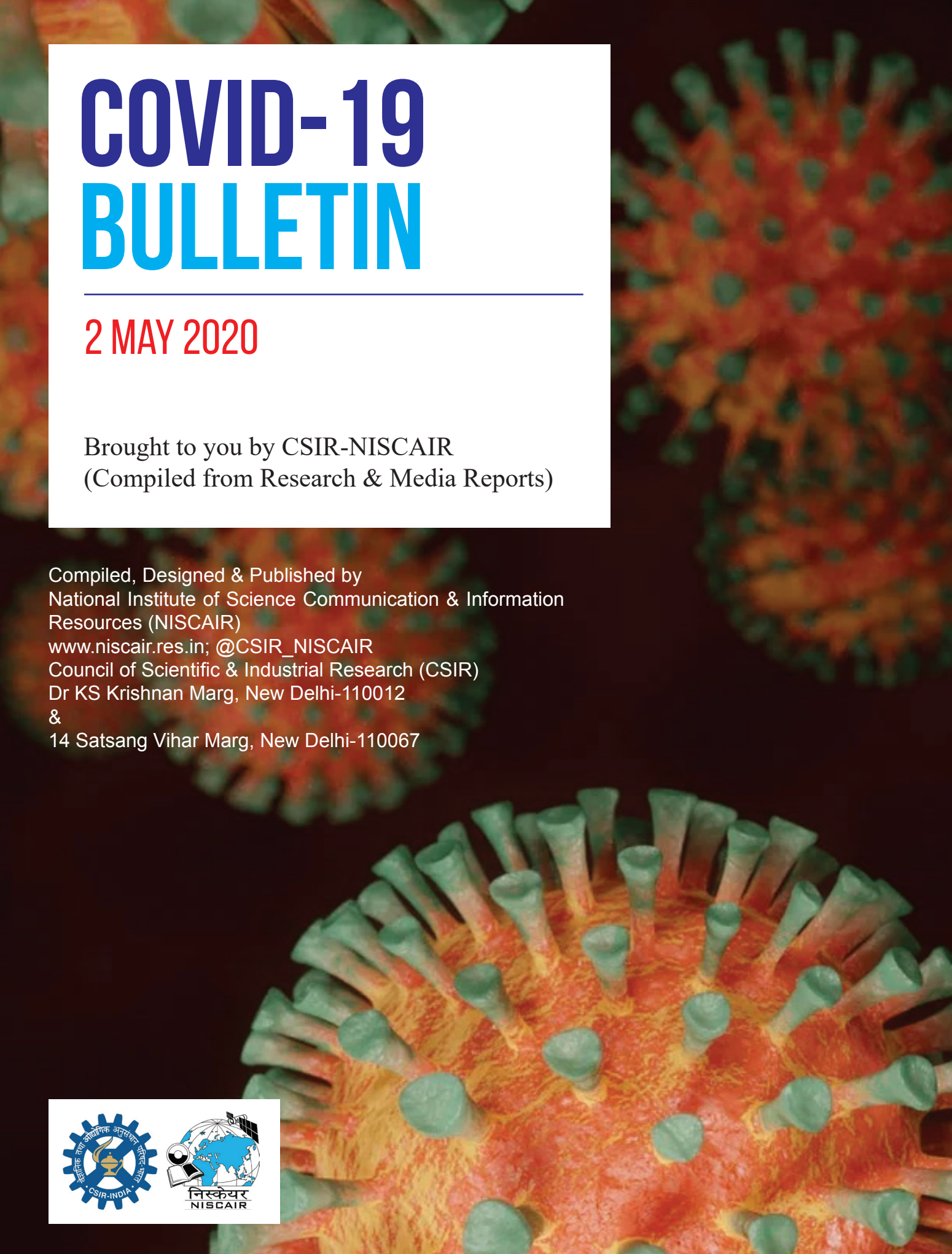

COVID-19 BULLETIN

2 MAY 2020

Brought to you by CSIR-NISCAIR
(Compiled from Research & Media Reports)

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COVID-19 Dashboard

COVID-19 Cases and Deaths in India & Worldwide

(WHO Data as of 2 May 2020)

	India	Worldwide
Total confirmed cases	37336	3267184
Total confirmed new cases	2293	91977
Total deaths	1218	229971
Total new deaths	71	5799

www.who.int

CORONA RESEARCH SNAPSHOT

Reinfection among recovered patients is a concern

In a study, about 5% to 15% people have the possibility to test positive again in China. However, the rate of re-infection is different at different places, at some places the re-infection rate is just around 1% according to Dr. Wang Guiqiang, Director of Department of Infection at Peking University First Hospital. The re-infection in recovered patients is a great concern in China. Scientists do not have much clear understanding and are keen to know the reason of re-infection among recovered patients.

