

# PRISM

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## COVID-19 SPECIAL EDITION - II



The Policy Perspectives Foundation (PPF) is a non-profit, apolitical think tank on matters on national interest. PPF's activities focus on complex and inter-connected challenges to peace, stability and development in India in cognizance of the external dimension. PPF is committed to spreading awareness, building capacity and promoting resilience.

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Subsequent to the nation-wide lockdown relaxation from June 1, 2020 the number of COVID-19 cases in India have increased swiftly. After nearly two-and-a-half months of strict, curfew-like restrictions implemented since March 24 and extended over four phases, the government announced a more relaxed Lockdown-5 phase, with a focus on 'unlocking' and 'reopening,' from 1 June up to 30 June, 2020. The coming months will prove to be a testing time as the country gradually 'unlocks' to revive the economy from the lockdown shocks, but without a guaranteed COVID-19 vaccine, keeping the virus under control carries a risk.

As the government proceeds to 'unlock' the nation while controlling the spread of COVID-19, the pandemic has brought to the forefront the fragility of health care infrastructure in India. PPF's COVID-19 Special Edition - II includes articles on the origins of the coronavirus, the communication and management of public risks with specific reference to the COVID-19 global pandemic and the proceedings of a comprehensive webinar in which experts from the health care sector discussed the various investment, infrastructure and other measures that would constitute a resilient health care ecosystem for India.

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*We at PPF wish our readers and their families health and safety during these difficult times.*



## Origin of COVID 19: A few Questions

– P C Haldar

India has embarked on a journey of hope and aspirations of revival with 'Unlock 1'. While pessimists amongst us would count rising figures of Corona related cases and casualties in an unequal comparison with other jurisdictions having much smaller population. If we compare India's performance in combatting Corona taking the Statistics with reference to total population and casualties suffered, India will figure way down in the list – which is good. This does not however mean that everything is hunky-dory with the manner the crisis was handled. There is a lot that could have been done differently to achieve better outcomes and experience for the citizenry while dealing with the 'Corona crisis'. But that must wait for now and give way to other priorities.

There is, however, another related matter that one thinks deserve a continuing attention from everyone concerned with pandemics and national security. There is little clarity as of now about what is the origin of the Corona virus (more explicitly COVID-19). Some indicators have since been identified that suggest a possible trajectory. One must confess that these indicators are not conclusive yet, but these deserve to be brought out in the open to trigger a responsible discussion by the civil society.

It is generally accepted that the CORONA virus has its original prevalence amongst the bats. A paper in NATURE (Vol. 21, No. 12, December 2015) mentioned of laboratory experiments that talks of capability for 'human transmission' of this virus. The paper entitled 'A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence' was published by a group of researchers working among others with the Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina (US) and Key Laboratory of Special

Pathogens and Biosafety, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China.

The paper explained that metagenomics studies did identify 'sequences of closely related SARS like viruses circulating in Chinese bat population that may pose a future threat'. The mention of a 'future threat' must be understood with reference to earlier variants of strains emanating from animal population like H5N1, H1N1 and H7N9 besides MERS-CoV that caused serious disease, mortality and economic hardship in the areas afflicted by these strains. It is in this context, that it was decided to examine the potential of SARS-CoV cluster to infect humans. To this end, a 'chimeric' virus encoding a zoonotic CoV spike protein (RsSH014) was isolated from Chinese horseshoe bats. The in vivo experiment (which often refers to experimentation done in live isolated cells rather than in a whole organism) tested the efficacy of the available immune therapeutics with a view to predicting and preparing for future emergent viruses. A series of subsequent experiments established that the 'SHCo14' could mediate infection of human cells and cause disease in mice. The experiments thereafter proceeded, according to the paper, to synthesize a full length SHO14-CoV clone and subsequent experimentations pointed towards the ability of 'SHC014' enabled SARS-CoV backbone to cause robust infection in both human airway cultures and in mice without RBD adaption.

The spike protein in SARS-CoV2 was found to be very adept at binding to human lungs on account of a specific mutation (cleavage site) in its sequence, which is not seen in any other bat borne coronavirus. The presence of this cleavage in the Spike protein enables the human enzyme furin to efficiently facilitate entry of the virus into human cells. This heightened efficiency of SARS-CoV2 to attach to human lung cells is the key reason for its contagiousness.



Interestingly, the paper while concluding observed that based on the finding of such studies, 'scientific review panels may consider similar studies building chimeric viruses based on circulating strains too risky to pursue', adding that such studies were at a crossroads point in terms of 'gain of function (GOF) studies. Interestingly, the studies mentioned in the paper had been undertaken with 'grants' coming from the National Institute of Allergy & Infectious Disease and National Institute of Aging of the US National Institute of Health (NIH) and the National Natural Science Foundation of China.

The paper concluded by saying that in view of the capability of the SHC014 to replicate in human airway cultures, cause pathogenesis in vivo and escape current therapeutics, there was a need for both surveillance and improved therapeutics against circulating SARS-like viruses.

Shi Zhengli, one of the authors of the 2015 paper quoted above, is still working with the Wuhan Institute. Her group in 2017 claimed to have created as many as 8 chimeric viruses from SARS like viruses collected from the very caves around Kunming, Yunnan province she had originally succeeded in finding RsSCH014 and Rs. 3367<sup>1</sup>. (Shi was a co-author of a research on Ebola conducted at Nagaland from 2017 to 2019. The study was not approved by the ICMR and hence violative of the protocol. It was funded by USA's Dept of Defense via NUS Singapore.

We are indeed at a crossroad. Nothing can be taken at a face value. The US and Chinese Institutes which co-funded the original research must have done in good faith. We need not doubt that. A study of metagenomic data to predict emergence of new (novel) virus and to deploy the derived knowledge to treat/combat the emergence of such virus are commendable objectives. No questions about that. But what happened thereafter? We do not have a clear picture. Did US and China in post-2015 period

1. <https://doi.org/10.1371/journal.ppat.1006698>

take note of the progress and establish a protocol for how to go about it and ensure fail-safe storage of such hazardous samples? What happened to the therapeutic advantages to be extracted from the knowledge acquired?

Several questions remain on the origin and the process of its release that need to be resolved. In terms of widespread damage, loss of lives and the severely adverse impact on global economy, the corona pandemic requires a thorough international investigation by WHO. India, as the Chair of the WHO Health Assembly for this year must take up the issue and drive the agenda towards identification of the origin of this virus.

