT and artificial intelligence in various healthcare industries and services to offer best services to all citizens. □

Council for Technical Education (AICTE). The task force will identify the most promising start-ups that are close to scale-up their production in these areas. DST has set up a COVID-19 task force for mapping of technologies from R&D labs, academic institutions, startups, and MSMEs to fund nearly market-ready solutions in the area of diagnostics,

testing, health care delivery solutions, equipment supplies.

As part of the mechanisms being used for rapid development, manufacturing, and deployment of relevant technology options, DST has already invited two separate sets of proposals, one each under the Science and Engineering Research Board (SERB) and the Technology



Redesigning Public Health

Dr Kelasur Shivanna Rajashekara

The outbreak of corona virus is alerting the world about global public healthcare. The discussion all over the world is focused on the respiratory disease known as COVID-19. Its epicentre is Wuhan city in China. The challenging task is to save 7.8 billion global population. Millions have been affected and lakhs have died due to the deadly virus. Corona could bring global economy to a standstill and create a situation of rewriting the global order in the coming days. Population cartogram shows that large countries of the world with small population shrink in size if public healthcare is neglected and the issue of reengineering public healthcare system is not taken seriously as it is going to rewrite the global economic order and pose threat to the national community.

The World Health Organization calls for boldest actions to fight against corona pandemic in association with UNO and warns countries to not undergo lockdown without public healthcare measures. The leaders of G-7 industrial power house pledged to halt this pandemic. There is a proposal to launch COVID-19 Solidarity Response Fund. The Asian Development Bank recently announced \$6.5 billion package to its member countries to fight against the pandemic. PM Modi recently has given a call to SAARC nations for joint strategy to save

people of this region. The initiatives like janata curfew, social, Swachh Bharat, trusteeship except medical emergency are based on Gandhian principles. The rich in India have voluntarily started contributing some portion of their earnings as trustees of society to combat coronavirus. This human hazard has drawn the attention all global leaders towards public healthcare system.

Weak Public Healthcare System

The public healthcare system is not equipped with intensive care unit and ventilators, pathology and clinical laboratories, surgical instruments with sufficient medical and paramedical forces. It resulted in hard healthcare and soft healthcare supply constraints. The medical industry, comprising of hard segment like pharmaceuticals, surgical

instruments, medical devices, pathological and clinical laboratories for testing virus and soft segment comprising of soft segment like service of doctors, specialists, nurses, medical education and research and other paramedical forces, fails to function and operate with network as software and IT companies during the outbreak of coronavirus. This is a total failure on the part of global public healthcare system in consolidating and deploying the health force to combat corona and safeguard the global community.

Re-engineering of Healthcare System

Now, it is time to think of building a healthcare network with national buffer and global pump house for public health services. The proposed national buffer can



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strategy to promote global trade in health service covering medical education under different modes of general agreement on trade in services and to operate trade in health service in the channels of consumption abroad (Mode-1), cross border consumption (Mode-2), commercial presence (Mode-3) and presence of natural persons (Mode-4). The economics of public healthcare with an opportunity of global trade in health services has become an academic interest. The consolidation and deployment of medical and paramedical forces including nurses at national and global levels needs attention to promote trade in health services.

Conclusion

Ensuring public healthcare security through the national buffer by pooling medical and paramedical force and operating it as global pump for deployment of medical force during health emergencies should be the goal of global health policy. The World Trade Organisation in association with WHO and other international organisations view this global public issue seriously in promoting global trade in health services. A global strategy for national buffer and global pump house for health service with network could be worked out for the benefit of global community. The proposed health buffer could be operated as pump house under the norms of World Trade Organisation to conduct inter-regional and global trade in health services. The world can build strong and healthy nations with public healthcare system. It is in this context, the review of public healthcare system and examining the opportunity of trade in health services by adopting the strategy of national buffer and global pump house for health services becomes important.

The careful examination of population cartogram shows that large countries of the world with small population shrink in size if

be operated as a global pump house for healthcare and to save global population. This is not high time to think of buffer for healthcare services on lines with buffer stock operation for public distribution. The world trade organisation in association with its member countries can work out a plan to build national buffer for health service by supporting and standardising medical education.

China's Public Healthcare Model

It is interesting to observe that the outbreak of corona in the hard hit province of China subdued using national buffer and pump house of medical and paramedical forces as defense force. The trained medical and paramedical forces pooled for public healthcare service using a network is called national buffer and the healthcare service is provided by operating this buffer as pump house during the time of health emergency. China has kept ready medical and paramedical forces on public records as buffer and successfully operated as pump house to combat coronavirus. China is the first country to adopt the strategy of national buffer and pump house for public healthcare service during the outbreak of corona.

Global Trade in Health Services

The careful examination of global public healthcare system keeping the global trade in health services in view is the need of the hour. The World Health Organisation in association with World Trade Organisation is

drawing the attention of its members towards the global public healthcare system and promoting global trade in health services. In this direction, the investment on medical education and research in member countries should be encouraged through the public private participation. The World Bank can promote private investment to create healthcare force in its member countries. The international monetary fund can think of diverting its annual subscription fund of special scheme to deal with poverty to combat the health hazards of coronavirus. The World Trade Organisation has made provision for trade in services under general agreement on trade in services (GATS). Serious discussions are going on at international level to bring healthcare under its ambit and promote global trade in health services. They are working out

The careful examination of global public healthcare system keeping the global trade in health services in view is the need of the hour. The World Health Organisation in association with World Trade Organisation is drawing the attention of its members towards the global public healthcare system and promoting global trade in health services.



public healthcare system is not sound enough to protect their population. This is a serious warning to all developed nations to work out some strategy. The strategy of national buffer for healthcare and operating it as pump house for global trade in health services increases export earnings of member countries besides acting as an engine of economic growth. The strategies should aim at exploiting country's comparative advantage in niche areas of health sector with regional and international

The World Trade Organisation has made provision for trade in services under general agreement on trade in services (GATS). Serious discussions are going on at international level to bring healthcare under its ambit and promote global trade in health services.

cooperation. This is the right time to draw the attention of global leaders towards the issue of national buffer and global pump house for health service for sound public healthcare system and global trade in health service and make them alert in designing health policy to achieve millennium developmental goals. □

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Resilience and National Spirit

Durga Shanker Mishra

In India, natural disasters are a common phenomenon. Cyclone Fani wreaked havoc in Odisha. The preparedness of disaster management authorities was well appreciated across the world, when the coastal authorities in Odisha moved more than a million people from the area within Cyclone Fani's projected path onto higher ground, significantly reducing the death toll. India's preparedness for natural disasters has increased a lot in recent times, but there is still a long way. India needs to address the challenge of engaging with modernity and economic development with cultural preservation.

