



VIGYAN PRASAR

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# COVID-19

## Science & Technology Efforts in India

In the face of adversity we have a choice - stay updated with scientific facts

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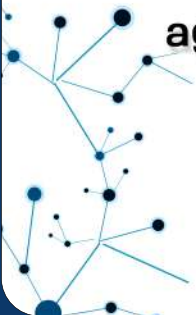
In case of any variance between what has been stated and that contained in the relevant document, the latter shall prevail.

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Although we have made the best effort to keep the information updated, the accuracy, completeness or adequacy of information will depend on what is made available by the third party or the same being up-to-date.

This will depend on the availability of the same. The e-Newsletter is continuously evolving and the aggregation of information is an unceasing process.

The process requires the co-operation of and synergy with all stakeholders.





# PREFACE

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**H**aving fought the pandemic with vigour so far, we cannot afford to be complacent in our fight against the COVID-19 at any cost. The pandemic has highlighted the importance of public health response during health emergencies. During the first wave of COVID-19, patients did not opt for home isolation due to the high fear factor among family members and the community. However, during the second wave, patients went to the hospital only when needed with the unprecedented surge in cases. Patients and families felt psychologically more stable and safer and preferred monitored treatment at home or closer to home. Home-based care under medical officers and health workers' supervision with decentralised and digital management became a reliable solution for timely and appropriate healthcare and averted many deaths. This edition reinforces to make the readers sensitise about the latest developments and provide them with resource materials for better understanding.

Vigyan Prasar continues compiling new information on the pandemic every fortnight to keep the readers constantly aware of the latest developments, with the primary objective of strengthening the usefulness of the data and showcasing the efforts of our scientific communities and institutions in fighting the disease tooth and nail with a singular aim to defeat it once and for all. Hopefully, the coverage about how the country is overcoming challenges with the help of knowledge will instil confidence and trust in the country's scientists and scientific administrators, ultimately resulting in inculcating scientific temper. Together we can, and we will, beat the pandemic, with the collective strengths and spirit of services as the backbone.

We wish an engaging reading to our audience across all strata of the society and look forward to their suggestions and feedbacks at [covidnewsletter@vigyanprasar.gov.in](mailto:covidnewsletter@vigyanprasar.gov.in). Additionally, feedback questionnaires have been included, and a link has been provided for submission. This, in turn, will help our readers in finding desired and more relevant compiled information.

26 November 2021

Vigyan Prasar

New Delhi





The older issues of e-newsletter are available in the Archival Section at <https://vigyanprasar.gov.in/covid19-newsletters/>

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# EFFORTS IMPACTING COVID MITIGATION

**T**he efforts made by various agencies, apex bodies, domain institutions, and so on, which are working in the STI ecosystem towards meeting the requirements posed due to the pandemic are compiled here for the consumption and benefit of the general public. These efforts are presented here in terms of deliverables, outputs, technologies, products, services, etc., which are impactful and bring in STI elements in the activities and initiatives.

## SECTION GUIDELINES

**Merck's anti-COVID-19 pill Molnupiravir is likely to get approval from DCGI**

**DBT sequenced one lakh genome so far in fighting the COVID-19 pandemic**

**Multi-copter DRONE designed and developed by NAL delivers COVID-19 vaccines at remote locations on the outskirts of Bengaluru**

**IIT Roorkee launches website to help people find plasma donors**

**IIT Kanpur makes self-help group to tackle COVID-19**

**ICMR invites Expression of Interest for validation of rapid antigen detection assays for COVID-19**

## Merck’s anti-COVID-19 pill Molnupiravir is likely to get approval from DCGI

With data on over 700 patients submitted, American pharmaceutical giant Merck’s anti-COVID-19 pill Molnupiravir is likely to be given emergency-use approval soon, said the chief of the COVID Strategy Group at the Council of Scientific and Industrial Research (CSIR). The Drugs Controller General of India (DCGI) is currently reviewing clinical data of Molnupiravir for the treatment of COVID-19 in adults in India.

Hailed as a ‘game-changer’, Merck has entered into voluntary licensing agreements with at least eight Indian drug makers, including Cipla, Dr Reddy’s Laboratories, Sun Pharma, Hetero, Aurobindo Pharma, for oral medication. Some of these drug makers have finished conducting the late-stage clinical trials and submitted the data to the country’s apex drug regulator for a marketing nod.

Molnupiravir is the first oral antiviral approved by the UK Medicines and Healthcare Products Regulatory Agency (MHRA) for the treatment of mild-to-moderate COVID-19 in adults. It is under review by the US Food and Drug Administration (FDA) for Emergency Use Authorisation (EUA).

Dr Ram Vishwakarma, chairman of the COVID Strategy Group, CSIR, said Molnupiravir was one of the 24 molecules selected by the institute for repurposing against COVID-19. “Three CSIR institutes have already developed the processes and technologies, which we are ready to share with as Indian pharma companies to add to the capacity of their manufacturing in India,” he said.

The antiviral medication is for the treatment of mild-to-moderate COVID-19 in adults with a positive SARS-CoV-2 diagnostic test and who have at least one risk factor for developing severe illness. The risk factors include obesity, old age (above 60 years), diabetes mellitus and heart disease.

### Website link:

<https://www.csir.res.in/sites/default/files/11%20To%2015%20November%202021.pdf>

<https://sunpharma.com/wp-content/uploads/2021/11/Press-Release-Sun-Pharma-gearing-up-to-introduce-molnupiravir-under-the-brand-name-Molxvir%20AE-in-India.pdf>



## DBT sequenced one lakh genome so far in fighting the COVID-19 pandemic

Union Minister of State (Independent Charge) for Science & Technology, Minister of State (Independent Charge) Earth Sciences, MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh informed that so far one lakh genome and DNA sequencing has been done for COVID-19 by the Department of Bio-Technology (DBT) and five COVID-19 biorepositories while 57,000 samples were made available to academia and industry for R&D and product development.

The Minister was presiding over a high-level meeting to review the current status of COVID-19 research, development of vaccines and other protocols as well as the contribution made in this direction by each of the autonomous institutions of the Department of Biotechnology located in different parts of the country.



### Website link:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1771252>

## Multi-copter DRONE designed and developed by NAL delivers COVID-19 vaccines at remote locations on the outskirts of Bengaluru

National Aerospace Laboratories (NAL), a constituent of CSIR, India has developed an indigenous, medium class BVLOS multi-copter UAV. The UAV is made out of light weight carbon fibre foldable structure for ease of transportation and has unique features like autonomous guidance through dual redundant MEMS-based digital autopilot with advanced flight instrumentation systems.