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## **Communication and Management of public risks (with specific reference to the COVID-19 global pandemic)**

– V. S. Ramamurthy and D. K. Srivastava

We are in the midst of a global pandemic, viz. COVID-19. It is considered to have first surfaced in Wuhan, China and patients were admitted to the hospitals in the first week of December 2019. Apparently, bats from a remote cave in China transmitted this virus to pangolins in a wet market, which in turn transmitted it to humans. It is thus a zoonotic disease. By the time it was recognized that the virus was highly contagious and a drastic lockdown was imposed in Wuhan and in the entire Hubei Province, a large number of people were already infected and the disease was being noticed across the world, carried by persons travelling to and from China. More than five million people from across the globe have been infected by the virus, with about 6.5% succumbing to the infection. India is no exception with confirmed infections and deaths increasing in numbers every day. Experts across the globe are working closely to cure the disease and prevent further infections. Meanwhile, the global

march of the pandemic continues with no end in sight.

### **A little bit of history and associated lessons learnt**

Pandemic diseases have always been an integral part of the evolution of human civilization since times immemorial. The first plague in recorded history was the Plague of Justinian, as it came to be known after Emperor Justinian I, who held the throne of Byzantium in 540 CE. The plague is said to have originated in northern Egypt and transmitted to Constantinople through black rats that travelled with the grain consignments from North Africa (Wikimedia Commons). In the absence of any drugs or vaccines or any targeted efforts to contain the infection, the pandemic had a free run and resulted in the loss of at least 25 million people. Understandably, the plague also resulted in the fall of the Byzantine Empire. The same bacterium is reported to have reappeared several times afterwards, most notably, the disastrous Black Death in Europe in the 14th century and the third plague pandemic of the 19th century. In today's context, one should also mention the 1918 Spanish flu pandemic. Influenza, commonly referred to as flu, is a virus that is highly contagious and attacks the respiratory system. When an infected person coughs, sneezes or talks, respiratory droplets are generated and transmitted into the air, which can then be inhaled by anyone nearby. Additionally, a person who touches something with the virus on it and then touches his/her mouth, eyes or nose can also become infected. Young children, people over age 65, pregnant women and those with certain medical conditions such as asthma, diabetes or heart disease face a higher risk of flu-related complications.

Considered as one of the deadliest pandemics in history, the Spanish flu infected an estimated 500 million people worldwide and killed about 20–50 million. At that time, there were no effective drugs or vaccines to treat this killer flu strain.

Citizens were ordered to wear masks; schools, theatres and businesses were shuttered; the New York City Health Commissioner tried to slow down the transmission of the flu by overcrowding on the subways; in spite of all these efforts, bodies piled up in makeshift morgues before the virus ended its deadly global march. Prior to the 20th century, each pandemic in history took its own course in the absence of any mechanism to combat the infection. Only when a majority of the population acquires infection-induced immunity against the disease, commonly referred to as herd immunity, will the pandemic weaken and gradually disappear. It is not surprising that pandemics were invariably taken as catastrophic Acts of God.

The 19th and 20th centuries were watershed years in the field of human healthcare. New discoveries in drugs and pharmaceuticals, vaccines, and diagnostic tools to combat human, animal and plant diseases have considerably strengthened our ability to counter pandemics of any kind. For example, smallpox is one of the oldest and most feared diseases of the world, the global spread of which can be traced to the growth and spread of civilizations across several centuries. The discovery of vaccine inoculation in the early 19th century (1801) by Edward Jenner was a major milestone in our efforts to combat smallpox. In 1959, the World Health Organization (WHO) initiated a plan to rid the world of smallpox. This disease has been fully eradicated across the globe because of a global collaborative vaccination programme of WHO. Similarly, as part of the global polio eradication initiative, we are inching towards a polio-free world. India has not only completely eliminated the wild polio virus transmission, but has also maintained that status for five years. Considering the country's diversity, population, poor civic infrastructure, poor public health system, rampant malnutrition and high population mobility, these are indeed remarkable achievements.



India's experience in combating vector-borne diseases like malaria and dengue needs special mention. Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. These mosquitoes lay their eggs in water, which hatch into larvae, eventually emerging as adults. The female mosquitoes seek high-protein blood meal to nurture their eggs. Bites by infected female mosquitoes transmit the parasites to humans. In the absence of an effective malaria vaccine, the focus of the malaria eradication programme has been to kill the larvae using pesticides like DDT (dichlorodiphenyltrichloroethane) and eliminate stagnant water bodies. Malaria treatment using antimalarial drugs is marked by a constant struggle between evolving drug-resistant parasites and search for new drug formulations. The malaria eradication drives therefore depended heavily on DDT. Originally synthesized in 1874, DDT was rediscovered in 1939 as a new insecticide. The 1948 Nobel Prize in Physiology or Medicine was in fact awarded to Paul Hermann Muller 'for his discovery of the high efficiency of DDT as a contact poison against several arthropods'. In the next 30 years, DDT was extensively used across the globe as a 'wonder' pesticide in our war against vector diseases. The anti-malaria campaign of WHO in the fifties and sixties relied heavily on DDT. The great reduction in vector diseases using DDT did not come without its environmental and human costs. Not only did DDT contaminate the water bodies and have a negative impact on the ecosystem, it even entered the human food chain and is considered a possible carcinogen. Ultimately, the US Government imposed a ban on the use of DDT in 1973, and piloted a worldwide ban on its use. Incidentally, even today there is a section of people who believe that the governments have over-reacted to the ill-effects of DDT and compromised malaria eradication. India is one country that is still

manufacturing DDT and is opposing a worldwide ban on it.

Tuberculosis (TB) is yet another bacterial disease that mainly affects the lungs and has been around for millennia. Due to its infectious nature, chronic progression and long treatment, TB is considered a great social burden. Though often referred to as a poor man's disease, TB does not always spare the rich. The classic case is the story of a rich man contacting the infection from his car driver with whom he used to travel in a closed air-conditioned car. The introduction of Bacille Calmette-Guerin (BCG) as a vaccine against TB in the last century was a major advance in combating the disease. Even today, BCG remains the only vaccine available against TB. For various reasons, including but not limited to funding constraints, the Indian TB eradication programme was not successful. India accounts presently for about a quarter of the global TB burden. WHO estimates that 2.74 million people in India are infected with TB annually and more than 410,000 die from the disease (USAID.gov). The more recent emergence of multidrug-resistant TB and the HIV-TB jugalbandhi have raised even greater concerns across the globe. The BCG vaccine, in addition to its specific effects against TB, is reported to have beneficial nonspecific effects on the immune system that protects against a wide range of other infections. This has led to the suggestion that vaccination with BCG might have a role in protecting healthcare workers and other vulnerable individuals against COVID-19.

Cholera is yet another infectious disease that can cause acute diarrhea following ingestion of food or water contaminated with the bacterium *Vibrio cholera*, leading to dehydration and even death if untreated. Though descriptions of cholera are found as early as the 5th century BC in Sanskrit texts, many outbreaks have occurred over the last 200 years, with millions of deaths. Cholera remains a global threat to public health, and an

indicator of inequity and lack of social development. A major milestone in our efforts to combat cholera is the development of modern oral rehydration salt (ORS) solution. Today, ORS is a part of the standard tool kit in our fight against this disease. It has been estimated that each year, there are about 1.3-4.0 million cases of cholera worldwide. Up to 80% of the cases are successfully treated with ORS. Provision of safe water and sanitation is critical to control the transmission of cholera as with many other waterborne diseases.