Our delegation for 11th India-Japan Joint Working Group Meeting on Urban Development reached Japan on 15th October, just 3 days after super Typhoon Hagibis, one of the most powerful in the last six decades, hit Japan and claimed 74 lives. We were astonished by the warmth with which the delegation was greeted by Japanese counterparts. Quite remarkably, the travel itinerary and official engagements over 5 days visit remained unchanged and executed by our hosts as planned. Further, we were overwhelmed by the preparations for the visit of around 2,000 dignitaries from around 200 countries for the Coronation Ceremony of Emperor Naruhito of Japan the week after, which was unwavering by the wrath of super Typhoon Hagibis. We visited Roppongi Grand Tower, a 231 metre tall building in heart of Tokyo, developed by Sumitomo Realty & Development Company. On our enquiry whether super Typhoon had any impact on the Grand Tower, the CEO seemed as unmoved as the gleaming skyscraper, standing out in the Roppongi skyline.

Japan is not new to disasters- the most devastating being Great Hanshin earthquake 1995, Great East Japan earthquake 2011 and Tsunami which triggered the Fukushima Daiichi nuclear disaster. Over the course of time, Japan's national spirit has been synonymous with utmost resilience, reinforced by Japan's ability to handle natural disasters in a well prepared and timely manner. Japan's political and economic commitment to disaster

risk reduction and resilience has been a leading example for the whole world to see.

In India as well, natural disasters are a common phenomenon. Cyclone Fani wreaked havoc in Odisha. The preparedness of disaster management authorities was well appreciated across the world, when the coastal authorities in Odisha moved more than a million people from the area within Cyclone Fani's projected path



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onto higher ground, significantly reducing the death toll to 89. India's preparedness for natural disasters has increased a lot in recent times, but there is still a long way to emulate the Japanese spirit.

During the visit to Tokyo Tower, we saw a movie depicting the series of events in World War II, culminating in atomic bombings of Hiroshima and Nagasaki in 1945 when the whole nation came to a standstill. The movie recounted the carpet "Bombing of Tokyo", when the entire city was ravaged by a series of firebomb assaults, leaving an estimated 100,000 civilians dead and over 1 million homeless. Significant city monuments like Tokyo station were also destroyed. In the 1950s, Japan, still ravaged by the war, aimed to become modern, peaceful and part of the world's economic elite. One of the key elements in the construction of this renewed Japanese society was

building of a monument to symbolize Japan's ascendancy as a global economic powerhouse. This led to the planning of Tokyo Tower by Hisakichi Maeda, to be taller than Empire State Building and Eiffel Tower, among the tallest structures in the world. The building of Tokyo Tower attracted

India has a rich history and culture. Over the course of the colonial rule, Sardar Vallabh bhai Patel, popularly remembered as Iron Man of India, successfully imbibed the spirit of solidarity within the citizens of the country. To realise his vision, 'Statue of Unity' was unveiled as world's tallest statue in 2018, taller than the Statue of Liberty.

thousands of Japanese construction workers and instilled a greater sense of nationalism in the hearts of Japanese people, at a time when it was needed the most. Tokyo Tower glorified their engineering and technical prowess and showed the world that it was way ahead of its time. By the end of 1958, the Tokyo Tower was finished and presented to the public as the world's tallest freestanding tower at the time, taller than Eiffel Tower. During the same period, the Japanese economy resurged and the tower signified the post-war recovery phase and the Japanese spirit.

In 1964, Japan became the center of attention for the world when they hosted the Tokyo Olympics with immense aplomb and success, announcing their comeback to the global stage. It was a massive undertaking at the national level, with some estimates suggesting that Tokyo spent the equivalent of

its national budget at that time on a major integrated development program which transformed the city's infrastructure. Simultaneously, completion of many large-scale infrastructure projects was timed to coincide with the 1964 Olympics, including the launch of the globally famous Shinkansen bullet train. Tokyo Station was rebuilt as a heritage building by innovative selling of air rights to enable an integrated development of the entire area. The collective effort of the entire nation driving the resurgence of the nation's economy, is what impressed us the most.

India too has a rich history and culture. Over the course of the colonial rule, Sardar Vallabh bhai Patel, popularly remembered as Iron Man of India, successfully imbibed the spirit of solidarity within the citizens of the country. To realise his vision, 'Statue of Unity' was unveiled as world's tallest statue in 2018, taller than the Statue of Liberty. Many people initially expressed discontent at the expenditure on the statue being exorbitantly high. Lately, the monument has witnessed high tourist footfalls, making it one of the most visited destinations across the country. Like Tokyo Tower of Japan, the 'Statue of Unity' of India will serve as a symbol to imbibe a sense of national purpose in hearts of 130 crore Indians, immensely essential to embark on building a strong, prosperous and inclusive India and to ensure that the fruits of development reach the bottom of pyramid.

India is working towards the holistic achievement of the global Sustainable Development Goals, taking unprecedented leaps under the leadership of Hon'ble Prime Minister Shri Narendra Modi. Running world's biggest health assurance scheme covering 500 million citizens, world's biggest financial inclusion scheme opening over 370 million bank accounts for the poor, India draws inspiration from 'Sabka Saath

Running world's biggest health assurance scheme covering 500 million citizens, world's biggest financial inclusion scheme opening over 370 million bank accounts for the poor, India draws inspiration from 'Sabka Saath Sabka Vikas Sabka Vishwas'. The efforts are ours, but their fruits are for global humanity.

Sabka Vikas Sabka Vishwas'. The efforts are ours, but their fruits are for global humanity. In 2014, India was lagging behind in sanitation and an Open Defecation Free (ODF) India seemed a far-fetched dream, with less than 50% of households in the country having access to sanitation facilities. Yet, India has been able to successfully implement the world's largest sanitation programme under Swachh Bharat Mission, building 110 million toilets in just 5 years, a tribute to Mahatma Gandhi on his 150th Birth Anniversary on 2nd October, 2019. Swachh Bharat Mission has turned into a *Jan Andolan*, catalysed by behavioral transformation led by 130 crore Indians. On one hand, India is committed to achieving the target of 450 GW of renewable energy and on the other hand India is leading the initiatives like International Solar Alliance, Coalition for Disaster Resilient Infrastructure, shining

On one hand, India is committed to achieving the target of 450 GW of renewable energy and on the other hand India is leading the initiatives like International Solar Alliance, Coalition for Disaster Resilient Infrastructure, shining examples of her ever-growing global influence.

examples of her ever-growing global influence.