(Source: *Bloomberg News*)

Breakthrough in blocking infection by COVID-19 among human cells using antibodies

Researchers from the Erasmus Medical Centre, Utrecht University and Harbour BioMed published a report which claims that a fully human monoclonal antibody is able to prevent the COVID-19 virus from infecting cultured cells in the lab. The discovery published in the reputed journal *Nature Communications* is being considered an important step in treating or preventing the infection caused by COVID-19 virus.

(Source: *Nature Communications*)

Immune system shows abnormal response to COVID-19

The immune response to SARS-CoV-2 differs from the response prompted by other respiratory viruses, according to an analysis of infected cells, ferrets and people. The finding supports the idea that treatments targeting the immune system could help people with COVID-19. Researchers found that cells infected with SARS-CoV-2 produce unusually low levels of antiviral proteins called interferons compared with cells infected with other respiratory viruses.

(Source: *Cell, https://go.nature.com/3bWE82b*)

Young children are not immune to COVID-19

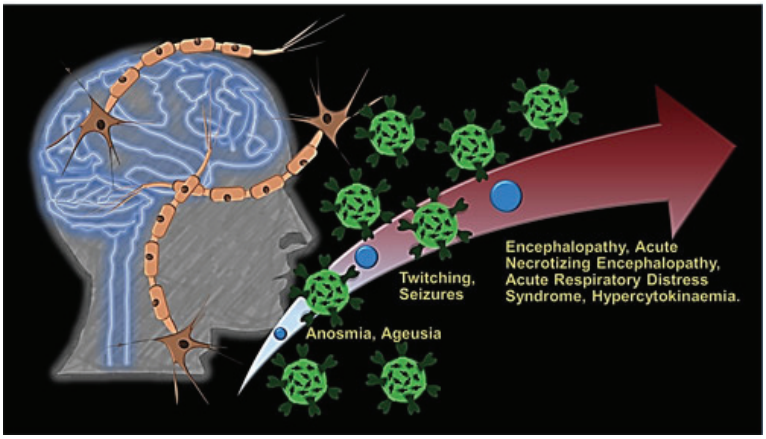
Children are as likely as adults to become infected with SARS-CoV-2 after close contact with an infected person, according to a study of people in Shenzhen, China. Researchers analysed nearly 400 cases of COVID-19 and 1,300 people who were 'close contacts' of the infected people. The team found that 7% of close contacts younger than age 10 became infected — roughly the same as in the population overall.

(Source: *Lancet Inf. Dis., http://doi.org/dtd7*)

SARS-CoV-2 might invade by hijacking its host's immune defences

The new coronavirus invades human cells after one of its proteins binds with ACE2, a protein found in cells in many human organs. But little has been known about that crucial interaction. Researchers found that in people with flu, signalling molecules called interferons — which normally help to fend off viruses — switch on the host genes encoding the ACE2 protein. The result suggests that the body's defences against viral attack drive the activation of the gene for ACE2.

(Source: *Cell, http://doi.org/ds9j*)



IIT Jodhpur scientists study neuroinvasive nature of COVID-19

Scientists at IIT Jodhpur have conducted a study which shows that COVID-19 may affect the Central Nervous System (CNS) causing loss of smell and taste. Nose and mouth both are significant entry points for the virus, from where it can reach the olfactory bulb

utilising the neurons of the olfactory mucosa. The olfactory bulb is situated in the forebrain which is primarily responsible for the feeling of smell.

(Source: *www.dst.gov.in*)

Organic-inorganic hybrid nanocoatings for disposable masks

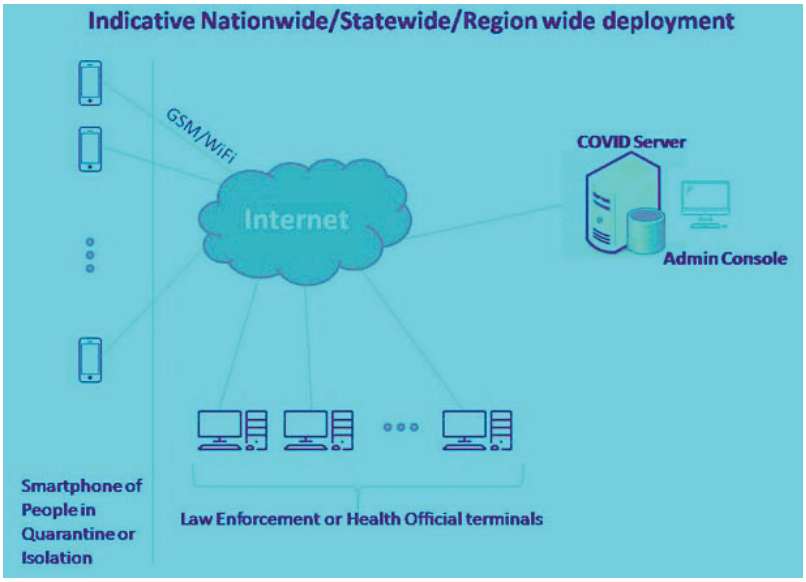
Dr Viswanatha R from Jyothy Institute of Technology, Bengaluru under the DST Nano Mission has developed organic-inorganic hybrid nanocoatings for disposable masks for which DST has approved support for large scale production. Nanoparticles using the sol-gel technology will make the nanocoating hydrophobic on the surface of the mask, which effectively repels water/ moisture from the surface. Further, the addition of an appropriate polymer will enhance the virucidal properties of the hydrophobic nanocoating. This makes the masks reusable and non-poisonous.