In 2017, WHO launched a global strategy on cholera control with a target to reduce deaths due to it by 90%. In all the above cases, the domineering role of the government cannot be missed. A few weaknesses of the government system have also come to the fore in the past. The government machinery is in general slow and overcautious. Governments across the world are perennially short of funds. Pre-disaster preparedness rarely gets priority in the budgets of the governments. It is also well known that governments across the globe are highly vulnerable to vested interests of various kinds. With more and more countries opting for democratic forms of governance, the elected governments are even more vulnerable to public perceptions. The increasing role of the judiciary with respect to new and emerging technologies is another matter of concern in our decision-making process. There has also been some resistance to immunization drives owing to negative rumours regarding its safety. The Indian experience proved that building partnerships with the private sector along with involvement of celebrities and socio-religious leaders were key interventions needed to tackle social resistance against any mass public health campaign.

### **The COVID-19 saga**

Let us consider the present COVID-19 pandemic. Despite global efforts, neither a drug nor a

vaccine to combat the infection is in sight. Globally and in India, the number of infections is still rising, so is the number of deaths. Experts and epidemiologists recommend a lockdown till herd immunity takes over and the countries move past the peak infection point. On the other hand, livelihoods are lost, and the economy is in doldrums. Lockdowns are no longer seen as an inevitable saviour.

### *Several points are quite clear by now:*

(1) Lockdown dilates the time between the onset of the pandemic and its end. With minimum person-to-person contact during the lockdown, spread of infection slows down considerably. However, the spread of infection does not stop because there is a minimum person-to-person contact even in a total lockdown for essential services. Total lockdown therefore does not guarantee the end of the pandemic.

It will stop when most of the population develops herd immunity after getting infected and surviving the infection. There is only a time dilation from onset to end of the infection cycle because of the lockdown giving us time to strengthen the healthcare infrastructure.

(2) Only a vaccine against the infection reducing the number of people getting infected or a drug to get rid of the infection can hasten the end of the pandemic and reduce the number of deaths.

(3) A total lockdown comes with a cost, since it brings economic activities to a standstill. Economists and economic planners will recommend easing the lockdown as early as possible to reduce the economic burden on the whole nation, more importantly, on the economically weaker sections of the population who cannot feed their families without daily and seasonal wages.



- (4) Balancing loss of life due to the pandemic and loss of livelihood due to lockdown is a challenge that the governments have to face while combating the same.
- (5) Zero-risk options do not exist unless vaccine or new drug is discovered early.

Risk communication to the public and their perception of risk play important roles in mobilizing public support and participation in all government initiatives to contain the pandemic. We note that the number of affected persons in the country is continuing to rise, though perhaps not as steeply as in many other countries. By and large, the lockdown has proceeded well and people – either because of fear of law or fear of infection – have mostly obeyed the government directives. Severe problems of migrant workers wishing to return to their homes have also surfaced. A large population of unorganized migrant workers in several megacities became victims of sudden job loss, eviction from shelter, inadequate distribution of relief and the associated uncertainties. It may be worth noting that when the lockdown was first imposed, the Prime Minister had requested all the employers to pay salaries to their employees and take care of them. This request has largely been ignored by the employers of migrant workers, who were left to fend for themselves. Driven out from their temporary dwelling places, with confusion about the support for food and shelter, and no transport available, many decided to walk back to their villages, several hundred or thousand kilometres away – several have died on the way, due to accidents and exhaustion. Many have been harassed by authorities during their long walks. A large part of the self-respecting and hard-working population, who had travelled large distances to find a means of livelihood all by themselves, and who contributed expertly to almost all industries – were suddenly left in a lurch to fend for themselves. This remains one of the most painful and shameful episodes of the

present lockdown. One may also add that at some places they were being instigated to agitate to return home for narrow political gains, even though attempts were being made to provide them with food and shelter. Many charities and NGOs have pitched in to help. Despite all these efforts, the fact of the matter is that help is not reaching all. In hindsight, it would have been better if the government had intervened directly in taking care of the migrant labourers during the lockdown.

Maintaining social distancing is also not easy in the homes of the poor and in thickly populated slums in metropolitan cities. Thus, COVID-19 is hitting hard those who are already disadvantaged.

Early days of the pandemic were also marked by lack of special hospitals, testing facilities, personal protection equipment for medical personnel and even ventilators for patients. This has by now been addressed, though the facilities in small hospitals and quarantine centres are still far from adequate. There have also been instances of violation of the lockdown and social distancing norms, especially in major markets. Either people are ignorant, or they have a mistaken sense of bravado, or they are just desperate because of being locked in for such a long period, or they are misled. This reveals our failure in communicating effectively to the people about the risks involved in violating the lockdown or other government directives. There have been instances when public servants involved in law and order, healthcare and public services have come under attack, which is a cause of concern and again indicates our failure to address the public perception of the risks associated with this pandemic. There is a fear that the number of infections may rise further, due to the breach of lockdown procedures and as people start arriving from foreign countries and other states, where they have been stranded for a long time, and enduring severe hardships. A strict quarantine procedure and check-up can,



however, keep this under control, but at the cost of further inconvenience to the public. Again, there is a need to educate people about the inherent risks. The most important lesson we have learnt the hard way is that public health has been neglected in the country for a long time in the mistaken notion that it concerns only the economically weaker sections of society.

### What is the way forward?

India is the largest democracy in the world. With increasing participation of the public in policy making, including government policies on regulatory matters, we need to take the public into confidence and empower them with reliable information. However, communicating matters of high and emerging technologies to the public at large is complex and challenging. This is even more complex in India with multiple languages and poor literacy. Often, genuine differences of opinion among experts erode the confidence of the public on them. Risk communication is even more of a challenge.

As we enter a new phase of our fight against COVID-19, let us not be under the illusion that life will return to 'normal' once the lockdown ends. On the one hand, with no drug or vaccine in sight, our fight against the coronavirus is far from over. We are only entering a new phase, the 'new normal', where we learn to live with the virus in our midst. After several weeks of lockdown, we are now easing regulations with an explicit understanding that our vigilance against the virus will not be diluted. Physical distancing has substantially slowed down the spread of the virus. Even in the coming days, we cannot afford to dilute physical distancing. Unfortunately, as was mentioned earlier, even during the lockdown, there have been many instances of violation of physical distancing.

This can increase in the post-lockdown days. There is no way other than a change in public perception to address this problem. Everyone

must realize that the country and the government face an unprecedented crisis. The only safe course is strict implementation of physical distancing, wearing of masks and frequent disinfection of workplaces. We may also see several lifestyle changes. The hospitality industry, travel and tourism industry, and public entertainment spaces must rediscover themselves. Web-based education, working from home, web-based meetings and conferences are all becoming the 'new normal'. There is also an increasing realization that safety nets to the economically weaker segments of society to tide over such crises are a must for a stable society. It is interesting to note that many of the 'new normal' practices in personal hygiene that are being adopted across the globe in the post-COVID-19 era have always been considered as essential requirements of cleanliness in traditional Indian households, like 'Namaste' in place of handshakes or hugs. It is interesting to recall some more of these.