India is one of the fastest growing nations, with an annual average economic growth of 7.5% over the last 5 years, coupled with low inflation and low fiscal deficits. In the last 4 years, India has jumped 79 positions in the World Bank Ease of Doing Business (EoDB) rankings, currently ranked at 63, being the only large country in the world to witness such monumental progress. The jump of 25 places in EoDB in Construction Permits this year is unprecedented, considering last year's jump was 129 places. Recently, reforms and policy measures in the country have ensured commitment towards a "one nation one belief" approach, charting its way towards realising the vision of a \$5 trillion economy.

India needs to address the challenge of engaging with modernity and economic development with cultural preservation, learning from Japan. With focus on modernisation, Japan has always aspired to achieve their development goals through state-led encouragement of a nationwide and collective effort. Japanese people have always leaned on their own unique culture, despite the global wave of westernisation. Their united effort at improving themselves, focusing on their internal strengths and competencies is commendable. Japanese spirit of embracing challenge with spirit and camaraderie has synergies with Indian ethos. The advanced, precision manufacturing and kaizen quality control principles are leading examples for the rest of the world. Thus, a lot of lessons can be taken from the Japanese national spirit of collectivism and unity. Similarly, our country can realise its vision for equitable growth by incorporating a sense of national pride amongst its citizens through projects of national integration, ensuring that each one of us contributes towards the natural goal of meeting the aspirations of New India. □



Ministry of Health & Family Welfare
Government of India

Help us to
help you



NOVEL CORONAVIRUS (COVID-19)

Protect yourself and others!
Follow these **Do's** and **Don'ts**

Do's ✓



Practice frequent hand washing. Wash hands with soap and water or use alcohol based hand rub. Wash hands even if they are visibly clean



Cover your nose and mouth with handkerchief/tissue while sneezing and coughing



Throw used tissues into closed bins immediately after use



See a doctor if you feel unwell (fever, difficult breathing and cough). While visiting doctor wear a mask/cloth to cover your mouth and nose



If you have these signs/symptoms please call State helpline number or Ministry of Health & Family Welfare's 24X7 helpline at 011-23978046



Avoid participating in large gatherings



Have a close contact with anyone, if you're experiencing cough and fever



Touch your eyes, nose and mouth



Don'ts ✗

Spit in public

Together we can fight Coronavirus

For further information :

Call at Ministry of Health,
Govt. of India's 24X7 control room
number **+91-11-2397 8046**
Email at **ncov2019@gmail.com**



New National Helpline Numbers
for queries on Coronavirus



1075

and

1800-112-545

In addition to this, state helpline numbers continue to remain the same.



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[@MoHFW_INDIA](https://twitter.com/MoHFW_INDIA)



[mohfwindia](https://www.youtube.com/mohfwindia)

1. India's fight against Corona is people-driven, in the truest sense of the term. We are fortunate that today the whole country; each and every citizen of the country; every person is a soldier in this battle; nay, leading the battle. The entire country is marching ahead together in the same direction, towards a single common objective.
2. To facilitate your selfless endeavor towards our country, as per your inclination and time, the government has come up with a Digital Platform, it is called *covidwarriors.gov.in*. Through the medium of this platform, the government has linked volunteers of social organizations, representatives of civil society and local administration with each other. It did not take long for 1.25 crore people to be part of this portal. These people are of immense help at the local level in preparing Crisis Management Plans and implementing them.
3. We are experiencing the results of the entire country in unison as a team. Today, the Central Government, State Governments; each and every department and institution are working hand in hand for relief at full speed. Many of you might be aware of a special campaign called 'Lifeline Udan' undertaken for ensuring supply of medicines to every corner of the country. Within a short span of time, our colleagues clocked a flight distance of three lakh kilometers, delivering over five hundred tons of medical supplies to you in the farthest corners of the country.
4. Similarly, our colleagues in the Railways are working relentlessly during the lockdown, so that



- the common man throughout the country does not have to face the shortage of essential commodities. For this, Indian Railways is running more than 100 parcel trains on close to 60 routes. Similarly, our postal department personnel are playing a critical role in ensuring medical supplies. All these colleagues of ours are Corona Warriors in the truest sense.
5. Money is being directly transferred into the accounts of the poor, as part of the Pradhan Mantri Gareeb Kalyan Package. Old age pension has been started. The poor are being provided facilities like free of cost gas cylinders and rations for three months. In all these activities, different government departments and banking sector personnel are working together round the clock as a team. And I would also like to commend our state governments for playing a very proactive role in dealing with this pandemic.
 6. Medical services personnel across the country have expressed satisfaction with the ordinance that has been issued recently. This ordinance provides for stringent punishment for those harassing or injuring or indulging in violence against Corona warriors. This step was critical to ensure the safety of our doctors, nurses, para-medical staff, community

health workers and all such personnel who are working round the clock to ensure a Corona-free India.

7. You would have seen in the past few days, that India has taken some decisions while keeping true to its culture and ethos – and upholding our cultural heritage. During this crisis, the world - including rich and prosperous nations - is facing a shortage of medicines. While we stepped up efforts to fulfill India's needs, we also paid heed to the cry of help that came from other parts of the world to save humanity. We undertook the task of providing medical supplies to the needy across the world, and have successfully completed this humanitarian task. In the same vein, people across the world are paying special attention to the importance of India's Ayurveda and Yoga.
8. In the midst of this pandemic, as a member of your family, and all of you happen to be my family members, it is also my responsibility to touch upon certain points and offer some suggestions. To my countrymen, I urge, let us not at all get caught in the trap of over-confidence, let us not harbor a feeling that if corona has not yet reached our city, our village, our street or our office, it is not going to reach now. See! Never make such a mistake! "Maintain a distance of two yards and keep yourself healthy!" or "Do Gaz Doori, Bahut Hai Zaroori". Wishing all of you the best of health,

Excerpts of Mann Ki Baat address delivered on 26th April 2020 by the Prime Minister

Source: Press Information Bureau

'Covid India Seva', an Interactive Platform for Citizen Engagement on COVID-19



Covid India Seva is an interactive platform to establish a direct channel of communication with millions of Indians amid the pandemic. This initiative is aimed at enabling transparent e-governance delivery in real-time and answering citizen queries swiftly, at scale, especially in crisis situations like the ongoing COVID-19 pandemic. Through this, people can pose queries @CovidIndiaSeva and get them responded to in almost real time. It works on a dashboard at the backend that helps process large volumes of tweets, converts them into resolvable tickets, and assigns them to the relevant authority for real-time resolution. Trained experts will share public health information swiftly here at scale, helping to build a direct channel for communication with citizens.

The dedicated account is accessible to people be it local or national in their scope. Whether it is for latest updates on measures taken by the Government, learning about access to healthcare services or seeking guidance for someone who perhaps has symptoms but is unsure about where to turn to for help, @CovidIndiaSeva empowers public to reach out to the authorities.