(Source: *www.dst.gov.in*)

CORONA INNOVATIONS

SAMPARC App of DRDO will Track COVID-19 Patients

Centre for Artificial Intelligence and Robotics (CAIR), Defence Research and Development Organization (DRDO), Bengaluru has developed the SAMPARC App to track COVID patients who are under quarantine. SAMPARC stands for Smart Automated Management of Patients and Risks for COVID-19. SAMPARC enables geo-fencing, AI-based automated face recognition (between selfie taken during registration and subsequent selfies sent by the patient), and displays the information to state officials on a map which can be colour-coded to depict the containment zones and hotspots. The violators would be shown in red on a map if they break the geo-fence or their selfie does not match; in blue if their smart phones stop sending periodic updates; and in green if everything is found satisfactory. Once the period of the home quarantine or isolation is over, the patients can uninstall the App from their smart phones.



(Source: *www.government.economictimes.indiatimes.com*)

Drone CK100: Corona Killer

Sanitization of big compounds of schools, hospitals, airports or government offices through manual spraying is time consuming. Corona Killer 'Drone CK100' developed by Garuda Aerospace is an Automated Disinfecting Technology that aids in sanitization of public places, hospitals and tall buildings. Drone operations are faster, longer and safer than manual spraying workers who can become potential carriers of COVID-19. Drones reach heights up to 450 feet and spray disinfectants on buildings, which is impossible manually.

Drone CK 100 is currently being used in 26 cities of India. It consists of patented autopilot technology, advanced flight controller system and is equipped with fuel efficient motors that enable the drone to be deployed for 12 hours a day. It has a payload capacity of 15-20 litres, flight duration of 40-45 minutes and maximum ceiling height of 450 feet. These features are sufficient to disinfect 99% of tall buildings across the country. Each drone can cover 20 km a day.

(Source: *www.business-standard.com*)

Ruhdaar — Low-cost Ventilator by IIT Bombay

Students from IIT Bombay, NIT Srinagar and Islamic University of Science & Technology (IUST), Jammu & Kashmir have designed a low-cost mechanical ventilator utilising locally available materials. The ventilator provides adequate breathing support helping critically ill COVID-19 patients. The prototype costs around Rs10,000 and can be further reduced with large-scale manufacturing.

(Source: *www.pib.gov.in*)

ATULYA — Microwave Steriliser

Defence Institute of Advanced Technology (DIAT), Pune, has developed a cost-effective microwave steriliser named 'ATULYA' to disintegrate novel coronavirus by using differential heating in the range of 560 to 600˚C temperatures. The developed products can operate in portable or fixed installations and can be used for non-

metallic objects only. The sterilisation time is from 30 seconds to one minute depending upon the size and shape of the objects.

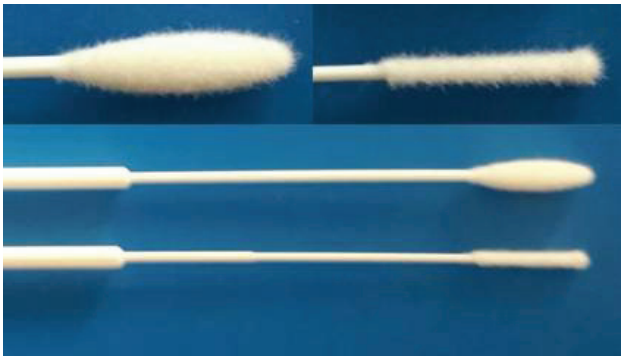
(Source: *www.pib.gov.in*)

Device to Track Coughing Person

Two undergraduate students of the Jadavpur University have developed a smart non-contact device with embedded image and sound sensors, which can track a coughing person and also analyses her/him for COVID-19. The device can track even if the person is away from it and is capable of identifying multiple coughing persons at the same time. The device can be used in quarantine centres, office-spaces, classrooms or built-up areas with gatherings for monitoring the people present there.