- (i) लवणं व्यंजनं चैव घृतं तेलं तथैव च ।  
लेह्यं पण्ये च विविधं हस्तदत्तं न भक्षयेत् ॥  
— धर्मसिन्धु ३पू. आह्निक  
(Salt, ghee, oil, and other foods and drinks should not served with bare hands. Use spoons... *Dharma Sindhu 3 pu. Ahnika.*)
- (ii) अनातुरः स्वानि खानि न स्पृशेदनिमित्ततः ॥  
— मनुस्मृति ४ / १४४  
(Do not touch you own eyes, noses, ears, etc. without a reason... *Manusmrithi 4/144*)
- (iii) अपमृज्यान्न च स्ननातो गात्राण्यम्बरपाणिभिः ॥  
— मार्कण्डेय पुराण ३४ / ५२  
(Do not use clothes already worn by you and dry yourself after bath... *Markandaya Puran, 34/52.*)
- (iv) हस्तपादे मुखे चैव पंचाद्रे भोजनं चरेत् ॥  
— पद्म. सृष्टि ५१ / ५५





नाप्रक्षालितपाणिपादो भुंजीत ।।

– सुश्रुतसंहिता चिकित्सा 24/18

(Wash you hands, feet, mouth before you eat... *Padma Srishti 51/88; Sushruta Samhita 24/98.*)

(v) न धारयेत् परस्यैवं स्नानवस्त्रं कदाचन ।।

– पद्म. सृष्टि. 51/86

(Do not use a cloth (like towel) used by another person for drying yourself after bath... *Padma Srishti. 51/86*)

(vi) अन्यदेव भवद्वासः शयनीये नरोत्तम ।

अन्यद् स्थ्यासु देवानाम् अर्चयाम् अन्यदेव हि ।।

– महाभारत अनु. 104/86

(Use different clothes while sleeping, while going out, while doing pooja... *Mahabharath Anu. 104/86.*)

(vii) तथा न अन्यदृतं (वस्त्रं) धार्यम् ।।

– महाभारत अनु. 104/86

(Do not wear clothes worn by other... *Mahabharath Anu. 104/86*)

(viii) न अप्रक्षालितं पर्वधृतं वसनं विभूषाद् ।।

– विष्णुस्मृति 64

(Clothes once worn should not be worn again before washing... *Vishnu Smriti 64*)

(ix) न आद्र परिदधीत ।।

– गोभिसगृह्यसूत्र 3/5/24

(Do not wear wet clothes... *Gobhisgrihya Sutra 2/5/24*)

(x) चिताधूमसेवने सर्वे वर्णाः स्नान्नाम् आचरेषुः ।

वमने श्मश्रुकर्मणि कृते च ।।

– विष्णुस्मृति 22

(Take a bath on return from the ceremation ground. Take a bath after every harecut or an attack of vomiting.... *Vishnumrithi 22.*)

COVID-19 is primarily a respiratory disorder. However, it can affect the heart, liver, kidneys, brain, endocrine system, and the blood system. People with predisposed health conditions such as diabetes, blood pressure, chronic heart conditions, etc. are more vulnerable to fatal COVID-19 attack. The importance of building immunity by resorting to healthy and balanced food, and maintaining physical fitness cannot be underestimated.

The Ministry of AYUSH, Government of India (GoI) has recommended several self-care guidelines for preventive health measures and boosting immunity with special reference to respiratory health. These are supported by Ayurvedic literature and scientific publications.

**The recommended measures are as follows:**

(a) **General measures**

1. Drink warm water throughout the day.
2. Daily practice of Yogasana, Pranayama and meditation for at least 30 min as advised by the Ministry of AYUSH.
3. Spices like haldi (turmeric), jeera (cumin), dhaniya (coriander) and lahsun (garlic) are recommended while cooking.

(b) **Ayurvedic immunity promoting measures**

1. Take Chyavanprash 10 g (1 teaspoon) in the morning. Diabetics should take sugar-free Chyavanprash.
2. Drink herbal tea/decoction (kadha) made from tulsī (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, if needed.
3. Golden milk – half teaspoon haldi (turmeric) powder in 150 ml hot milk – once or twice a day.

### (c) *Simple Ayurvedic procedures*

1. Nasal application - Apply sesame oil/ coconut oil or ghee in both nostrils (Pratimarsh Nasya) in the morning and evening.
2. Oil pulling therapy - Take 1 tablespoon of sesame or coconut oil in the mouth and swish for 2-3 min; then spit it followed by rinsing with warm water. This can be done once or twice a day.

### (d) *For dry cough/sore throat*

1. Steam inhalation with fresh pudina (mint) leaves or ajwain (caraway seeds) can be done once in a day.
2. Lavang (clove) powder mixed with natural sugar/honey can be consumed 2-3 times a day in case of cough or throat irritation.
3. These measures generally treat normal dry cough and sore throat. However, it is best to consult a doctor if these symptoms persist.

Also avoid junk food, fried food, food made using all-purpose flour (maida) and eat only freshly cooked food.

### **Effects on the economy**

The lockdown has brought all economic activities to a standstill. The impact of this on the country's economy cannot be underestimated. It has been estimated that a complete lockdown will cost India about Rs 35,000 crores per day. The bouquet of economic activities is going to be different in the coming years; so will be the job opportunities. The skillsets required to fill these jobs are also going to be different. An aggressive programme of retraining may have to be put in place. Education at all levels is reshaping itself to satisfy the emerging requirements.

India has a large working population in the unorganized sector both in rural and urban

settings, including a large migrant population. This segment of the workforce has no safety net in times of difficulties. Large exodus of migrant workers to their hometowns in times of difficulties is not only a human tragedy that can be avoided, but can also lead to an artificial shortage of labour in the coming days. GoI has announced a slew of measures to immediately mitigate the trauma of the poorer segments of the population, and to put the economy of the country back on track.

A relief package of Rs 1.71 lakh crores has been announced under a newly formed Pradhan Mantri Garib Kalyan Yojana to alleviate the financial loss faced by migrant workers, farmers, urban and rural poor, and women, so that up to 800 million people can be covered. Besides, many states have also announced steps to provide free or highly subsidized food rations to people. These are welcome initial steps, though many believe that they may not be enough. A more comprehensive economic stimulus package of Rs 20 lakh crores has also been announced recently. Most importantly, the announced policies are for the first time 'humanity-centric and not economy-centric'. Considerable enhancement to funding for the MNREGA scheme has been envisaged, which is valuable. Without active participation of the citizens, these measures will remain only on paper. Can we also envisage a social security scheme open to all, which starts operating in such events? This could involve an allowance towards living and housing costs, and assured medical treatment in case of illness or injury to every citizen of the country, with extreme care that children do not suffer any deprivation and continue to have access to quality education. After all, such a social security network operates in many Scandinavian countries. This is not going to be easy, considering the vast population of India and large-scale poverty. However, we cannot aim to be a world power and a major economy in the world by leaving a large part of our population in



abject poverty without any hope. It is well recognized that money spent on public health and public awareness is not expenditure but investment by any government.