As these responses are transparent and public, everyone can benefit from the responses received around common queries. It is important to note that the Ministry of Health and Family Welfare will respond to broader queries and public health information. This does not require the public to share personal contact details or health record details.

Over the last three months, the Ministry has introduced several initiatives in the war against Corona- including as part of a strategic communication strategy. This includes focused travel and health advisories, various Guidelines/ Standard Operating Procedures/Protocols for different stakeholders across the public and private sectors for the governments, hospitals, citizens, different healthcare workers, employees and various other knowledge resources. Different channels of communication spanning the print, electronic and social media have been deployed as part of a holistic awareness campaign. It is as a result of these collaborative efforts that today there is a widespread awareness regarding basic measures of social distancing, hand washing and respiratory etiquettes to be followed for avoiding the virus. This effort has also been successful in the participation of different sections of the community in the prevention and containment measures of the Government.

Source: Press Information Bureau

Revival of Post- COVID-19 Indian Economy

The Technology Information, Forecasting and Assessment Council (TIFAC), an autonomous technology think-tank under the Department of Science & Technology (DST), Government of India, is preparing a white paper to strategise revival of post-COVID-19 Indian economy.

This document would mainly focus on strengthening Make in India initiatives, commercialisation of Indigenous technology, developing a technology-driven transparent Public Distribution System (PDS), efficient rural health care delivery, reduction of import, adoption of emerging technology domains like AI, Machine Learning, Data Analytics and many more. It will be soon submitted to the decision-making authorities of the Government.

The entire globe has come under one umbrella to fight against COVID-19. The pandemic outbreak is affecting the human life of both developed and emerging economies, with the impact spread over almost all sectors ranging from manufacturing to trade, transport, tourism, education, healthcare, and so on. The extent of the economic impact will depend on how the pandemic outbreak unfolds and also the containment strategy of any Nation. TIFAC's team of scientists from a range of disciplines is exploring the best methods to revive the Indian economy and reduce the impact on it post COVID-19. They are also designing future strategies to face similar situations.

India, so far, has taken a set of well thought out steps to control this pandemic, lockdown at the initial stage being a significant one. All Government departments, research institutions, civil society bodies, and, more importantly, citizens of India have joined hands to offset the impact of COVID-19 to the maximum extent possible.

Source: Press Information Bureau



Ministry of AYUSH recommendations, based on Ayurvedic literature and scientific publications, for preventive health measures and boosting immunity with special reference to respiratory health.

Measures for Enhancing Immunity

- Drink warm water throughout the day.
- Daily practice of Yogasana, Pranayama and Meditation for at least 30 minutes.
- Spices like Haldi (Turmeric), Jeera (Cumin), Dhaniya (Coriander) and Lahsun (Garlic) recommended in cooking.

Simple Ayurvedic Procedures

- **Nasal Application**– Apply Sesame Oil/Coconut oil or Ghee in both the nostrils (Pratimarsh Nasya) in morning and evening.
- **Oil Pulling Therapy**– Take 1 table spoon Sesame or Coconut Oil in mouth. Do not drink, swish in the mouth for 2 to 3 minutes and spit it off followed by warm water rinse. This can be done once or twice a day.

Ayurvedic Immunity Enhancing Tips

- Take Chyavanprash 10gm (1tsf) in the morning. Diabetics should take sugar free Chyavanprash.
- Drink Herbal Tea/Decoction (Kadha) made from Tulsi (Basil), Dalchini (Cinnamon), Kalimirch (Black Pepper), Shunthi (Dry Ginger) and Munakka (Raisin) - once or twice a day. Add jaggery (Natural Sugar) and/or fresh Lemon Juice to your taste, if needed.
- Golden Milk- half tea spoon Haldi (Turmeric) powder in 150 ml Hot Milk - once or twice a day.

Immunity Boosting Measures for Self-Care

Actions During Dry Cough/Sore Throat

- Steam inhalation with fresh Pudina (Mint) leaves or Ajwain (Caraway Seeds) can be practiced once in a day.
- Lavang (Clove) powder mixed with Natural Sugar/Honey can be taken 2-3 times a day in case of cough or throat irritation.
- These measures generally treat normal dry cough and sore throat. However, it is best to consult doctors if these symptoms persist.

COVID-19 Disinfection Process

Defence Research and Development Organisation (DRDO) in its continuous quest to contribute towards fight against COVID-19, has been developing several solutions from its existing arsenal of technologies and experience. These consist of innovations and quickly configuring the products for present requirements. DRDO has introduced two products which can enhance the operations at public places during the pandemic.

Automatic Mist-based Sanitiser Dispensing Unit



Centre for Fire Explosive & Environment Safety (CFEES), Delhi along with HPO 1, using its expertise in mist technology for fire suppression, has developed automatic mist-based sanitiser dispensing unit. It is a contactless sanitiser dispenser which sprays alcohol based hand rub sanitiser solution for sanitisation of hands while

entering the buildings/office complexes, etc. It is based on water mist aerator technology, which was developed for water conservation.

The unit operates without contact and is activated through an ultrasonic sensor. A single fluid nozzle with low flow rate is used to generate aerated mist to dispense the hand rub sanitiser. This sanitises the hands with minimum wastage. Using atomiser, only 5-6 ml sanitiser is released for 12 seconds in one operation and it gives the full cone spray over both palms so that disinfection operation of hands is complete.

It is a very compact unit and bulk fill option makes it economical and long lasting product. It is easy to install system as wall-mountable or on a platform. As an indication of operation an LED illuminates the spray. The unit can be used for sanitisation of hands at entry and exit to hospitals, malls, office buildings, residential buildings, airports, metro stations, railway stations, bus stations and critical installations. The product is also expected to be very useful for entry/exit of isolation and quarantine centres.

UV Sanitisation Box and Hand-held UV Device

Defence Institute of Physiology & Allied Sciences (DIPAS) and Institute of Nuclear Medicine & Allied Sciences (INMAS), DRDO laboratories in Delhi have designed & developed Ultraviolet C Light based sanitisation box and hand held UV-C (ultraviolet light with wavelength



254 nanometres) device. The UV-C consists of a shorter, more energetic wavelength of light. It is particularly good at destroying genetic material in COVID-19. The radiation warps the structure RNA which prevents the viral particles from making more copies of themselves. The UV-C kills microbes quickly. Sanitisation of the items by employing UV-C light avoids the harmful effects of the chemicals used for the disinfection. This is environment friendly and is a contact free effective sanitisation method.

The UV-C box is designed for disinfecting personal belongings like mobile phone, tablets, purse, currency, cover of office files, etc. COVID-19 virus will be deactivated by using UVC lamps in one minute placed equi-distantly in a box with UV dose of 100 mJ/cm². The UV lamps used in the sanitisation box also emits 185 nm which produces ozone and is able to take care of the unexposed area on the surfaces of the objects placed in the box.

