

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

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*We are in the midst of a global pandemic, the COVID-19. With no vaccine against the infection or medicines to treat the infected, the world is struggling to cope up with the increasing infections and casualties. It is recognized by everyone that the only option available to reduce the spread of the infection is to bring in lifestyle changes. Active participation by everyone is mandatory for success of this strategy. It is emphasized that the scientific community can play a very effective role in conveying this message across the entire population.*

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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

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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 diarrhoea 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 over-cautious. 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 व्यञ्जनं चैव घृतं तैलं तथैव च ।  
लेह्यं पेयं च विविधं हस्तदत्तं न भक्षयेत् ॥  
– धर्मसिन्धु ३पू. आह्निक

(Salt, ghee, oil, and other foods and drinks should not be served with bare hands. Use spoons... *Dharma Sindhu* 3 pu. Ahnika.)

- (ii) अनातुरः स्वानि खानि न स्पृशेदनिमित्ततः ॥  
– मनुस्मृति ४/१४४

(Do not touch your own eyes, nose, ears, etc. without a reason.... *Manusmrithi* 4/144.)

- (iii) अपमृज्यान्न च स्त्रातो गात्राण्यम्बरपाणिभिः ॥  
– मार्कण्डेय पुराण ३४/५२

(Do not use clothes already worn by you and dry yourself after a bath... *Markandeya Puran*, 34/52.)

- (iv) हस्तपादे मुखे चैव पञ्चाद्रे भोजनं चरेत् ॥  
– पद्मसृष्टि. ५१/८८

नाप्रक्षालितपाणिपादो भुञ्जीत ॥

– सुश्रुतसंहिता चिकित्सा २४/९८

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

- (v) न धारयेत् परस्यैवं स्नानवस्त्रं कदाचन ॥  
– पद्मसृष्टि. ५१/८६

## GENERAL ARTICLES

(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 रथ्यासु देवानाम् अर्चयाम् अन्यदेव हि ॥  
– महाभारत अनु १०४/८६

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

- (vii) तथा न अन्यधृतं (वस्त्रं) धार्यम् ॥  
– महाभारत अनु १०४/८६

(Do not wear clothes worn by others... *Mahabharath* anu 104/86.)

- (viii) न अप्रक्षालितं पूर्वधृतं वसनं बिभृयाद् ॥  
– विष्णुस्मृति ६४

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

- (ix) न आद्रं परिदधीत ॥  
– गोभिसगृह्यसूत्र ३/५/२४

(Do not wear wet clothes. *Gobhisagrihya Sutra* 3/5/24.)

- (x) चिताधूमसेवने सर्वे वर्णाः स्नानम् आचरेयुः ।  
वमने श्मश्रुकर्मणि कृते च ॥  
– विष्णुस्मृति २२

(Take a bath on return from the cremation ground. Take a bath after every haircut or an attack of vomiting.... *Vishnusmrithi* 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 tulasi (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 and 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 defaecation 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 destress. 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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