NAL's octacopter can carry a payload of 15 kg with hovering endurance of 40 minutes. It can fly at an operational altitude of 500 m AGL and at maximum flying speed of 36 kmph. Its regulatory compliance includes DGCA-NPNT, geo-fencing and digital sky with 360 degree collision avoidance, making it one of the best UAVs in its class. Octacopter can be used for a variety of BVLOS applications for last mile delivery like medicines, vaccines, food, postal





packets, human organs, etc. It is integrated with powerful onboard embedded computer and latest generation sensors for versatile applications like agricultural pesticide spraying, crop monitoring, mining survey, and magnetic geosurvey mapping, etc.

CSIR-NAL has teamed with the Department of Health & Family Welfare, Government of Karnataka, for aerial delivery of COVID-19 vaccines in remote areas. The octacopter has successfully delivered 50 vials of COVID-19 vaccines along with syringes in a special container from Chandapura PHC to Haragadde PHC on 13th November 2021. The entire mission has covered a distance of about 14 km in 20 minutes, including delivery of vaccines. Medical Officer Dr Manisha said it usually takes about 30-40 minutes to deliver vaccines to Haragadde from Chandapura by road. The doctors at PHCs were delighted to witness the demonstration of fast and safe aerial delivery of vaccines.

**Website link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1771470>

**IIT Roorkee launches website to help people find plasma donors**

IIT Roorkee, in response to the current situation of COVID-19, has made a website covid19help, an initiative launched by National Service Scheme (NSS), to provide people in need with verified information on plasma donors and help them to connect besides helping citizens of the country find verified leads on plasma donors.





There are two options available on the website: one is for requesting plasma and the other for donating plasma. The interested donors can register on the portal. The COVID-19 recovered patients are encouraged to come forward and donate their plasma for the recovery of infected patients. The portal will also serve as an all-in-one place for the COVID-19 resources. It provides access to myths and truths, along with verified leads across various cities.

**Contact info:**

[covid19help@iitr.ac.in](mailto:covid19help@iitr.ac.in)

**Website link:**

<https://covid19help.iitr.ac.in/>

**IIT Kanpur makes self-help group to tackle COVID-19**

Indian Institute of Technology (IIT) Kanpur has made a self-help group to tackle COVID -19 emergencies in the institute. The aim of this group is to respond to medical emergencies of everyone related to IITK and their families. People can find out about different initiatives launched by this group like information about hospital/ doctors/beds available, quick-response team, online resources and information, and medicine support. People can also consult a doctor through this initiative. Along with that, the public can get other assistance like support groups for people in home isolation, oximeter library, financial assistance, vaccination, and mental health, etc.



**Website link:**

<https://sites.google.com/view/iitk-self-help/home>

**ICMR invites Expression of Interest for validation of rapid antigen detection assays for COVID-19**

ICMR invites applications for validation of rapid antigen detection tests for COVID-19 from all manufacturers who have developed rapid antigen test (RAT) kits. Requirements for validations are based on various categories, like first-time validation, revalidation, and validation with alternate sample types. The gold standard RT-PCR diagnostic test for COVID-19 has limitations in terms of widespread availability. In view of this, there is urgent requirement for reliable and convenient rapid point of care antigen detection assays with high sensitivity and specificity. Such assays could be used as potential diagnostic tests in all possible public and private healthcare settings and made available for mass testing.

Deadline: Open till next announcement

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**Website link:**

[https://www.icmr.gov.in/pdf/tender/Revised\\_EOI\\_for\\_Ag\\_kit\\_validation\\_I3082021.pdf](https://www.icmr.gov.in/pdf/tender/Revised_EOI_for_Ag_kit_validation_I3082021.pdf)

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# RESEARCH SUPPORTS

**T**he scientific approach has driven the ways the country is mitigating the pandemic. Here is an effort to sew up the significant contributions made by STI communities to humankind. The information is most suitable for the research fraternity, for whom the contact information is also provided to communicate further and up-skill the research.

## SECTION GUIDELINES

**IISc research has leads for COVID-19 prognosis and therapy**

**CSIR-CCMB's dry swab RT-PCR test method gets validated**

**IIT Palakkad analyses COVID-19 impact on children suffering from Kawasaki disease**



## IISc research has leads for COVID-19 prognosis and therapy

A recent study, led by Shashank Tripathi from Indian Institute of Science (IISc), Bengaluru reports two novel findings: a specific gene signature in nasal swabs, which can predict COVID-19 severity, and the potential offered by an FDA-approved drug (Auranofin) for COVID-19 therapy.

In the study, the researchers analysed COVID-19 data from nasopharyngeal samples and were able to identify specific genes belonging to the S100 family, which could serve as prognostic markers of severe COVID-19. This gene signature can be detected by RT-PCR in the nasal swabs, which are collected for COVID-19 diagnosis.

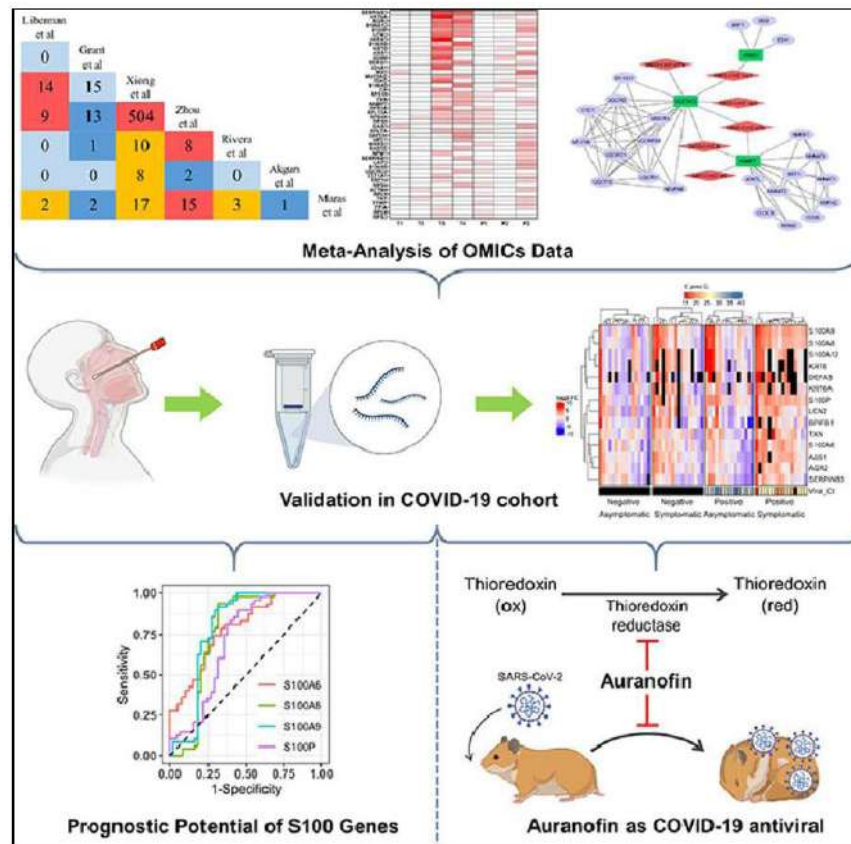
The researchers also identified multiple host processes that may be involved in virus replication and disease progression, and may serve as targets for host-directed therapy. Crucially, a redox regulatory protein called Thioredoxin (TXN) was found to be consistently overexpressed in COVID-19 patients. Auranofin, an FDA-approved drug that targets the enzyme thioredoxin reductase and blocks the thioredoxin pathway, was found to reduce SARS-CoV-2 replication in cell culture as well as in the hamster model. Auranofin is a safe and economical drug used for arthritis treatment. The study, therefore, suggests that it could serve as a promising COVID-19 antiviral.