The hand held device having eight watt UV-C lamp disinfects office and house hold objects like chairs, files, postal delivered items and food packets with an exposure of 45 second at a 100 mJ/cm² irradiance placed at a distance of less than two inches. This measure can reduce the transmission of Coronavirus in office and public environment which is required to work in all conditions.

Source: Press Information Bureau

Extraordinary Virtual G20 Leaders' Summit

An Extraordinary Virtual G20 Leaders' Summit was convened to discuss the challenges posed by the outbreak of the COVID-19 pandemic and to forge a global coordinated response. Earlier, PM had a telephonic conversation with the Crown Prince of Saudi Arabia on this subject. The extraordinary G20 Summit was a culmination of the Finance Ministers and Central Bank Governors Meeting and G20 Sherpas Meeting on the COVID-19 pandemic.

At the meeting, G20 Leaders agreed to take all necessary measures to contain the pandemic and protect people. They also supported strengthening of the WHO's mandate in the fight against pandemics, including delivery of medical supplies, diagnostic tools, treatments, medicines and vaccines.

Leaders also committed to use all available policy tools to minimize the economic and social cost of the pandemic and to restore global growth, market stability and strengthening resilience. G20 countries committed to inject over USD 5 trillion into the global economy to counter the social and economic impact of COVID-19. Leaders also agreed to contribute to the WHO led COVID-19 Solidarity Response Fund on a voluntary basis.

PM thanked the King of Saudi Arabia for convening this extraordinary session of G20. In his remarks, PM

noted the alarming social and economic cost of the pandemic, He added that 90% of the COVID-19 cases and 88% of deaths were in G20 countries even as they share 80% of world GDP and 60% of world population. He called on the G20 to come out with a concrete action plan to fight the global pandemic.

PM underscored the need to put human beings at the centre of our vision of global prosperity and cooperation, freely and openly share the benefits of medical research and development, develop adaptive, responsive and humane health care systems, promote new crisis management protocols and procedures for an interconnected global village, strengthen and reform intergovernmental organisations like WHO and work together to reduce economic hardships resulting from COVID-19 particularly for the economically weak.

PM called on the Leaders to help usher in a new globalisation, for the collective well-being of humankind and have multilateral fora focus on promoting the shared interests of humanity. At the end of the Summit, a G20 Leaders' Statement was issued which called for a coordinated global response to fight the pandemic, adopting measures to safeguard the global economy, minimising trade disruption and steps to enhance global cooperation.

Source: Press Information Bureau

Ministry of Health & Family Welfare
Government of India

NOVEL CORONAVIRUS DISEASE
(COVID-19)

Help us to help you

Not disclosing symptoms could put you and your family's life at risk

In case of symptoms like

Fever

Cough

Difficulty in breathing

DO NOT FEAR

Seek medical advise

Call 1075 (toll-free)

Together we will fight COVID-19

For information related to COVID-19
Call the State helpline numbers or Ministry of Health and Family Welfare,
Government of India's 24x7 helpline number

1075 (Toll Free)
Email at ncov2019@gov.in , ncov2019@gmail.com

mhfw.gov.in [f MoHFWIndia](https://www.facebook.com/MoHFWIndia) [@MoHFW_INDIA](https://twitter.com/MoHFW_INDIA) [mhfwindia](https://www.youtube.com/channel/UCmHfWINDIA) [@mhfwindia](https://www.instagram.com/mhfwindia)

Online Data Pool of Critical Human Resource for Combating and Containing COVID-19

MBBS doctors Total Numbers 927000	MBBS Students Total Numbers 153656	Nurses Total Numbers 1748363	Dentists Total Numbers 217000
Pharmacists Total Numbers 1125222	AYUSH Total Numbers 832445	CPSEs Hospitals Total Numbers 201	ESIC Hospitals Total Numbers 48
Railway Hospitals Total Numbers 50	Defence Hospitals Total Numbers 13	Port Hospitals Total Numbers 12	LAB volunteers Total Numbers 43736
Ex-Servicemen Total Numbers 179918	NYKS Total Numbers 1486045	NSS Total Numbers 1367600	NCC Total Numbers 48175

The Union Government has created an online data pool on <https://covidwarriors.gov.in> of doctors including AYUSH doctors, nurses and other health care professionals, volunteers from NYKs, NCC, NSS, PMGKVY, ex Servicemen etc for use by the ground level administration at state, district or municipal levels. The information has been uploaded on a dashboard which is regularly updated.

The dashboard is available for use by various authorities to prepare Crisis Management/Contingency Plans based on the available manpower, in coordination with nodal officers for each group. This database can also be used to utilise the services of volunteers for enforcing social distancing at banks, ration shops, mandis and for providing help to elderly, divyang and orphanages. This will also help States/UTs to move human resources from one location to the other for their utilisation.

Source: Press Information Bureau

Ministry of Health and Family Welfare
Government of India

Novel Coronavirus Disease (COVID-19)

Help us to help you

Some patients may have:

- Pains
- Nasal congestion
- Running nose
- Sore throat
- Diarrhoea

#COVIDFAQ

mohfa.gov.in | @MoHFWIndia | @MoHFW_INDIA | mohfwinda

E-Learning Sees Upsurge During COVID-19

As the HRD Ministry carries on with its efforts to mitigate the effects of the COVID-19 lockdown and provide students with continued access to learning during this period, e-learning in the country has witnessed an appreciable upsurge.

Both schools and higher education institutions have started various modes of online classes and sharing of study material depending on the resources available with them and with the students. These range from structured online classes through various platforms to teachers uploading lectures and class notes, sharing links of digital learning resources like SWAYAM and NPTEL, providing access to online journals.

About 50-65 percent of students in HE institutions like Central Universities, IITs, IIITs, NITs, IISERs are participating in some form of e-learning. Lack of internet connectivity and other required digital infrastructure with students is proving to be an impediment to e-learning in many cases. To overcome this problem to some extent, teachers are also sharing slides or hand written notes apart from recorded lectures and live sessions so that students with uncertain network access can also get at least some material. Recorded lectures ensure that a short term problem with network access does not block out a student. Faculty members are doing online chat sessions with students to answer any queries that they may have.

Similar is the case with the other digital initiatives of the Ministry and organizations under it. The National Digital Library was accessed about 1,60,804 times in just one day (9 April 2020). The Education portals of NCERT like DIKSHA, e-pathasala, National Repository of Open Educational



Resources, Senior Secondary Courses of NIOS, NPTEL, NEAT, AICTE Student-College helpline web portal, AICTE Training and Learning (ATAL), IGNOU Courses, UGC MOOCS courses, Shodhganga, ShodhShuddhi, VIDWAN, e-PG Pathshala, and the other ICT initiatives like Robotics education (e-Yantra), Open Source Software for Education (FOSSEE), Virtual experiments (Virtual Labs) and Learning programming (Spoken tutorial) are also experiencing very large access rates.