The COVID-19 pandemic has completely shredded our complacency about our public health system which was found to be grossly lacking in everything, from the number of beds to personal protective equipment and medicines. This has put our medical staff under extreme stress, several of whom have paid for it with their lives. This deficiency has not developed overnight. The health of our people has been neglected for long, with reduced funding, staff, and facilities at public hospitals. At the same time, extra-expensive private hospitals have come up across the country, catering to the super-rich. The consequences of this frustration of the poor should not be underestimated. Massive and sustained efforts are needed to build a modern and responsive medical system across the country, and not only in large cities. We would also like to raise the issue of public hygiene in places like slums across the country, which still do not have easy access to such basic facilities like running water or a toilet.

The filth across cities, villages and slums in the country remains the biggest enemy of public health. While the Swachha Bharat Abhiyan and efforts to stop open defecation have succeeded, they need to be continued and the scope expanded to improve public hygiene. The disposal of municipal solid waste, release of sewage and industrial waste into rivers and other water bodies, the dangerous and casual dumping of medical waste along with municipal waste have to stop immediately, if we are really serious about protecting the health of our people. Fortunately, science and technology (S&T) offers solutions to each one of these problems. For example, technologies for the treatment of sewage by radiation to kill all bacteria and pathogens, incineration of medical waste using plasma pyrolysis, etc. are available in our

national laboratories waiting to be adopted by the country. Even the notorious plastic pollution can be handled using cold plasma pyrolysis to convert it into useful fuel. (It should be remembered that less than 10% of the plastic waste can be recycled, that too at a great cost.) Education is undergoing a vast change in the COVID-19 times, and it is difficult to assess its impact if this crisis continues for a long time. For generations, the students have benefitted from classroom interactions with teachers and other students. The schools also offered an opportunity for students to play games, helping them with physical exercises and social interactions. We are grateful to successive governments who ushered in an IT revolution in the country, which has helped in the fight against the COVID-19 challenge with distance education tools.

We cannot, however, forget that a large part of the student population in our country does not have access to computers and Wi-Fi networks, and may miss education entirely in the 'new normal'. There is an increasing trend of 'working from home' in the 'new normal'. Several commentators have pointed out the perils of mental stress and attendant problems looming around the corner. After all, home is a home, a place to de-stress. The coming 'new normal' years are going to be different from those of the past. S&T is going to play an increasingly important role in letting us, the 1.3 billion population of India, adapt to the 'new normal' days. Are we equipped to do this? Only timely and effective communication can prepare us for this.

### **To communicate or not**

A folktale of two villagers on a desolate road connecting two remote villages illustrates the problem of communication to the common people. Let us call them Kishan and Ramu. It was fairly late in the evening and visibility was poor. Kishan was ahead and Ramu was following him a few steps behind. Suddenly Ramu saw a snake-like object just behind Kishan. In an effort to warn

Kishan of the possible danger, he shouted 'Kishan bhai, watch out.

There is a snake behind you'. Kishan turned back, saw the snake-like object, had a heart attack due to extreme fear and fell dead. However, the object was only a rope. The villagers who assembled there soon felt that Ramu should have been more careful and not frightened Kishan.

Ramu understandably got a good beating. Two weeks down the line, it was fairly late in the evening and visibility was poor. Ramu was on the same road and there was a man ahead of him. Let us call him Rahim. Suddenly Ramu saw a snake-like object just behind Rahim. He wanted to warn Rahim of the possible danger but remembered the thrashing he received two weeks back. So, he slowly moved closer to Rahim to see whether it was a snake. It was indeed a snake and provoked by Ramu, it bit Rahim who fell dead. Soon the villagers assembled there. They all felt that Ramu should have warned Rahim by shouting instead of going closer to him and provoking the snake in the process. Ramu understandably got a good beating for his stupidity. Two more weeks passed. It was fairly late in the evening and visibility was poor. Ramu was again on the same road and there was a man ahead of him. Let us call him Peter. Suddenly Ramu saw a snake-like object just behind Peter. He wanted to warn Peter of the possible danger but remembered the thrashing he had received on two earlier occasions. So, he closed his eyes and started chanting 'Ram, Ram, Ram' and prayed to God to save Peter. It was indeed a snake and which bit Peter who fell dead. Soon the villagers assembled there.

They all felt that Ramu should have either warned Peter by shouting or going closer to him. Ramu understandably got a good beating for his stupidity. Nowadays, Ramu does not take that road at all. The governments have no option but to take that road but keep learning all the time how to communicate with the citizens at large on matters of new and emerging threats.

## Summary

Under and over-playing emerging risks by anyone are counterproductive and do not elicit a calibrated response from the public. In general, grown-ups tend to cling to known concepts. It is the young who are open to new demands and new opportunities. We need to target the youth. A bright silver lining deserves to be noted: Scientists across the world are still treated with trust. This increases their responsibility. We are aware that public outreach has not been a priority in our educational and scientific institutions. Also, the role of professional bodies like our science and engineering academies, media, celebrities, political and socio-religious leaders cannot be underestimated.

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**PPF's Centre for Cohesive Society Studies organized a two-day webinar on May 15 & 16, 2020 to discuss the vulnerabilities of the Healthcare system in India which the COVID -19 pandemic has exposed. The webinar explored modalities and protocols required to ensure a true and greater three-way co-operation between stakeholders of, and means to enhance the spending in, the Health sector in the context of India.**

**Dr. Kalyan Banerjee, Former Director, National Institute of Virology, Pune** commenced his presentation by saying that "It is really not a fight between two armies, it is between an inanimate object and the host, the living organism, it is a fight between living and dead, where we have to see that the living things live and dead things remain dead."