### Contact info:

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### Website link:

[https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964\(21\)00318-2/fulltext](https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964(21)00318-2/fulltext)



## CSIR-CCMB's dry swab RT-PCR test method gets validated

CSIR-CCMB's novel 'dry swab', extraction-free direct RT-PCR testing method, which has reduced the time taken for the COVID-19 test result to be declared, got further validation with another study highlighting the 'immense' value of the method in the detection of any kind of variant, better sensitivity and illuminating more 'scientific dimensions'.

In the latest issue of Journal of Biosciences, published by the Indian Academy of Sciences, the article, 'Temporal Stability and Detection Sensitivity of Dry Swab Diagnosis' of SARS-CoV-2, authored by scientists CG Gokulan, Uday Kiran, Santosh Kumar K. and Rakesh Mishra of CSIR-CCMB, Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, and Buchmann Institute for Molecular Life Sciences, Goethe University, Frankfurt (Germany), discussed more advantages and scope for commercialisation as it can increase lab throughput by three-fold.

Challenges like reagent shortage, limited human resources and high transmission rate can be handled in a better manner to contain the infection and better allocation of medical resources, as it can quickly diagnose and control the spread. The study on temporal stability of two strains of SARS-CoV-2 at two different temperatures indicates that for shorter distance transportation, cold chain can be avoided and the dry swab samples with low viral load also is stable at RT for 24 hours.

In case of high sample surge, the swabs can be stored at 4°C for up to three days without compromising detection sensitivity. The method is expected to hold similar advantages in case of other emerging variants of SARS-CoV-2 as indicated by multiple sewage surveillance and sequencing studies, it said.

This suggests that while the virus variants could be different with respect to the rate of infection and eliciting immune response, they are generally stable for longer time in different conditions. Throughput of dry swab-based sample processing could be further increased by the collection of samples directly into tubes containing the 'TE-P buffer'. Since no transportation is required, it would increase the turnover time drastically when thousands of samples are being tested.

Data indicates that dry swab method correlates well with the conventional method. Lesser CT values of dry swab samples in comparison to that of the VTM-RNA samples suggest better sensitivity of the method within 48 hours of time. Dry swab samples are also found to be stable at RT for 24 hours and the detection of SARS-CoV-2 RNA by RT-PCR does not show variance from VTM-RNA. This extraction-free, direct RT-PCR method holds phenomenal standing in the present life-threatening circumstances due to COVID-19.

### Website link:

<https://pubmed.ncbi.nlm.nih.gov/34728592/>

## IIT Palakkad analyses COVID-19 impact on children suffering from Kawasaki disease

During the early days of the COVID-19 pandemic, medical doctors in Europe and the US found a small section of young patients either recovered from COVID-19 or previously exposed to SARS-CoV-2 developing a novel multi-systemic disease condition, which has a close resemblance to an earlier-known illness called Kawasaki disease.

Called Multisystem Inflammatory Syndrome in Children (MIS-C) in the US and Paediatric Inflammatory Multisystemic syndrome (PIMS) in Europe, the new condition had several

overlapping symptoms and manifestations similar to that of Kawasaki disease, prompting a section of experts to speculate that both belonged to the same disease spectrum.

IIT Palakkad scientists provide critical analyses on how COVID-19-triggered inflammatory disease in children is different from Kawasaki disease. A team of international researchers led by an Indian scientist, who analysed reports emerging from different labs around the world, has concluded that they are distinctly different diseases even though they share many symptoms and elicit a somewhat similar immune response. They also found that Kawasaki disease and MIS-C have varying degrees of hyper inflammation and misdirected immune responses.

**Contact info:**

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**Website link:**

<https://iitpkd.ac.in/news/team-led-iit-palakkad-scientist-provide-critical-analyses-how-covid-19-triggered-inflammatory>

<https://www.nature.com/articles/s41584-021-00709-9>







# 3

## COVID RESOURCES AND OUTREACH

**T**he efforts made by multiple agencies and institutions in compiling the information, releasing the knowledge products in print or digital form, and reaching out to multiple target audiences are gathered here for one point, ready-to-use evidence. These include resource books, newsletters, magazines, exclusive editions, and so on.

### SECTION GUIDELINES

**NITI Aayog releases compendium of best practices on home-based management of COVID-19**

**Kernel – IISc, Bengaluru’s research newsletter covers latest research on COVID-19**

**CSIR bulletin on COVID news and updates about the pandemic**

**IIT Madras, IISc and ISI collaborate with Semantic Web India to upgrade COVID-19 data website**

**Initiative by myGOV to engage the general public in thanking the healthcare workers**

**Union Health Ministry organises national webinar for media to further strengthen awareness about the month-long Har Ghar Dastak campaign**

**INSA released white paper on COVID-19 immunity and vaccines**

**IIT Mandi, by comparing India and the US, presents a COVID-19 research paper at UNESCO on social science elements**

**myGOV reaches out to citizens by inviting blogs for the largest vaccination drive**

**IIT Kanpur develops an information resource on its research efforts to combat COVID-19**

**Government of India presents a regular COVID-19 India factsheet and immunisation programme**

**Outreach initiatives by India Science OTT Channel**

**Press Information Bureau releases daily bulletin on COVID-19**

**Outreach initiatives through India Science, Technology and Innovation (ISTI) Web Portal**

**COVID-19: Science & Technology Efforts in India – An information resource on the pandemic**

## NITI Aayog releases compendium of best practices on home-based management of COVID-19

NITI Aayog has released Home-Based Management of COVID-19, a compendium of best practices adopted by states to combat the pandemic. The report was launched by its Vice-Chairman Dr Rajiv Kumar, Member (Health) Dr Vinod K Paul, CEO Amitabh Kant, and Additional Secretary Dr Rakesh Sarwal.