(Source: *www.economictimes.indiatimes.com*)

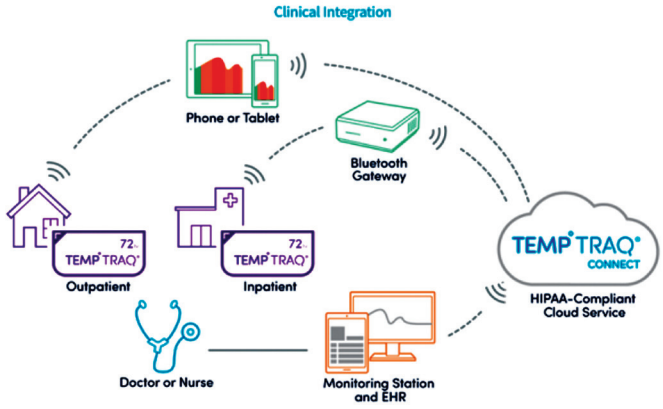
Swabs and Viral Transport Medium for COVID-19 Testing



Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) has developed two types of nasal and oral swabs and viral transport medium for COVID-19 testing. Chitra EmBed flocked nylon swabs (co-developed with Mallelil Industries Pvt. Ltd) and Chitra EnMesh, polymeric foam-tipped, lint-free swabs with flexible plastic handles. Both have proven efficiency in specimen collection and rapid elution of specimen into the liquid viral medium. They also have good recovery of viral RNA collected using these swabs and medium. These two swabs developed with locally available material can reduce import dependency of the materials currently used and can meet the huge demand at much lower costs.

(Source: *www.pib.gov.in*)

Innovative device to monitor temperature



This TempTraq wireless wearable temperature monitoring device allows clinicians and healthcare workers to remotely monitor fever with little to no direct patient contact. It can monitor up to 72 hours continuously with one patch.

(Source: *www.wearable-technologies.com)*

Expanding medical training opportunities

In COVID-19 patients, lung ultrasound is considered as an alternative to chest radiography or CT scanning. This pathological diagnosis is safe, radiation free, easy and quick for use at point-of-care, repeatable and cost effective. Hence, training of physicians to rapidly acquire lung ultrasound skills can be critical for the success of COVID-19 management.

The Simbionix software allows for training to the full extent of the lung examination and includes practicing of the various lung zones, documentation and clinical reporting in a full clinical environment.

(Source: *www.jpost.com*)

Vital intelligence screening

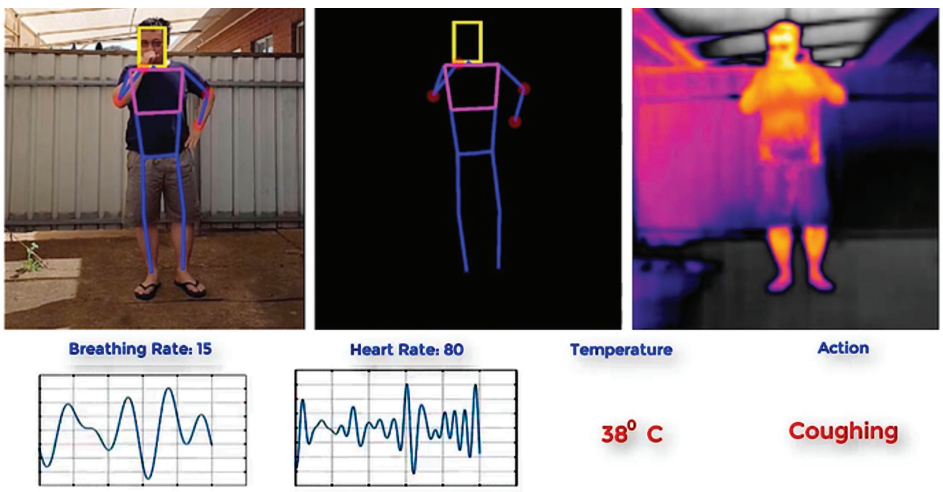
Dragonfly's Vital Intelligence Screening Project is an innovative respiratory monitoring platform that involves utilization of new and existing camera networks. This digital platform for respiration monitoring is being immediately commercialized for health monitoring and detection of respiratory and infectious conditions including monitoring temperatures, heart and respiratory rates, amongst crowd, workforces, airlines, cruise ships, potential at-risk groups, i.e., seniors in care facilities, convention centers, border crossings or critical infrastructure facilities.