Politicians and media should give proper perspective on the pandemic – neither overemphasize nor underemphasize. It is important to keep airports under strict health surveillance control to prevent transmission of the disease. India should have its own information gathering and analysis about diseases and their spread. India has a very large population with many living in difficult circumstances, so social distancing is not possible; there is a need to think of an alternative method. Herd immunity is an abused concept. Explaining the composition, Dr. Kalyan said that the virus therefore has a transitional chemical which is the non-living part and within the cell wall is the living part thus, it is partly living and partly dead. The living part within the cell wall is responsible for all the damage caused to the host body and the transitional chemical is responsible for transfer of the virus from one host to the next. Viruses in general after harming the host, the virus searches for a new and healthy host. This transfer occurs either through touch, body fluids, air, water, or some insects, etc. Famous epidemiologist from Russia, E.N. Pavlovsky initiated the study 'natural nidality of virus infections' which means that a virus or an organism has to maintain itself its natural 'nidus' or 'nest'. Nidus or nest are the circumstances or the immediate conditions in which the virus can persist itself without damaging the host excessively. Host tends to develop anti-bodies or cellular immunity in defence. There are many examples in virology and in microbiology that the natural cycle of the organism gets disrupted or changed due to certain interventions. Without the human interventions, these viruses remain within their selves and they may kill or do a little damage to the host. It is not in the best interest of the micro-organism to kill the host, if it does it also dies with the host. When the virus crosses this natural barrier, it tends to harm the host. An epidemic or a pandemic takes place only when this nidus is broken. Dr. Kalyan said that noble laureate Dr. Macfarlane Burnet, thought that we

have conquered the infectious diseases by antibiotics, but that has since been proved wrong as instead of conquering the microorganisms, it has rather given a chance to the microorganisms to proliferate. The drug resistance of tuberculosis, typhoid and other microorganisms have since come out.

The resistance of genetic changes continues and will continue to evolve, and the human immunity also have to continuously evolve for its own protection. The population density is also very important in the evolution and spread of microbial diseases.

Another important aspect is the transport system. Modern transport system and quick air travel, in this particular case, is responsible for rapid transmission of pathogenic organisms and related diseases on a global level. Sometimes back, there was a big scare of plague in India. The plague was not there but it was the media that made a plague scare. It caused a lot of people to migrate from the cities of Surat, Ahmadabad, Pune, etc., so one must see to the panic factor which comes out of media made epidemics.

Many factors such as mass psychology, mass movement are involved. If the vulnerable or suspected carrier are moving out, it must be studied and understood how they move and whether they can carry the diseases themselves, etc. The Corona virus is originally from China and then it spread out to different places through air travel and it was the responsibility of the countries to keep the air traffic under control. The new aerosol root of virus transmission or bacterial transmission will be a new paradigm in the epidemiology of diseases.

While handling an epidemic situation, it is the people and their reactions to the situation which is very important. Medical people have to take their own responsibility and they have their share of work during an epidemic, but it is also the business of the politicians and the media to

give a proper perspective of the condition. Neither overemphasis nor underemphasis would help.

It is necessary is to keep the airports absolutely under control along with the people coming in the airport from different sources. Zoonotic viruses are those organisms which are normally present in animals but also get transmitted to humans one of the common zoonotic virus that we have worked on extensively the Kyasanur Forest disease virus (KFDV) from Karnataka. The information about a disease can directly be gathered from around the world and then immediately analyzed to help is fight the method of transmission and method of growing within the population. Social distancing is very hard to practice in a country like ours where 80% of the population live in congested spaces.

When an organism is circulating inside a population it will produce some degree of immunity which is called herd immunity. Although it is a very abused concept. Some people escape the herd immunity and get the infection and those people are responsible for spreading the infection amongst other people who don't get infected, I mean they do get infected but they don't fall sick and that produces herd immunity.

Health should be a priority sector in the government, both in the state and in the central government. We can encourage the private sector to increase the skewed ratio of health workers and infrastructure through government induced policies.

We need to have detailed surveillance system not only for Corona but for all CDs and for the NCDs also. Without an effective surveillance, we shall truly not know the epidemiology of Corona and another virus in India. We also need to strengthen the implementation of already existing polices to deal with the situation of such a nature.

**Dr. Anita Kar, Founder-Director of the Birth Defects Centre in Pune** commenced her talk stating that, "In the last three decades almost 30 new pathogens have been identified and 60 per cent have zoonotic origin, that is they are born out of animals and passed on to humans- so the COVID-19 virus is not going to be the last and is here to stay for a while". She questioned the role that the Integrated Disease Surveillance Project funded by the World Bank, played this time around?

Sequelae of the disease are not that simple - not a typical viral respiratory infection. What is not known is how this virus behaves in a tropical environment in populations which have a high level of malnutrition, which live in unhygienic conditions, and a high density of population. 17-34% may be asymptomatic (but who have the potential to spread the virus). Then, there are the Pre-symptomatic - before they fall ill - when viral shedding may be at its highest. One of the challenges involved is how to detect who have been exposed to the virus? There are several types of tests, but predictive value is not very good.

Airport screening by itself alone does not constitute a very good way to stop the virus because of the issues like asymptomatic, pre-symptomatic cases.

By the time international commercial flight ban happened in India on March 22, virus transmission was already ongoing in 22 countries and more than 40,000 cases in Italy - so there was a good 10 week window when virus could have entered the country and as such it is probable that community transmission is ongoing in India.

As per the Oxford University Stringency Index India scored a perfect score 100% on the Public Health interventions that the government implemented by the middle of March. Options were Herd immunity versus containment and mitigation using non-pharmaceutical



intervention (in absence of a vaccine and a drug).

Flattening the curve - Containment Plan for COVID 19 was rather flexible with the Ministry of Health adapting as it went. The first element was contact tracing and active case search. The industrial countries had limited tracing activities. In contrast in India, the focus was on “catch and contain” to stop the spread of the virus. In Bhilwara, one doctor unknowingly infected people across the town and the entire staff of a public health system ended up diverted to contact tracing.

The Government approach did not take the people as partners in Public Communication. It chose to prescribe to them what to do. It went into measures such as stamping of people to show they were in health quarantine implying a lack of faith that they would not remain quarantined – which is what ended up happening. The law enforcement agencies became involved in tracing suspects which is a “no, no” of public health. Inevitably, the consequence was an avoidable stigmatization, and the whole purpose of contract tracing and identifying active cases was ruined as suspects went underground instead of voluntarily co-operating with the health authorities.

Testing is a difficult challenge in terms of the opacity of the data regarding how many were positive, how many were repeat tests, how many with symptoms, how many were contacts, demographics etc. Drawing any inference on disease epidemiology becomes very difficult to decipher. Currently, the data unfortunately is being procured from the media.

The natural history of COVID-19 may be entirely different from that witnessed in Italy, US, and other nations etc, in some of these the median age of the population is 45 years whereas 60 per cent of Indians are less than 35 years of age. However, India failed to devise an independent strategy to

deal with the epidemic in view of its cultural, social, and economic context. Hand-washing advisories, which makes sense in low density countries but perhaps not in India where people in lower income group might not even have enough living space to maintain a proper social distance during the lockdown and water supply scarce. An emphasis on respiratory etiquette in such cases is perhaps more important.

Iran, closest comparison to India with respect to COVID-19, tested 7.9 per 1000 people whereas India had tested only 1.21 per 1000 people as on May 12, 2020. India has considerably lagged behind in speeding up the testing procedure by limiting only to those with symptoms or contacts which could be a major cause behind the subsequent community transmission.