The compendium presents a holistic picture of various home-based care models adopted by the states and summarises basic principles and practical recommendations. Several of these successful strategies can be replicated and scaled up.

Over the past two years, the country has been facing an unprecedented public health crisis in the form of COVID-19. Since the onset of the pandemic, state governments have responded with various innovative measures to contain the spread of the virus. The changing dynamics of the COVID-19 infection called for early identification, remote monitoring, and appropriate referral mechanism to reduce the number of severe cases and deaths. This led to the formulation of a 'home-based care model for COVID-19'.

### Why home-based care?

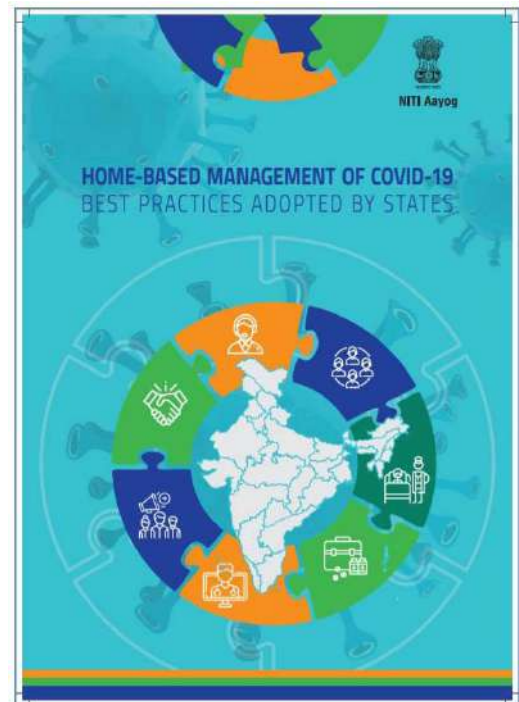
Home-based care is a low-cost model and can reach many people at the same time with the help of digital tools such as telemedicine/call centres/apps, etc. It has emerged as an important pillar of pandemic management. Various home care best practices included in this document have provided holistic support to patients and their families.

However, there could be some limitations if all services are not connected and integrated at all levels and if there are delays in referrals, transportation, and admissions. There is a risk of the spread of infection to family members if protocols are not followed properly. Clear standard operating procedures and triaging are, therefore, extremely critical for efficient home care. Hospitalisation should be accessible at well-functioning referral facilities.

The integrated command and facilitation centres should be flexible, adaptable, and resilient for use in COVID-19, and adaptable non-COVID-19 related services in a quiescent pandemic situation.

Community engagement and management have contributed to the large-scale take-up of home-based care. Local efforts are essential for better case management and for reducing fear and stigma. Community preparedness can help in ensuring that no one is left behind. The practices on home-based care described in this compendium may be adopted, adapted, and replicated by the states/UTs for scale-up in respective contexts, building on their experiences.

This compendium aims to provide information focused on sustainability and scalability of home-based care models adapted by various



states of India. This document will act as an essential knowledge resource for the stakeholders from other low- and middle-income countries (LMICs) across the globe and will go a long way in strengthening the battle against COVID-19 and similar pandemics in the future. The compendium will provide strategic direction to decision-makers for designing sustainable healthcare models at the national and sub-national levels.

**Contact info:**

[healthdiv-pc@gov.in](mailto:healthdiv-pc@gov.in)

**Website link:**

<https://www.niti.gov.in/sites/default/files/2021-11/State-practices-on-home-based-care-forCOVID-19.pdf>

**Kernel – IISc, Bengaluru’s research newsletter covers latest research on COVID-19**

The IISc is India’s premier destination for science and engineering. Research at IISc spans six divisions and is distinctively interdisciplinary. Kernel, a monthly magazine that showcases the institute’s significant research contributions, is published as a monthly digest in its new avatar, providing snapshots of recent researches and initiatives.

Despite their limitations, models and simulations are useful for tracking the spread of a pandemic like COVID-19. In this issue of Kernel, read more about such tools developed by IISc researchers to gain deeper insight into disease transmission.

**Contact info:**

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**Website link:**

<https://kernel.iisc.ac.in/wp-content/uploads/2021/11/Kernel-Issue-8-2021.pdf>



**CSIR bulletin on COVID news and updates about the pandemic**

CSIR was at the forefront of the battle against COVID-19 pandemic. It also put in place measures to counter the infodemic. CSIR-In-Media is a weekly newsletter published by CSIR magazine that showcases the institute’s significant research contributions.



**Website link:**

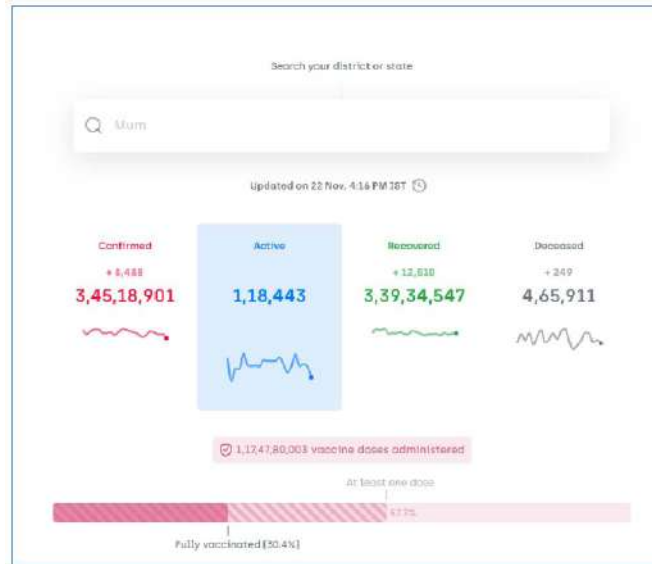
<https://www.csir.res.in/news-bulletin>



## IIT Madras, IISc and ISI collaborate with Semantic Web India to upgrade COVID-19 data website

Indian Institute of Technology Madras (IIT Madras), Centre for Networked Intelligence at Indian Institute of Science (IISc), Indian Statistical Institute (ISI), and Semantic Web India, a private technology firm based in Bengaluru, have joined hands to help continue the efforts of a critical COVID-19 Data Website, which was operated by a group of volunteers and has now shut down.

The previous website, Covid19India.org, offered a comprehensive view of the pandemic across India by providing data on confirmed cases, active and recovered cases, tests and fatalities. The portal also recently started showing vaccination administration status for single-dose and fully vaccinated. The website, which was run until now by volunteers based on a crowd-sourcing model, provided valuable data to the public and researchers studying the pandemic.