(Source: *www.globenewswire.com*)

At-home diagnostics kit

MIT University's Computer Science and Artificial Intelligence Laboratory (CSAIL) has developed a remote patient monitoring (RPM) technology. This innovative technology allows doctors to remotely monitor COVID-19 patients. The RPM device is a WiFi-like box that analyses wireless signals in the environment using AI to view people's vital signs, sleep and movement. Apart from COVID-19, it can also detect other respiratory problems such as anxiety or insomnia.

(Source: *www.csail.mit.edu*)



CORONA Q&A

How did SARS-CoV-2 infect humans?

Currently, the consensus among the scientific community is that SARS-CoV-2 originated in horseshoe bats. However, bats did not directly transmit the virus to humans. It is believed that the virus jumped from bats on to pangolins from where it spread to humans. A virus in bats shares similarities with a virus in pangolins, which shares similarities with the new virus that has appeared in humans. We don't need to manufacture this virus, it exists in nature. Earlier, SARS-CoV that caused the severe acute respiratory syndrome (SARS) pandemic in 2003, and a close relative of SARS-CoV-2, was also found to have been transmitted from bats to the masked palm civet, which subsequently infected humans.

What are the modes of transmission of COVID-19?

COVID-19 spreads through close contact through respiratory droplets from the nose or mouth of an infected person who sneezes or coughs. The droplets full of virus can travel 3 to 6 feet. It infects people who touch the surfaces on which the droplets have landed and then touch their nose, eyes or mouth providing entry to the virus.

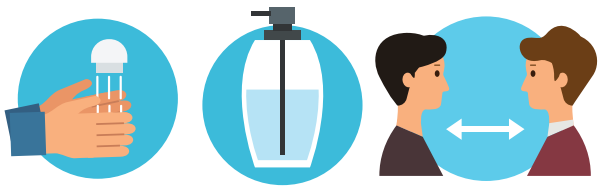
Who can infect?

a) *Symptomatic transmission*: When a person exhibits signs or symptoms like fever, cough, etc. compatible with COVID-19 illness and can transmit it to others.

b) *Pre-symptomatic transmission:* There is an incubation period which is the duration between the exposure to the virus and the appearance of symptoms, also known as the pre-symptomatic period. The incubation period of COVID 19 is 1 to 14 days. However, people with the infection, but without any serious symptoms can also transmit the infection.

c) *Asymptomatic transmission*: A condition when the virus transmits from a person who does not develop any sign of COVID-19.

How can I avoid getting infected?



The virus enters your body via your eyes, nose and/or mouth, so it is important to avoid touching your face with unwashed hands. Washing of hands with soap and water for at least 20 seconds, or cleaning hands thoroughly with alcohol-based

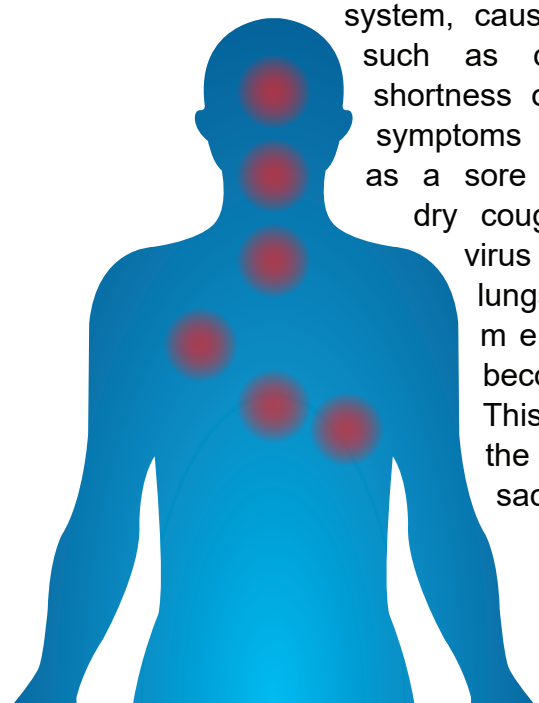
solutions, gels or tissues is recommended in all settings. It is also recommended to stay one metre or more away from people infected with COVID-19 who are showing symptoms, to reduce the risk of infection through respiratory droplets.

How can I avoid infecting others?

Cough or sneeze into your elbow or use a tissue. If you use a tissue, dispose it off carefully after a single use. Wash your hands with soap and water for at least 20 seconds. Stay one metre or more away from people to reduce the risk of spreading the virus through respiratory droplets. If you feel unwell, stay at home. If you develop any symptoms suggestive of COVID-19, immediately call your healthcare provider for advice.

How does Corona cause respiratory problems?