India ended up deploying a massively hybrid strategy. There are three groups of communities viz. urban vulnerable (the slum population), urban susceptible and the UMC. RWAs have locked up people and limited their exposure to the virus, so as soon as lockdown is lifted there is a possibility of explosion in cases; middle class and UMC are where non-communicable cases are clustered and where mortality can be expected to rise), and rural vulnerable (migrants).

Besides the urban vulnerable communities (lower income section) and rural vulnerable communities, a third group of people – the Urban Susceptible communities, are those who have limited exposure to the virus and are immunologically naïve. And as soon as lockdown is lifted, the country is going to witness explosion in cases because we know co-morbidities increase the risk of mortality in COVID-19 among middle class and upper middle class group, where the non-communicable diseases are clustered.

Opacity of the data is the major challenge doctors are facing at present, preventing them to plan

and act in order to combat the disease at least in their local settings. The only data that is made available to them by ICMR reflects the total number of samples tested but there is no key information available about the number of people particularly positive, frequency of repeated tests, location of patients, details of doctors who did the tests, etc. Therefore, the epidemiology of corona virus in India is very difficult to decipher. Access to detailed data is not only a right of the people but a public health responsibility. It is imperative to engage entire scientific community while dealing with a health crisis so that the opinions are shared, and questions are raised.

The data on hospital beds, ICU beds and ventilators is not made available to public health professionals, who therefore are naturally forced to access information available with media. Based on that data, there are certain ambiguities which are critical as well as concerning. While extra beds are being arranged, the purpose of doing so is unclear. These beds are placed so close to each other that the requirement of social distancing stands out. Moreover, the sick patients ought to be provided medical care if brought to the facilities but there is no arrangement of oxygen supplements and other necessary services etc.

In this outbreak, there has been a predominance of medical and bureaucratic leadership, very little public health leadership which monitors how virus is spreading and how to respond.

**Vyas Ji Mishra, Vice Chairman, State Disaster Management Authority, and former Health Secretary, Bihar** took the position that COVID-19 pandemic is a health hazard as well as a 'Disaster' which is unprecedented. The situations this pandemic has developed, completely fits in the definition of a disaster despite the fact that we have had a long list of health crisis situation which has killed, maimed and incapacitated hundreds of people in quick successions, we did

not declare any of them as a disaster. He elaborated that, how States have recognized and dealt with COVID-19 as a disaster under the Disaster Management Act (DMA). The nuances of the DMA were aptly discussed along with the ways it can be applied in situations similar to COVID-19. With the authority of a disaster management professional, he elaborated the steps to be taken in context of any disaster, post evaluation of danger in devising routes and ways through.

Taking the recent and ongoing experiences of the pandemic, the healthcare of our country with poor performing states like UP & Bihar, needs a revamp to make it resilient. Our healthcare must be strengthened through 'Institutional Capacity Building.' Healthcare is crippled with all sorts of shortages despite various National and State level programs. The strategy should shift from a curative care to preventive care and attempt to debunk the emphasis on the predominantly curative aspect of healthcare. There is a need to employ healthcare workers at village level and devise mechanisms to retain them. It is imperative that we introduce behavioral change programs at the grassroots level and impart easy and simple preventive measures through local and cultural heritage with proper monitoring mechanisms in place.

The grassroots unit of healthcare requires workers with continuous training to contain the disease and in imparting good healthcare practices. Importance of telemedicine was also touched upon along with the convergence of grassroots (HSC), CHCs, PHCs, Sub-Divisional and District level with State and National level healthcare standards.

Another experience related to the Kerala health system where the health system is much better than other states. The best thing Kerala health system was the integration and devotion of health workers in their jobs. That kind of factors must be sustained in the all-over health system in





India and in the policymaking process for the future. He agreed about the devotion and zeal will be difficult maintained at the individual level but needs to be implemented for the health sector in the future. According to him, the government should be sensitive to governance at every level and increase the number of workers with the co-operation of private sector.

The way this pandemic has laid bare the lacunae in our health system, we need to become resilient to similar situations which can be achieved only through preparedness. Also, we need a convergence of Public Healthcare and Disaster Management to mitigate and minimize the effects of health disasters.

Healthcare institutions would need to be built, strengthened making them sustainable. All these steps require immense amount of funds. The states should not rely on the funds from the Central Govt. alone. It should use local ingenuity geniuses and expertise with out of the box strategies to raise funds for the healthcare. Few methods suggested in the discussion were, introduction of a Health Cess, in order to become self-reliant and through Public-Private Partnerships. Policymakers, should strive and endeavor to provide all forms of support to the healthcare professionals and remove bottlenecks in the policies through adopting better monitoring and evaluation mechanisms.

**Dr. Anant Bhan member Advisory Committee for Venture Centre, Pune's Task Force on Repurposing of Drugs for COVID-19** described India's lockdown as one of the earliest and largest in the world. Pandemics, leaky infrastructure, shortage of human resource, gaps in regulatory system' etc., are not overnight issues. Though the lockdown is meant to be public health measure, its implication is also found to be socio-economic in nature. The present migrant workers most probably are the product of a larger migration than partition. These workers did not have enough savings, food is scarce & uncertainty in

the job market including the informal job market. There have been also lot of violation and neglect in the process that undermined their dignity and rights - spraying of disinfectant, many deaths took place who had been run over by trains/ buses, still not been able to respond to their health, food needs & basic security needs.

Lots of infections are focused on urban centers, but the challenge with easing of lockdown & movement of migration, these infections will travel fast from urban to rural areas. So, the question arises, is rural India really prepared for this infection. Odisha witnessed recent increase of cases and the infection are also asymptomatic in nature.

India failed in its approach to the issues of stigma around infection & infection spread. People sometime can be reluctant to come forward for testing, people who are tested positive or their family; even health care workers are being stigmatized.

The guidelines issued by the government which emphasize social distancing and hygiene, with frequent hand washing and wearing a mask are not so easy to implement in low income, high density communities. Where one family is staying in a single with 7-8 individuals, is social distancing possible? The quarantine mechanism should cater to compensation for daily wage earners.

The infection is being brought by the upper class/ middle class travelling from abroad, but the implication is felt much more by the rural/ poor families. There is no definitive evidence to indicate that either Hydroxychloroquine or non-allopathic/ traditional medicines are possible cures.

The Aarogya Setu Application which has been made mandatory for some sections of the population like working in a government office, boarding a train, might require when boarding a flight raises serious questions about implications

of surveillance mechanism on privacy and data access.

Lessons from around the globe which India's health system can learn from them. North East India has seen lesser number of cases and Sikkim is the only state with zero cases.