SWAYAM PRABHA group of 32 DTH channels is devoted to telecasting of high-quality educational programmes on 24X7 basis using the GSAT-15 satellite and the contents are provided by NPTEL, IITs, UGC, CEC, IGNOU, NCERT and NIOS. Similarly, IGNOU's Gyan Vani (105.6 FM Radio) and GyanDarshan, which is a 24-hour educational channel offering the best of educational programmes for pre-school, primary, secondary and higher secondary students, college/university students, youth seeking career opportunities, homemakers and working professionals.

Source: Press Information Bureau

**Ministry of Health & Family Welfare
Government of India**

**NOVEL CORONAVIRUS DISEASE
(COVID-19)**

Help us to help you

I am a responsible citizen

I always cross-check all information related to COVID-19 from reliable sources before forwarding it on social media

Gather information related to COVID-19 from reliable sources

- <https://www.mohfw.gov.in/>
- <https://www.epl-win.com/>
- <https://www.mygov.in/covid-19>
- <https://icmr.nic.in/>
- <https://www.who.int/emergencies/diseases/novel-coronavirus2019/situationreports/>
- <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

Together we will fight COVID-19

For information related to COVID-19
Call the State helpline numbers or Ministry of Health and Family Welfare, Government of India's 24x7 helpline numbers
1075 (Toll Free) or 011-23978046. Email at ncov2019@gov.in, ncov2019@gmail.com

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Empowering Front Line COVID-19 Warriors with iGOT e-learning Platform

The Department of Personnel and Training has launched a learning platform (<https://igot.gov.in>) to combat COVID-19 for all front-line workers to equip them with the training and updates in coping with Pandemic. Appropriate training will also prepare them for the subsequent stages of the pandemic. By giving COVID-19 training to other potential second line workforce, India will be better prepared for the emergent situations.

The target group is Doctors, Nurses, Paramedics, Hygiene Workers, Technicians, Auxiliary Nursing Midwives (ANMs), Central & State Govt. Officers, Civil Defence Officials, various Police Organisations, National Cadet Corps (NCC), Nehru Yuva Kendra Sangathan (NYKS), National Service Scheme (NSS), Indian Red Cross Society (IRCS), Bharat Scouts & Guides (BSG) and other volunteers.

The platform delivers curated, role-specific content, to each learner at his place of work or home and to any device of his choice. iGOT platform is designed to population scale, and will provide training to around 1.50 crore



workers and volunteers in the coming weeks. To begin with nine (9) courses on iGOT have been launched on topics like Basics of COVID, ICU Care and Ventilation Management, Clinical Management, Infection Prevention through PPE, Infection Control and Prevention, Quarantine and Isolation, Laboratory Sample Collection and Testing, Management of COVID 19 Cases, COVID 19 Training.

Through its customised approach COVID-WARRIORS can learn about critical areas from this one-stop source and respond to the prevailing and emergent situations, by keeping themselves updated in a real-time manner. The platform is well equipped to cater the demands of unlimited requests of learning at any time anywhere. The platform can be accessed by following an easy to use manual for desktop and mobile versions, thereby making it accessible for all.

The first version of the platform is available to use with Google Chrome and Mozilla Firefox, and subsequent versions will support other browsers.

Source: Press Information Bureau

Swasth ke Sipahi Delivering Essential Services and Medicines

Pharmacists, popularly known as “Swasth ke Sipahi”, of Pradhan Mantri Jan Aushadhi Kendra, are delivering essential services and medicines at doorstep of patients and elderly under Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) of the Government of India. Working as part of Pradhan Mantri Jan Aushadhi Kendras (PMJAK), they are extending essential services by making available quality generic medicines at affordable prices to the common People of the country and the elderly persons at their doorstep to fight Corona pandemic. This is supporting the government’s initiative of practicing social distancing.

PMJKs are being run by Bureau of Pharma PSUs of India (BPPI) under Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Government of India with an objective of providing quality and affordable healthcare to anyone in need. Presently, more than 6300 PMJAKs are functioning across the nation, covering 726 districts of the country.

All PMJAKs play a key role during lockdown in ensuring availability of essential medicines and delivering them at their doorstep. As informed by BPPI, recently, one of their “Swasth ke Sipahi” shared his experience. He told about an elderly woman who called him at PMBJK, Pahadiya, Varanasi asking for help. According to the Pharmacist, the elderly woman lives

with her husband in Varansi, alone and had exhausted the stock of her daily medicines. Consuming these medicines regularly is critical to maintain her bodily functions. The pharmacist could not stop himself from helping the couple. He collected the medicines, as she asked and set out to deliver the same at her house. Since then, pharmacist has been delivering medicines to the sick and elderly at their doorstep.

One central warehouse in Gurugram, two regional warehouses at Guwahati and Chennai and around 50 distributors are working towards ensuring a surplus supply of the medicines to all the kendras, across the country. In order to control the supplies of the medicines, set up a strong SAP based end to end point of sales software to avoid any stockout situation. mobile application “Jan Aushadhi Sugam” is also available for common public to locate their nearest kendra and availability of medicines with its price. The app. can be downloaded from Google Play Store and Store.

In the lockdown period, Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) is generating awareness through informational posts on their social media platforms, to help people protect themselves from Coronavirus. You can also get updates by following us @pmbjpbppi at Facebook, Twitter, Instagram, etc.

Source: Press Information Bureau





Ministry of Health & Family Welfare
Government of India

NOVEL CORONAVIRUS DISEASE (COVID-19)



Information for General Public: Availability and use of necessary medicines in India

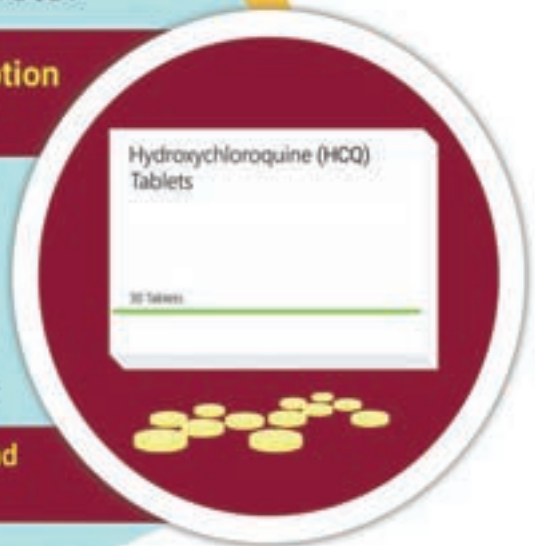
- ◆ Hydroxychloroquine (HCQ) is a prescription medicine and its sale is totally prohibited without a valid prescription by a doctor