The new public repository is currently being hosted at [www.incovid19.org](http://www.incovid19.org).

### Contact info:

[contact@incovid19.org](mailto:contact@incovid19.org)

### Website link:

<https://iisc.ac.in/news-events/iisc-in-the-news/>

## Initiative by myGOV to engage the general public in thanking the healthcare workers

As the second wave of COVID-19 once again tests India's strength and dedication in defeating coronavirus, doctors, nurses and frontline workers have isolated themselves away from their families and have been working day and night to battle the atrocities of the raging pandemic. To make their job easier, people can support them by following COVID-appropriate behaviour and take out time to say a heartfelt 'thank you'.

To make them feel valued, myGOV has started an initiative for healthcare workers, for which you have to first join the Thank You Healthcare Workers Initiative and share your appreciation message.



Last date: 31 December 2021

**Website link:**

[https://www.mygov.in/group-issue/lets-thank-our-healthcare-workers/?target=inapp&type=group\\_issue&nid=309871](https://www.mygov.in/group-issue/lets-thank-our-healthcare-workers/?target=inapp&type=group_issue&nid=309871)

**Union Health Ministry organises national webinar for media to further strengthen awareness about the month-long Har Ghar Dastak campaign**

A national interactive webinar was organised for the media by the Union Ministry of Health & Family Welfare (MoHFW) to further strengthen awareness about the month-long Har Ghar Dastak campaign. The campaign aims to ensure that the entire adult population is covered with the first dose of COVID-19 vaccine, while those who are due for the second doses are also motivated to take the same. Har Ghar Dastak, which means knocking at every door, aims to reach out to those eligible adults who have either not taken their first dose or for some reason have missed their second dose. Healthcare workers will conduct door-to-door vaccinations of eligible people across India with special focus on districts where less than 50 per cent of the eligible population has been vaccinated.

The interactive webinar was addressed by Dr. Manohar Agnani, Additional Secretary, MoHFW. He said that going by India’s current vaccination pace we can claim with confidence that the world’s largest adult vaccination programme is well on track since its launch on 16th January 2021. To date, about 79 per cent of the eligible population in India has been vaccinated against COVID-19 with the first dose, while another 38 per cent have been fully vaccinated. In several



states, 100 per cent of the adult population has received the first dose of the vaccine. He expressed confidence that with India's current vaccine delivery capacity, the entire adult population will soon be covered.

While enthusiasm for vaccines has been growing fast, the last mile coverage comes with its own set of unique challenges. There could be several reasons for some people not taking the vaccine, including accessibility issues for those living in remote areas, the continuing fear of side effects and lingering vaccine hesitancy in some communities. Dr Agnani observed that through this campaign, the country's frontline health workers are addressing several such issues on the ground that are preventing people from taking the COVID-19 vaccine. The campaign also envisages collaboration with local religious and community leaders and other agencies and organisations, such as Central Statistics Office (CSO), non-government organisations, NSS, etc., to motivate people who have not taken their vaccine. Multimedia information, education and communication (IEC) campaign will be designed to counter anti-vaccine rumours and to emulate innovative approaches and practices followed by high coverage districts within the states/UTs.

While addressing queries from the participating mediapersons, Dr Agnani stressed on the importance of taking both the vaccine doses. He also urged them to motivate people through positive stories. Thanking the media for their continued support, he requested them to help fight the last vestiges of lingering hesitancy in some pockets of the country.

**Website link:**

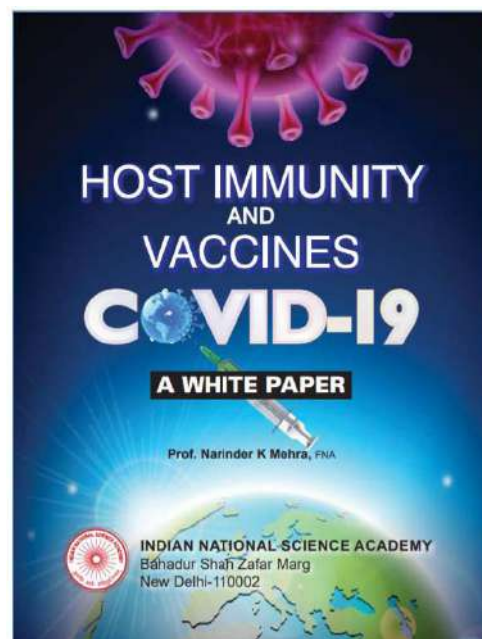
<https://pib.gov.in/PressReleasePage.aspx?PRID=1771292>

**INSA released white paper on COVID-19 immunity and vaccines**

Globally, the year 2020 witnessed a huge surge in infections across all age groups, with a substantial number of patients becoming seriously ill leading to high mortality. Due to its recent association with humans, the SARS-CoV-2 may not yet have been fully adapted to the human host. This has led to the speculation that the virus may be evolving continuously towards even higher transmissibility.

It is now clear that COVID-19 is a droplet infection, driven largely by human-to-human transmission, forcing public health officials to announce wearing face mask, frequent hand wash and practicing social distancing as the most effective ways to drive down the virus's reproductive numbers.

The world over, the scientific community quickly got together in an exemplary international effort to develop effective countermeasures against the virus, including robust diagnostics, novel treatment strategies and efficacious vaccines. There has been an unprecedented growth in scientific enquiry about various facets of the causative organism, underlying pathogenetic mechanisms, host immunity, epidemiology and clinical trials using new and repurposed drugs as well as scores of vaccines. The data generated so far has been particularly helpful in forecasting the disease outcome and for developing effective strategies of control.



The white paper released by Indian National Science Academy (INSA) is a comprehensive treatise with focus on host immunity, vaccines and ethical aspects of COVID-19 – the most significant pandemic that the human race has faced in recent times, leaving no country untouched. There are eight chapters, written in easy-to-understand format and contributed by biomedical scientists of notable eminence having made significant contributions in diverse areas of medicine and biology.