Coronaviruses typically affect the respiratory system, causing symptoms such as coughing and shortness of breath. The symptoms often start as a sore throat and a dry cough. When the virus reaches the lungs, the mucous membranes become inflamed. This can damage the alveoli or lung sacs. The lungs have to work harder to supply oxygen to the blood. The swelling makes it that much more difficult for oxygen to swim across the mucous membrane. The swelling and the impaired flow of oxygen can cause those areas in the lungs to fill with fluid, pus and dead cells. Pneumonia, an infection in the lung, can occur. Some people have so much trouble breathing that they need to be put on a ventilator. In the worst cases, known as Acute Respiratory Distress Syndrome (ARDS), the lungs fill with so much fluid that no amount of breathing support can help, and the patient dies.



Why are antibiotics not effective in treating COVID-19?

When we have bacterial or viral infection, usually three types of cure agents are used – antibiotics, antivirals and vaccines. All these three agents identify the germs and kick them out from the human body. Antibiotics can prevent us from bacterial disease but do not work against viruses. COVID-19 is a viral disease, therefore antibiotics don't work. This medicine should not be used for novel coronavirus prevention or treatment. But if the doctors diagnose a bacterial co-infection in the COVID-19 patient, then as per the discretion of the doctor, antibiotics may be given.

#CSIRFightsCovid19

CSIR has mounted a strategic, well-coordinated and integrated approach towards mitigating the Coronavirus outbreak ranging from containing the spread of the virus by providing sanitisation and disinfection solutions to equipping the frontline workers and health warriors with protective gear, and from exploring repurposing of existing drugs to discovering new drugs and vaccines. Some major developments this week.

- CSIR-IGIB has developed a low-cost, paper-strip coronavirus test which can detect the virus within an hour. The paper-strip test, which utilises CRISPR-Cas9, is not only cost-effective – costs Rs 500 as compared to the PCR test being currently used and which costs Rs 4500 – it does not need dedicated machinery or specialised skill.
- CSIR-IICT has developed key starting material for Remdesivir, a drug that has recently received FDA approval for emergency use for COVID-19 patients.
- CSIR-IICT has also developed a synthetic process for development of another promising drug Favipiravir and transferred it to Cipla.
- TATA and CSIR have a started a pilot project in Kolar with support of the Karnataka Government, NIMHANS, and THSTI for Sentinel testing and Random testing to determine accurate risk stratification at the community level.
- Sixteen CSIR labs have been approved to carry out testing for COVID-19. By virtue of CSIR's direct efforts nearly 4000 samples have been tested so far.
- CSIR-CCMB and CSIR-IGIB are training health workers in conducting Coronavirus testing.
- CSIR has taken a major initiative to pursue convalescent plasma therapy. The West Bengal State Govt. approved the proposal of CSIR-IICB for Convalescent Plasma Therapy programme on April 9, 2020.
- CSIR is jointly working with the Ministry of AYUSH to explore natural products like *Glycyrrhiza glabra*, *Tinospora cordifolia* and *Withania somnifera* that can be used in treatment of COVID-19.

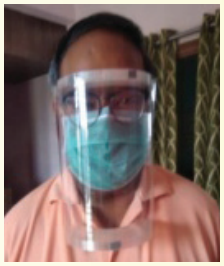
- CSIR-IMMT has developed a hands-free hand sanitising system mechanically operated by foot for dispensing liquid soap.
- CSIR-CSIO has developed a "Foot Controlled Water Tap" for delivering water from a plumbing system using foot to avoid transfer of germs/microbes.

- CSIR-CSIO has developed an Electrostatic Disinfection Spray Machine that can disinfect any surface, place or object and can be used in public places, bus stands, and airports. The technology has been transferred to BHEL for large-scale manufacturing.
- CSIR-CMERI's Disinfection Walkway can be deployed at critical locations with a considerable amount of footfall.

- CSIR-CMERI's Road Sanitiser Unit utilizes a 3000 litre tank with a pump of 22 LMP to sanitise a road stretch of upto 50 km.
- CSIR-NAL has developed the Bi-Level Positive Airway Pressure (BiPAP) ventilator for critical COVID-19 patients.

- CSIR-CSIO has designed an easy to fabricate Face Shield with minimum investment in materials and machines. The design is ergonomic with universal head size adaptability, avoids fogging, is ultra light weight and provides ample room for wearing eye glasses.

- Scientists of CSIR-CSMCRI have used 3D printing technology to make protective face shields for doctors and paramedics attending to COVID-19 patients.