It is harmful to consume HCQ without prescription as it may have adverse effects on your health

◆ Adequate quantities of HCQ have already been procured for the following categories:

- ➔ Patients who have been clinically advised
- ➔ Health workers at risk due to their direct contact with COVID-19 patients
- ➔ Household contacts of confirmed COVID-19 cases

HCQ is only for the above mentioned categories and not for general public



DO NOT CONSUME HCQ WITHOUT MEDICAL ADVICE

Together we will fight COVID-19

For information related to COVID-19

Call the State helpline numbers or Ministry of Health and Family Welfare, Government of India's 24x7 helpline number 1075 (Toll-Free) or email at ncov2019@gov.in, ncov2019@gmail.com



RBI Announces Relief Measures

The Reserve Bank of India (RBI) has reduced the Repo Rate by 75 basis points to 4.4% and Reverse Repo Rate by 90 basis points to 4%. CRR of all banks is to be reduced by 100 basis points to 3% with effect from 28 March for one year. These measures will inject liquidity of Rs 3.74 lakh crore to the system. In another major announcement, all commercial banks (including regional rural banks, small finance banks and local area banks), co-operative banks, all-India Financial Institutions, and NBFCs (including housing finance companies and micro-finance institutions), that is, lending institutions, are being permitted to allow a moratorium of three months on payment of instalments in respect of all term loans outstanding as on March 1, 2020.



Further, it has been announced that in respect of working capital facilities sanctioned in the form of cash credit/overdraft, lending institutions are being permitted to allow a deferment of three months on payment of interest in respect of all such facilities outstanding as on March 1, 2020. The accumulated interest for the period will be paid after the expiry of the deferment period. Also, the moratorium on term loans and the deferring of interest payments on working capital will not result in asset classification downgrade.

The decision to reduce reverse repo rate by 90 basis points to 4%, will make it relatively unattractive for banks to passively deposit funds with RBI and instead, it will encourage them to use it for productive lending, he stated. The paramount objective of RBI is to keep finance flowing and it is time to unleash an array of instruments to mitigate the impact of this pandemic and revive growth.

The Governor of the Reserve Bank of India Shaktikanta Das announced a set of nine measures to revive the struggling domestic economy. Making the announcements through an online address, the Governor stated that the human spirit is ignited by the resolve to overcome the COVID-19 pandemic which has “gripped the world in its deadly embrace”.

Here is an overview of the nine announcements made today. The full statement by the Governor can be read [here](#).

Liquidity Management

1) Targeted Long-Term Operations (TLTRO) 2.0

A second set of targeted long-term repo operations (TLTRO 2.0) for an initial aggregate amount of Rs. 50,000 crore will be conducted. This is being done to facilitate funds flow to small and mid-sized corporates, including NBFCs and MFIs, who have been more severely impacted by the disruptions due to COVID-19. The funds availed by banks under TLTRO 2.0 should be invested in investment grade bonds, commercial paper, and non-convertible debentures of non-banking financial companies (NBFCs), with at least 50 per cent of the total amount availed going to small and mid-sized NBFCs and micro finance institutions (MFIs).

2) Refinancing Facilities for All India Financial Institutions

Special refinance facilities for a total amount of Rs. 50,000 crore will be provided to National Bank for Agriculture and Rural Development (NABARD), the Small Industries Development Bank of India (SIDBI) and the National Housing Bank (NHB) to enable them to meet sectoral credit needs. This will comprise Rs. 25,000 crore to NABARD for refinancing

regional rural banks (RRBs), cooperative banks and micro finance institutions (MFIs); Rs. 15,000 crore to SIDBI for on-lending / refinancing; and Rs. 10,000 crore to NHB for supporting housing finance companies (HFCs).

3) Reduction of Reverse Repo Rate under Liquidity Adjustment Facility

Reverse repo rate has been reduced by 25 basis points from 4.0% to 3.75% with immediate effect, in order to encourage banks to deploy surplus funds in investments and loans in productive sectors of the economy.

4) Raising Limit of Ways and Means Advances of States and UTs

Ways and Means Advances (WMAs) Limit of states and union territories has been increased by 60% over and above the limit as on March 31, 2020, in order to provide greater comfort to states for undertaking COVID-19 containment and mitigation efforts, and also to help them plan their market borrowing programmes better.

Regulatory Measures

In addition to the measures announced by RBI on March 27, 2020, the bank announced additional regulatory measures to lessen debtors' burden in wake of the pandemic.

5) Asset Classification

With respect to recognition of Non-Performing Assets (NPAs), the central bank has decided that the payment moratorium period, which lending institutions have been permitted to grant as per RBI's announcement on March 27, 2020, will not be considered while classifying assets as NPAs. i.e., the moratorium period will be excluded while considering 90-day NPA norm for those accounts for which lending institutions decide to grant moratorium or deferment and which were standard as on March 1, 2020. This means that there will be an asset classification standstill for such accounts from March 1 - May 31, 2020. NBFCs will have the flexibility under the prescribed accounting standards to provide such relief to their borrowers.

6) Extension of Resolution Timeline

Recognising challenges to resolution of stressed assets or accounts which are or are likely to become NPAs, the period for implementation of resolution plan has been extended by 90 days. Currently, scheduled commercial banks and other financial institutions are required to hold an additional provision of 20 per cent if a resolution plan has not been implemented within 210 days from the date of such default.

7) Distribution of Dividend

It has been decided that scheduled commercial banks and cooperative banks shall not make any further dividend payouts from profits pertaining to FY 2019-20; the decision will be reviewed based on the financial position of banks at the end of the second quarter of the financial year 2019-20.

8) Lowering of Liquidity Coverage Ratio Requirement

To improve the liquidity position for individual institutions, Liquidity Coverage Ratio requirement for scheduled commercial banks has been brought down from 100% to 80% with immediate effect. This will be gradually restored in two phases - 90% by October 1, 2020 and 100% by April 1, 2021.