**Contact info:**

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**Website link:**

[https://www.insaindia.res.in/pdf/Host\\_Immunity\\_Vaccines\\_Covid19.pdf](https://www.insaindia.res.in/pdf/Host_Immunity_Vaccines_Covid19.pdf)

**IIT Mandi, by comparing India and the US, presents a COVID-19 research paper at UNESCO on social science elements**

The French Presidency of the Bureau of the Intergovernmental Council (IGC) of UNESCO’s Management of Social Transformations (MOST) Programme organised a symposium, titled ‘Social Sciences and the COVID-19 Pandemic: State of Knowledge and Proposals for Action’, on 21st and 22nd October 2021. The symposium focused on the use of social science research in the management of health crises. The paper, titled, ‘Risk Perception, Fear, Social Distancing, Masks, and Treatments Regarding COVID-19 in India and the United States of America’, presented by Dr Varun Dutt, Associate Professor, IIT Mandi, highlighted the attitudes of people of India and the USA towards risk perception, fear, social distancing, mask-wearing, and treatments during the COVID-19 pandemic. Some of the salient points from the presentation involving 405 respondents across India and the USA are the following: risk perception, fear, social distancing, mask wearing, and treatments.



**Website link:**

[https://www.iitmandi.ac.in/news/articles/files/COVID19\\_Colloquium\\_oct2021.pdf](https://www.iitmandi.ac.in/news/articles/files/COVID19_Colloquium_oct2021.pdf)

**myGOV reaches out to citizens by inviting blogs for the largest vaccination drive**

myGOV is inviting blogs from Indian citizens for the largest vaccination drive in the country. It is inviting citizens from all walks of life to share a blog write-up of 500 words. The topics are as follows:

1. Overcoming vaccine hesitancy
2. Getting Covaxinated (COVID vaccine) is important
3. Key to a successful COVID-19 inoculation drive

The blog write-up should be in any of the two formats – word/pdf and the writer should not imprint or watermark the entry. Entries are to be submitted online only. Any other medium/ mode will not be considered for evaluation.





Last date: 31 December 2021

**Website link:**

<https://www.mygov.in/task/inviting-blogs-mygov-citizens-largest-vaccination-drive/?target=inapp&type=task&nid=309211>

**IIT Kanpur develops an information resource on its research efforts to combat COVID-19**

IIT Kanpur (IITK) is working round-the-clock to combat the COVID-19 pandemic. Its researchers have been assiduously working to develop a rapidly scalable range of products and services for COVID-19 prevention, protection, and management. It has given the complete information about its products and researchers in one document containing all necessary information about all products. These products and services are classified under five major heads: Modelling for COVID-19 Trajectory Prediction, Critical Treatment Personal Protection & Primary Healthcare, Disinfection & Sanitization, and Autonomous Services. IIT Kanpur played a central role in the development of the SUTRA model for predicting the trajectory of the COVID-19 pandemic. The model predicted a peak for India in mid-May and for UP in April-end. A portal was developed for oxygen consumption in 56 hospitals of the state in which data was updated every day. Apart from this, it has also developed an invasive ventilator, SIR (susceptible infected-removed) model, oxygen generator and ventilator, pressure respirator system, reusable N95 and N99 masks, protective equipment, fake news verification app, disinfection system, smart bin system, and many more products.



**Website link:**

<https://www.iitk.ac.in/new/data/innovations-on-covid-19.pdf>

## Government of India presents a regular COVID-19 India factsheet and immunisation programme

Government of India has provided, through the free-of-cost category and direct-state procurement category, around 120 crore vaccine doses (1,19,38,44,741) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 25th November 2021, 08:00 AM, it stands at 3,45,44,882 cases, of which 3,39,67,962 have recovered. The recovery rate stands at 98.33 per cent while the case fatality rate stands at 1.35 per cent.



Website link:

<https://www.mygov.in/covid-19>

## Outreach initiatives by India Science OTT Channel

India Science is an Internet-based Over-The-Top (OTT) science TV channel. An initiative of the Department of Science and Technology (DST), Government of India, it is implemented and managed by Vigyan Prasar (VP), an autonomous organisation of the DST. This 24x7 video platform is dedicated to science and technology knowledge dissemination, with a strong commitment to spreading scientific awareness, especially with Indian perspectives, ethos and cultural milieu. The initiative is supported by the National Council of Science and Technology Communication (NCSTC), DST.

Science and technology are the main driving forces of the nation and fundamental to progress and growth. So, the advantages of science and technology must reach all sections of the society through popular media of communication. India's large Internet user base of 500 million is split between 305 million urban Indians and 195 million rural Indians, all of whom need to be reached with authentic science and technology content. And to do so, the Internet is fast becoming the most accessible and preferred media for content delivery.



Since the occurrence of COVID-19, India Science has been working tirelessly to connect with the people, in the form of regular bulletins, documentaries, interviews, bytes and live sessions of scientists, doctors, experts, science administrators and policymakers. The following is a brief account of the information products produced by India Science:

1. Weekly COVID-19 video bulletin: Produced in both Hindi and English on a weekly basis from 7th July 2020, COVID-19 bulletin appries the audience about the latest developments happening in the S&T scenario in India that are helping in managing and overcoming the challenges thrown up by the pandemic. Vigyan Prasar produced a daily COVID-19 bulletin from 11th April to 6th July 2020. Thereafter, a weekly bulletin is being produced, which provides details about the most important S&T updates from the country related to COVID-19. From January 2021 onwards, the COVID-19 bulletin carried news about the vaccination drive initiated by the Government of India.
2. COVID-19 Explained: Short films to explain the important research findings related to COVID-19 and COVID-19 vaccination in layman's language are produced on a weekly basis. The topics chosen for COVID-19 Explained cater to the curiosity of the common man towards the pandemic.
3. Facebook live sessions on interviews of various stakeholders on COVID-19 vaccination programme.
4. Facebook and India Science live sessions on interviews with experts on COVID-19 vaccination.
5. Live phone-in programme: A live phone-in programme on COVID-19 vaccination is telecast from India Science on every Monday and Tuesday. Experts from the field give answers to the questions related to COVID-19 vaccination received from the audience.
6. India Science started 'Corona Ko Harana Hai' from April 2021. In this programme, India Science team conducts interviews on COVID-19-related different issues with top medical professionals of the country.
7. India Science makes infographics on COVID-19-related different issues regularly.
8. COVID-19 vaccine: Fact File also telecast every Saturday from India Science.

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<https://www.indiascience.in/>

**Press Information Bureau releases daily bulletin on COVID-19**

Press Information Bureau (PIB), Government of India, releases a daily bulletin on COVID-19, starting from the early days of the pandemic outbreak. The bulletin contains press releases



117.63 cr vaccine doses have been administered so far under Nationwide Vaccination Drive  
 Recovery Rate currently at 98.32%; Highest since March 2020  
 12,202 recoveries in the last 24 hours increases Total Recoveries to 3,39,46,749  
 7,579 new cases in the last 24 hours; lowest in 543 days  
 India's Active caseload stands at 1,13,584; lowest in 536 days  
 Active cases account for less than 1% of total cases, currently at 0.33%; Lowest since March 2020  
 Daily positivity rate (0.79%) less than 2% for last 50 days  
 Weekly Positivity Rate (0.93%) less than 2% for last 60 days  
 63.34 cr Total Tests conducted so far

concerning COVID-19, issued in the last 24 hours, inputs from PIB field offices, and fact checks undertaken by PIB. These bulletins are published in 14 languages: Hindi, English, Urdu, Marathi, Telugu, Tamil, Punjabi, Bangla, Kannada, Oriya, Gujarati, Assamese, Malayalam and Manipuri. The following data points were released on 23rd November 2021.