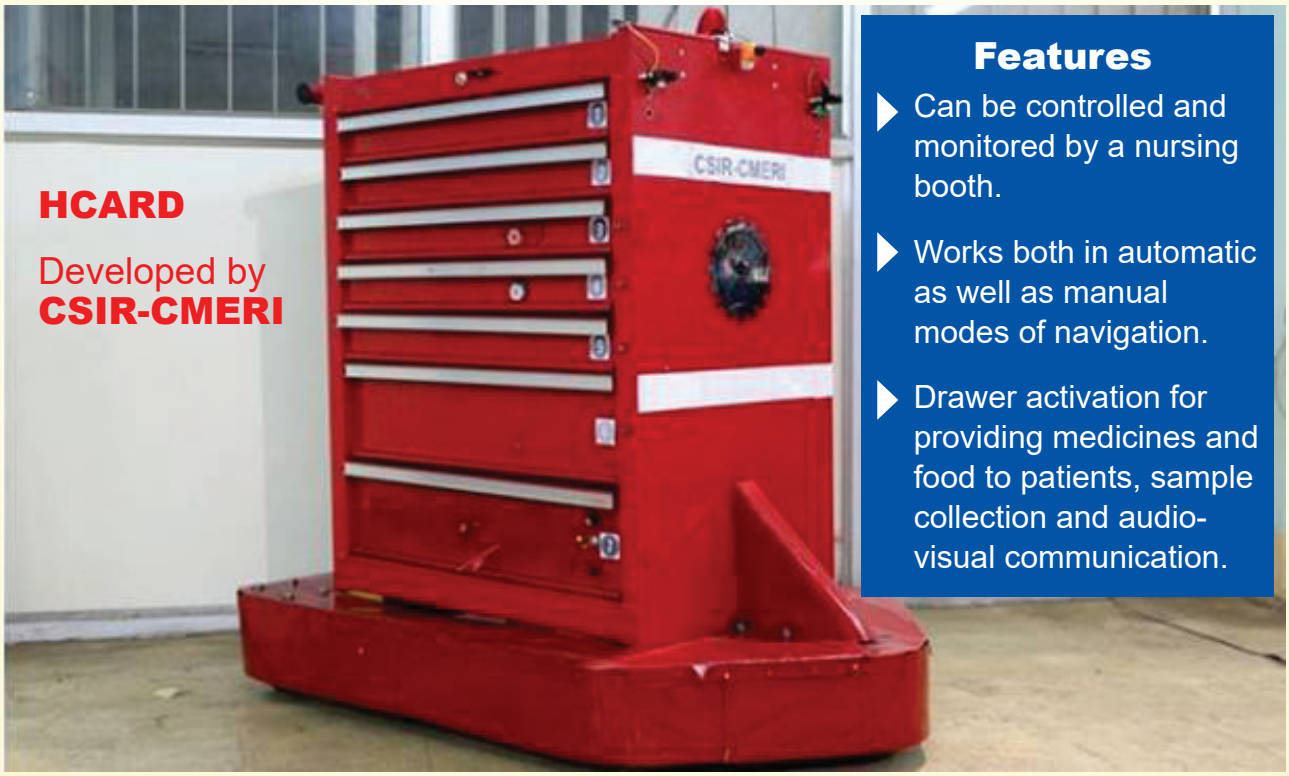


- CSIR-NCL has initiated collaboration with Bharat Electronics Ltd (BEL) for the assembly/manufacture of contact-less digital IR thermometer and Oxygen enrichment device.

- CSIR-NAL Bengaluru has developed a coverall protective suit for protection of healthcare workers. The polypropylene spun laminated multi-layered non-woven fabric has been developed in collaboration with MAF Clothing and has undergone stringent testing. MAF Clothing intends to manufacture 30,000 units per day of the cost-effective protective coverall.

- CSIR-CRRI has come up with an app called Kisan Sabha to resolve the problems related to the agricultural supply chain due to the lockdown. The Kisan Sabha acts as a single stop for every entity related to agriculture, be they farmers who need a better price for the crops or mandi dealers who want to connect to more farmers or truckers who invariably go empty from the mandis. The App also works for people in the agriculture services sector such as dealers of fertilizers/pesticides, who can reach out to more farmers for their services.

- HCARD, a robotic device, reduces the risk for healthcare workers at hospitals taking care of those infected by COVID-19. HCARD, short for Hospital Care Assistive Robotic Device, can help frontline healthcare workers in maintaining physical distance from those infected by coronavirus. Developed by the Durgapur-based CSIR-CMERI,



the device works both in automatic as well as manual modes of navigation. It can be controlled and monitored by a nursing booth with a control station having such features as navigation, drawer activation for providing medicines and food to patients, sample collection and audio-visual communication. The cost of this device is less than Rs 5 lakh and the weight is less than 80 kilograms.