There have been zero deaths in Vietnam because of steps like early prevention, travel restriction, close monitoring of those who have travelled, early schools' closure, and testing of everyone in quarantine. It was found that 40 % of asymptomatic and in quarantine were tested positive. More funding is needed for India's health system. Disbursement is sometime not on timely basis. One element, which concerns a lot of us, is inadequate testing, samples are collected but they take days to process, in some cases the government send the samples to Delhi for processing. This delays the public health response. India needs to look the impact of COVID 19 from a long-term perspective goal. Families are economically devastated and insurance are not reaching everyone.

**Vineet Chawdhary, Former Chief Secretary, Himachal Pradesh** mentioned that India's expenditure (1.28% of GDP in 2017-18) on Health Sector is still low compared to other nations in the world. There are cases made out for greater investment into health sector, but most spending doesn't necessarily mean positive and greater outcome in health sector in India. Population growth is a big challenge for India and India will surpass China in 2050. More spending on infrastructure will never going to be effective until we take some serious steps or move out of the population size. Unfortunately the central government has been more reluctant in terms of proposition, management of the population control. Safdarjung Hospital maternity ward has 300 bed occupancy but there are two people lying on a bed because of a surging population. Stressing the way to reform health sector, he expressed that the health sector should be functional.

National Health Mission symbolizes an aspiration for a single solution to health care problems in India. To this end, the central govt. transferred a lot of funds to states (on population basis) for discharging health care allocated funds based on population size. He felt that the states however should be given a greater degree of flexibility (in designing and delivery) since one size does not fit all.

Evidence based programs requires reliable data that needs to be collected, interpolated, and interpreted. In Northern India data is not being used at all and until that happens all the initiatives are perhaps like shooting in the dark. Silos in health system structure that are still functioning in the government hospitals militate against maximizing return on the investment, there is a need to work on building an effective referral system. He also drew attention to the fact that such programs where a payout is involved usually do well in terms of expenditure and outcome. There is also a need to change the behaviour of health seeking community, to encourage people to come to the health institutions to seek facilities only then the state government and politicians will be under pressure to provide health care as a right to our citizen. Until and unless that happens little progress can be there at the ground level. the Clinical Establishment Act has hardly been implemented in spirit. Amendment of the Drug and Cosmetic Act is also pending at the health ministry for the last 10 years. This encourages the mafia in the health sector continued to proliferate.

**Dr Muzaffar Ahmad, Former member NDMA & Former Director Health Services J&K** commenced his presentation by stating that increasing disasters can have a major effect on health of the population as its direct effect includes death, injury, disability, prolonged illness. Major hospitals in both public and private sectors have seen the problem during the urban flooding, whether it was Chennai or Kerala. The



experience in these emergencies have raised the question: Are our hospitals safe and the healthcare institutions resilient to face the challenges of emergencies and disasters at any point of time.

There is a need for safe healthcare institutions structurally and functionally to be able to be in a state of continuous operation during and after the disasters, irrespective of whether the disaster is internal or external. There have been instances of a collapse of hospital, a fire in the hospital in AIIMS, Bhubaneswar and Mumbai. In an incident of fire in a hospital in Calcutta hundreds of lives were lost. There is a need to make our hospitals safe for emergencies and disasters. Our healthcare institutions have suffered because of a chronically weak healthcare systems almost in all states besides other factors like poor facilities, location, lack of training of healthcare workers in the skills and competence of healthcare workers to provide care even during the emergencies.

There is, therefore, a requirement of planning, preparedness, capacity development of health worker. challenges of chemical, biological, radiological, nuclear (CBRN) require well equipped hospitals and the skilled workers. For instance, when a cobalt eradiator was sold from Delhi University to a scrap dealer in Mayapuri (Delhi) who cut it into pieces. It took him 6 days to be diagnosed that he had a radiation injury. During these 6 days he was taken from MAX hospital to AIIMS to detect the cause of the injury. That poses a question about the capacity of our healthcare system and doctors to deal with 21st century threats and medical emergencies.

Another important question is do we have healthcare systems preparedness plans and contingency plans which have been tested, taking our resources and manpower into view. During a major cyclone in Orissa in 1999 in which a large number of people lost their lives and immediately after that Orissa State Disaster Management Authority (OSDMA) prepared

plans for future cyclones which included shelter, evacuation and healthcare. In the next Cyclone, OSDMA could manage the situation with a much lower casualty figure. In Madhya Pradesh, which had witnessed the Bhopal Gas Tragedy, in a critical review of the Bhopal incident, it was found that doctors were unable to treat the victims because they had no knowledge about the antidotes.

Another question is the marketing techniques of pharmaceutical companies. Medicines are available are given but budget for medicines in the health sector is too low. There is need for a price control by the appropriate authority. The cost of laboratory tests is very high. Majority of our people in the country don't have health insurance. In fact, the rate for COVID-19 testing is Rs. 4,500. A collaboration between the government and private sector at the time of biological disasters will help. The time has come now that the large number of laboratories to play a role in Health emergencies. There is an urgent need for developing Public health cadre. Similarly, there is requirement of training frontline workers including emergency medical technicians. To meet these requirements within a medico-framework, a comprehensive Public Health and Health Emergencies Act should be considered.

**Ms. Anjali Nayyar, Executive Vice President, Global Health Services** said that public health in India has never received the kind of attention which it is really deserves. It is not dispensed universally. Our mass population is not covered with any health security. A good number of people who can afford to access easily health services in private hospitals but on the other hand so many people cannot afford. Investing in health sector is also means investing in the national economy. India must focus on Health care system including the primary health care sector. Most of the health technologies are available in the large city hospitals. There is also a

need to understand that Public Private Partnership is a key factor to scale up health care. With the help of private sectors, we can get increase the number of COVID testing also. India must take and give initiatives for Drugs and Diagnostics and open it to private sectors as well as for produce medicine and vaccine. India have a great experience like Bharat Biotech, who is one of the best producing medicine and vaccine. In India, HIV victims were stigmatized and discriminated; we must avoid this trap in respect of COVID 19 cases. India had a minimum number of public health professionals in leadership role with the dominance of medical and bureaucratic leaders. India must have a public health cadre to know the presence and virus in the population, especially districts. There is a need for better understanding about Public Health and clinical dominance that goes into an imaginative public health teaching and training especially in the medical systems. There is a need to strengthen Integrated Disease Surveillance Project which is supposed to be epidemic

intelligence unit and catch diseases of epidemic potential, remained quite tangential during the COVID-19 outbreak.

Dr. Anjali emphasized three major functions in a Public Health System: First, the 'Public Health function' which engages with communities (behavioral and social interventions) apart from epidemiology which tracks the virus. Second, the 'Medical Wing' relate to treatments and role of doctors. Third, 'Administration', are distinct in terms of work, however in many public health centres a medical officer who's not trained in accounts is found to be undertaking the administration work. There is a need for convergence and regulation. There are problems such as reliance on imports specially on medical products (PPE, COVID 19 test kits etc.) from China, which mostly had quality issues which must be sorted. It is important to focus on health security as key aspect of economic and social security. State level decisions are just as important as central government decisions in dealing with COVID 19.

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