**Website link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1774384>

**Outreach initiatives through India Science, Technology and Innovation (ISTI) Web Portal**

The India Science, Technology and Innovation Portal (ISTI) is a one-stop window for information about developments in India on science, technology, and innovation. The vision is to provide a single-window source of information on a web portal about all data related to the Indian STI ecosystem by aggregating data on scientific inputs and outputs, bringing stakeholders together and disseminating science, technology and innovation content. The portal focuses on bringing all stakeholders and Indian STI activities on a single online platform; helping efficient utilisation of resources; highlighting functioning of scientific organisations, laboratories and institutions; aggregating information on science funding, fellowship and award opportunities spanning from school to faculty level; pooling together conferences, seminars and events; and projecting science in India with its significant achievements. The ISTI web portal has been developed by Vigyan Prasar, an autonomous organisation of the DST.

In the critical times of the outbreak of the COVID-19, the web portal serves as a one-stop online information guide to bring together a collection of resources in response to the pandemic. These resources are generated by efforts made by numerous initiatives and schemes taken up by several departments and ministries of the Government of India and a host of institutions spread across the country. The content presented here relies on the best available scientific understanding of the disease and its transmission.

The web portal provides all information related to COVID-19, from presenting symptoms to vaccine science, distribution strategy, and preventive measures initiated for envisaged future waves. It contains content on fact-checks and myth-busters in question and answer format, contributions from the research fraternity, start-up spotlights, industry collaborations,





communications and resources, reaching out to society and so on. A dedicated focus has been given to exhibiting funding opportunities catering to the second wave of the COVID-19 pandemic.

**Contact info:**

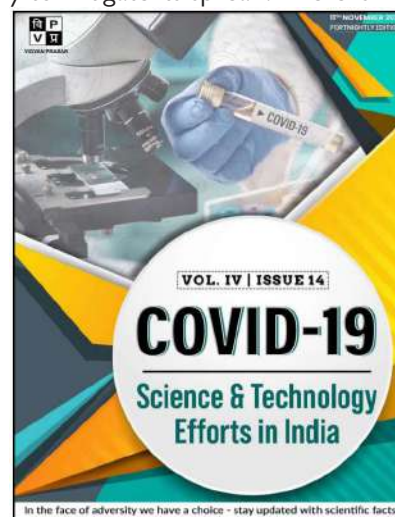
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**Website link:**

<https://www.indiascienceandtechnology.gov.in/>

**COVID-19: Science & Technology Efforts in India – An information resource on the pandemic**

Effective communication is in its own right a non-pharmaceutical intervention for any epidemic that can increase adherence to protective behaviours necessary to mitigate its spread. There is no ‘best practice’ for communication during a complex public health emergency, but past experiences have led to several principles that contribute to a successful strategy. India is fighting the second wave of the COVID pandemic with a lot of resilience and grit. A very encouraging and precise trend is now visible as the positivity rate is declining rapidly. In 2020, India dealt with the first wave of the COVID-19 pandemic with collective measures, scientific approaches, and awareness. The intelligent use of technology and well-planned resource allocation to tackle the new wave of the pandemic has been dealt with on a war footing. The newsletter – COVID-19: Science & Technology Efforts in India – is being compiled to inform our readers and strengthen the usefulness of any published information.



To bridge the gap between scientific contributions, leadership and administrative efforts, and the general public’s perspective, Vigyan Prasar is continuously reaching out to its audiences by way of a regular e-newsletter, taking its mandate of science communication, popularisation and extension to the next level. Our effort is firmly based on the fact that “Science gathers knowledge faster than society gathers wisdom.” The steady increase in the number of recoveries and the significant and continuous decrease in positivity rate provide us with the much-needed assurance that this may be the outcome of improving the health infrastructure and making health the cornerstone at the policy level. The e-Newsletter aims to be a handy guide to scientists, researchers, and scholars, especially those interested.

The latest edition was digitally published on 11th November 2021.

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**Website link:**

<https://www.indiascienceandtechnology.gov.in/covid-19-the-pandemic/newsletter-archive>



# COVID-19 SCIENCE & TECHNOLOGY EFFORTS IN INDIA



# 4

## COVID FACT-CHECKS

**T**his section attempts to answer frequently asked questions (FAQs) on various aspects of the COVID-19 disease, variants and mutants, associated illnesses and diseases, riding the second wave, assumptions on future waves, and, subsequently, busting the myths spread in the society.

### SECTION GUIDELINES

1. SARS-CoV-2 surveillance in India
2. Delta and Delta Plus variants
3. COVID-19 vaccination for pregnant women
4. The third wave of COVID-19 in India and protecting children
5. COVID-19 and White Fungus infection
6. Related to use of oxygen during current COVID-19 pandemic
7. Related to drugs and medications to fight the disease
8. Related to Black Fungus and COVID-19 disease
9. Related to indoor air and COVID-19 disease

## I. SARS-CoV-2 surveillance in India

### Q. What is INSACOG?

**A.** The Indian SARS-CoV-2 Genomics Consortium (INSACOG) is a national multi-agency consortium of Regional Genome Sequencing Laboratories (RGSLs) established by the Government of India on 30th December 2020. Initially, this consortium had 10 laboratories. Subsequently, the scope of laboratories under INSACOG was expanded and at present there are 28 laboratories under this consortium, which monitor the genomic variations in SARS-CoV-2.

### Q. What is the objective of INSACOG?

**A.** The SARS-CoV-2 virus, commonly known as COVID-19 virus, posed unprecedented public health challenges globally. To fully understand the spread and evolution of this virus, its mutations and resulting variants, the need for in-depth sequencing and analysis of the genomic data was felt. Against this backdrop, INSACOG was established to expand whole genome sequencing of SARS-CoV-2 virus across the nation, aiding understanding of how the virus spreads and evolves. Any changes to the genetic code, or mutations in the virus, can be observed based on the analysis and sequencing of samples done in the laboratories under INSACOG. INSACOG has the following specific objectives:

- To ascertain the status of variants of interest (VoI) and variants of concern (VoC) in the country
- To establish sentinel surveillance and surge surveillance mechanisms for early detection of genomic variants and assist in formulating effective public health response
- To determine the presence of genomic variants in samples collected during super-spreader events and in areas reporting increasing trend of cases/deaths, etc.