9) NBFC Loans to Commercial Real Estate Projects

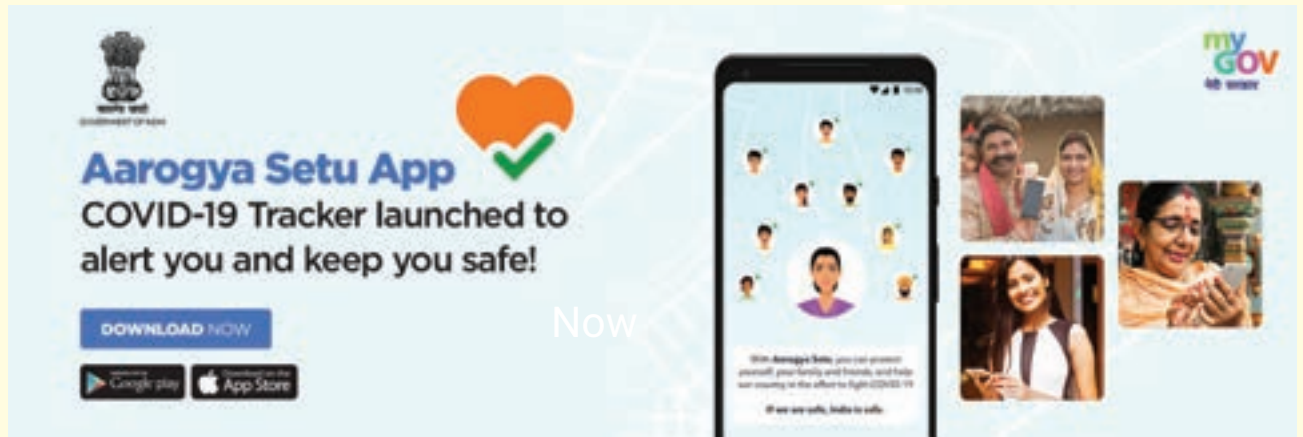
The treatment available for loans to commercial real estate projects with respect to the date for commencement for commercial operations (DCCO) has been extended to NBFCs, in order to provide relief to both NBFCs and the real estate sector. As per the current guidelines, DCCO in respect of loans to commercial real estate projects delayed due to reasons beyond the control of promoters can be extended by an additional one year, over and above the one-year extension permitted in normal course, without treating the same as restructuring.

According to IMF's global growth projections, in 2020, the global economy is expected to plunge into the worst recession since the Great Depression, far worse than the Global Financial Crisis. In this situation, India is among the handful of countries that is projected to cling on to positive growth (at 1.9%). He noted that this is the highest growth rate among the G-20 economies.

Speaking on the RBI's announcements, the Prime Minister Shri Narendra Modi has said that the measures will greatly enhance liquidity and improve credit supply. He said these steps will help small businesses, MSMEs, farmers and the poor and that it will also help all states due to the increase of WMA limits.

Source: Press Information Bureau

AarogyaSetu: A Multi-dimensional Bridge



The Government of India has launched a mobile app developed in public-private partnership to bring the people of India together in a resolute fight against COVID-19.

The App, called ‘AarogyaSetu’ joins Digital India for the health and well-being of every Indian. It will enable people to assess themselves the risk for their catching the Corona Virus infection. It will calculate this based on their interaction with others, using cutting edge Bluetooth technology, algorithms and artificial intelligence.

Once installed in a smart phone through an easy and user-friendly process, the app detects other devices with AarogyaSetu installed that come in the proximity of that phone. The app can then calculate the risk of infection based on sophisticated parameters if any of these contacts is tested positive.

The App will help the Government take necessary timely steps for assessing risk of spread of COVID-19 infection, and ensuring isolation where required.

The App’s design ensures privacy-first. The personal data collected by the App is encrypted using state-of-the-art technology and stays secure on the phone till it is



needed for facilitating medical intervention.

Available in 11 languages, the App is ready for pan-India use from day-1 and has highly scalable architecture.

This app is a unique example of the nation’s young talent coming together and pooling resources and efforts to respond to a global crisis. It is at once a bridge between public and private sectors, digital technology and health services delivery and the potential of young India with a disease-free and healthy future of the nation.

Source: Press Information Bureau

About the App:

GoI’s app to connect health services with the people of India to fight COVID-19

Aarogya Setu is a mobile application developed by the Government of India to connect essential health services with the people of India in our combined fight against COVID-19. The App is aimed at augmenting the initiatives of the Government of India, particularly the Department of Health, in proactively reaching out to and informing the users of the app regarding risks, best practices and relevant advisories pertaining to the containment of COVID-19.

To download:

<https://www.mygov.in/aarogya-setu-app/>

...Continued from Cover-II

Another example is telemedicine. We are already seeing several consultations without actually going to the clinic or hospital. Again, this is a positive sign. Can we think of business models to help further telemedicine across the world?

Efficiency

Perhaps, this is the time to think of reimagining what we refer to as being efficient. Efficiency cannot only be about- how much time was spent in the office.

We should perhaps think of models where productivity and efficiency matter more than appearance of effort. The emphasis should be on completing a task in the specified time frame.

Inclusivity

Let us develop business models that attach primacy to care for the poor, the most vulnerable as well as our planet.

We have made major progress in combating climate change. Mother Nature has demonstrated to us her magnificence, showing us how quickly it can flourish when human activity is slower. There is a significant future in developing technologies and practices that reduce our impact on the planet. Do more with less.

COVID-19 has made us realise the need to work on health solutions at low cost and large scale. We can become a guiding light for global efforts to ensure the health and well being of humanity.

We should invest in innovations to make sure our farmers have access to information, machinery, and markets no matter what the situation, that our citizens have access to essential goods.

Opportunity

Every crisis brings with it an opportunity. COVID-19 is no different. Let us evaluate what might be the new opportunities/growth areas that would emerge now.

Rather than playing catch up, India must be ahead of the curve in the post-COVID world. Let us think about how our people, our skills sets, our core capabilities can be used in doing so.

Universalism

COVID-19 does not see race, religion, colour, caste, creed, language or border before striking. Our response and conduct thereafter should attach primacy to unity and brotherhood. We are in this together.

Unlike previous moments in history, when countries or societies faced off against each other, today we are together facing a common challenge. The future will be about togetherness and resilience.

The next big ideas from India should find global relevance and application. They should have the ability to drive a positive change not merely for India but for the entire humankind.

Logistics was previously only seen through the prism of physical infrastructure – roads, warehouses, ports. But logistical experts these days can control global supply chains through the comfort of their own homes.

India, with the right blend of the physical and the virtual can emerge as the global nerve centre of complex modern multinational supply chains in the post COVID-19 world. Let us rise to that occasion and seize this opportunity.

I urge you all to think about this and contribute to the discourse.

The shift from BYOD (Bring Your Own Device) to WFH (Work From Home) brings new challenges to balance the official and personal. Whatever be the case, devote time to fitness and exercising. **Try Yoga as a means to improve physical and mental wellbeing.**

Traditional medicine systems of India are known to help keep the body fit. The Ayush Ministry has come out with a protocol that would help in staying healthy. Have a look at these as well.

Lastly, and importantly, please download Aarogya Setu Mobile App. This is a futuristic App that leverages technology to help contain the possible spread of COVID-19. More the downloads, more its effectiveness.

Will wait to hear from you all.





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