- CSIR labs have manufactured and distributed more than 50000 litres of hand sanitisers and disinfectants among more than 100,000 migrants,

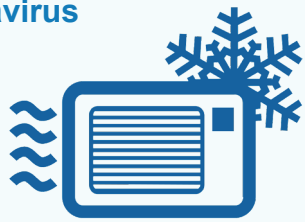
and personnel belonging to police, municipal corporations, electricity supply undertakings, medical colleges, hospitals, panchayats, and banks.

- CSIR labs distributed ready-to-eat food, peanut bars, multigrain energy bars, high-protein biscuits, and nutrifruit bars to more than 100,000 migrant labourers, patients, doctors and police personnel in various parts of the country.
- CSIR-CFTRI supplied 500 kg of high protein biscuits and 500 kg of high-protein rusks to the All India Institute of Medical Sciences, New Delhi for recuperating COVID-19 patients, on special request from the AIIMS.

COVID-19 MYTHBUSTERS

MYTH ✗

Air-conditioners can spread the coronavirus

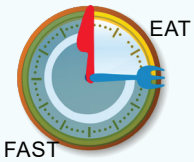


FACT ✓

Current understanding is that single-room air conditioners may not spread the virus, if they are well maintained and their outdoor parts are in properly ventilated areas. It is not clear yet how SARS-CoV-2 moves through centralized air cooling systems.

www.indscicov.in

Fasting reduces chances of getting infected by coronavirus



The coronavirus enters the body through the respiratory tract. Fasting will not stop it from entering anyway.

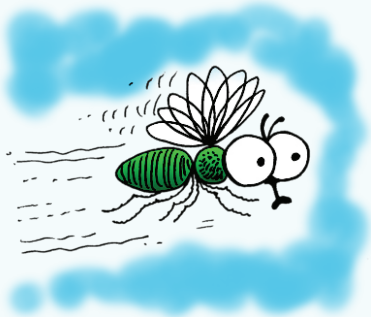
www.indscicov.in

Adding pepper to your meals prevents COVID-19

Hot peppers in your food, though very tasty, cannot prevent or cure COVID-19. The best way to protect yourself against the new coronavirus is to keep at least 1 metre away from others and to wash your hands frequently and thoroughly. It is also beneficial for your general health to maintain a balanced diet, stay well hydrated, exercise regularly and sleep well.

www.who.int

COVID-19 is transmitted through houseflies



To date, there is no evidence or information to suggest that the COVID-19 virus is transmitted through houseflies. The virus that causees COVID-19 spreads primarily through droplets generated when an infected person coughs, sneezes or speaks. You can also become infected by touching a contaminated surface and then touching your eyes, nose or mouth without washing your hands.

www.who.int

MYTH ✗

Exposing yourself to the sun or temperatures prevents coronavirus infection

FACT ✓

You can catch COVID-19, no matter how sunny or hot the weather is. Countries with hot weather have reported cases of COVID-19. To protect yourself, make sure you clean your hands frequently and thoroughly and avoid touching your eyes, mouth, and nose.

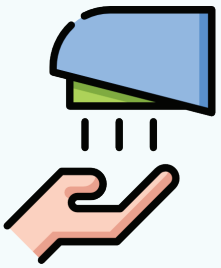
www.who.int

Drinking methanol, ethanol or bleach prevents or cures COVID-19

Methanol, ethanol, and bleach are poisons. Drinking them can lead to disability and death. Methanol, ethanol, and bleach are sometimes used in cleaning products to kill the virus on surfaces – you should never drink them. They will not kill the virus in your body and they will harm your internal organs.

www.who.int

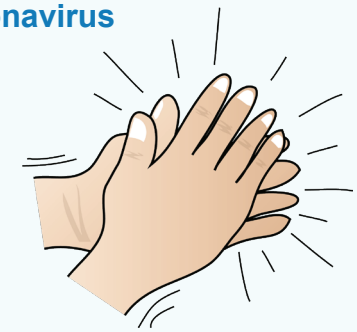
Hand dryers are effective in killing the new coronavirus



No. Hand dryers are not effective in killing the 2019-nCoV. To protect yourself against the new coronavirus, you should frequently clean your hands with an alcohol-based hand rub or wash them with soap and water. Once your hands are cleaned, you should dry them thoroughly by using paper towels or a warm air dryer.

www.who.int

Clapping hands together destroys the coronavirus



The frequency of clapping hands is too low (1-10 kHz) to destroy microorganisms. Only ultrasonic waves (>20 KHz) are known to cause damage to bacteria and viruses. Even if many people clap their hands together, the sound energy becomes weaker at a larger distance. Thus, there is no effect of clapping hands together on the coronavirus.

www.indscicov.in