### Q. When did India start SARS-CoV-2 viral sequencing?

**A.** India started sequencing SARS-CoV-2 viral sequencing of genomes in 2020. Initially, National Institute of Virology (NIV) and Indian Council of Medical Research (ICMR) sequenced samples of international passengers who arrived in India from the UK, Brazil or South Africa or transited through these countries, which reported a sudden surge in cases. RTPCR positive samples from states reporting sudden surges in cases were sequenced on priority. This was further expanded through the efforts of Council of Scientific and Industrial Research (CSIR), Department of Biotechnology (DBT) and National Centre for Disease Control (NCDC), as well as individual institutions.

The initial focus of India was on restricting the spread of global variants of concern in the country – Alpha (B.1.1.7), Beta (B.1.351) and Gamma (P.1) – which had high transmissibility. The entry of these variants was carefully tracked by INSACOG. Subsequently, the Delta and Delta Plus variants were also identified based on whole genome sequencing analysis conducted in the INSACOG laboratories.

### Q. What is the strategy for SARS-CoV-2 surveillance in India?

**A.** Initially, genomic surveillance was focused on the variants carried by international travellers and their contacts in the community through sequencing three to five per cent of the total RTPCR positive samples.

Subsequently, the sentinel surveillance strategy was also communicated to the States/UTs in April 2021. Under this strategy, multiple sentinel sites are identified to adequately represent the



geographic spread of a region, and RT-PCR positive samples are sent from each sentinel site for whole genome sequencing. Detailed Standard Operating Procedures (SOPs) for sending samples from the identified sentinel sites regularly to the designated RGSLs were shared with States/UTs. The list of INSACOG RGSLs tagged to States was also communicated to the States. A dedicated nodal officer was also designated by all States/UTs for coordinating the activity of whole genome sequencing.

1. Sentinel Surveillance (for all States/UTs/): This is an ongoing surveillance activity across India. Each State/UT has identified sentinel sites (including RT-PCR labs and tertiary health care facilities) from where RT-PCR positive samples are sent for whole genome sequencing.
2. Surge Surveillance (for districts with COVID-19 clusters or those reporting a surge in cases): A representative number of samples (as per the sampling strategy finalised by a state surveillance officer/central surveillance unit) are collected from the districts, which show a surge in the number of cases and are sent to RGSLs.

**Q. What is the standard operating procedure (SOP) for sending samples to INSACOG laboratories?**

**A.** The SOPs for sending samples to INSACOG laboratories and subsequent action based on genome sequencing analysis are as follows:

1. The Integrated Disease Surveillance Project (IDSP) machinery coordinates sample collection and transportation from the districts/sentinel sites to RGSLs. The RGSLs are responsible for genome sequencing and identification of VoCs/Vols, potential Vols, and other mutations. Information on VOCs/ VOIs is submitted to the Central Surveillance Unit, IDSP, to establish clinico-epidemiological correlation in coordination with state surveillance officers.
2. Based on discussions in the Scientific and Clinical Advisory Group (SCAG) established to support the INSACOG, it was decided that upon identification of a genomic mutation, which could be of public health relevance, RGSL will submit the same to SCAG. SCAG discusses the potential Vols and other mutations and, if felt appropriate, recommends to the Central Surveillance Unit for further investigation.
3. The genome sequencing analysis and clinico-epidemiological correlation established by IDSP is shared with MOH&FW, ICMR, DBT, CSIR and States/UTs for formulating and implementing requisite public health measures.
4. The new mutations/VoCs are cultured, and genomic studies are undertaken to see the impact on vaccine efficacy and immune escape properties.

**Source:**

<https://dbtindia.gov.in/pressrelease/qa-indian-sars-cov-2-genomics-consortium-insacog>

**2. Delta and Delta Plus variants**

**Q. Why are frequent mutations seen in SARS-CoV-2 virus? When will the mutations stop?**

**A.** SARS-CoV-2 can mutate due to the following reasons:

- Random error during replication of virus

- Immune pressure faced by the viruses after treatments such as convalescent plasma, vaccination or monoclonal antibodies (antibodies produced by a single clone of cells with identical antibody molecules)
- Uninterrupted transmission due to lack of COVID appropriate behaviour. Here the virus finds an excellent host to grow and becomes more fit and transmissible.

The virus will continue to mutate as long as the pandemic remains. This makes it all the more crucial to follow COVID appropriate behaviour.

## **Q. What are variants of interest (Vols) and variants of concern (VoCs)?**

**A.** When mutations happen – if there is any previous association with any other similar variant, which is felt to have an impact on public health – then it becomes a variant under investigation (Vul).

Once genetic markers are identified, which can have an association with a receptor binding domain or which have an implication on antibodies or neutralising assays, we call them variants of interest (Vols).

The moment we get evidence for increased transmission through field-site and clinical correlations, it becomes a variant of concern (VoC). VoCs are those that have one or more of the following characteristics:

- Increased transmissibility
- Change in virulence/disease presentation
- Evading diagnostics, drugs and vaccines

The first VoC was announced by the UK where it was found. Currently there are four VoCs identified by the scientists – Alpha, Beta, Gamma and Delta.

## **Q. What are Delta and Delta Plus variants?**

**A.** These are the names given to variants of SARS-CoV-2 virus, based on the mutations found in them. The World Health Organization (WHO) has recommended using letters of the Greek Alphabet, i.e., Alpha (B.1.1.7), Beta (B.1.351), Gamma (P.1), Delta (B.1.617), etc., to denote variants, for easier public understanding.

Delta variant, also known as SARS-CoV-2 B.1.617, has about 15-17 mutations. It was first reported in October 2020. More than 60 per cent of cases in Maharashtra in February 2021 pertained to Delta variants.

It is the Indian scientists who identified the Delta variant and submitted it to the global database. The Delta variant is classified as a VoC and has now spread to 80 countries, as per the WHO.

The Delta variant (B.1.617) has three subtypes B1.617.1, B.1.617.2 and B.1.617.3, of which B.1.617.1 and B.1.617.3 have been classified as Vol, while B.1.617.2 (Delta Plus) has been classified as a VoC.

Compared to the Delta variant, the Delta Plus variant has an additional mutation. This mutation is called the K417N mutation. ‘Plus’ means an additional mutation has happened to the Delta

variant. It does not mean that the Delta Plus variant is more severe or highly transmissible than the Delta variant.

**Q. Why has the Delta Plus variant (B.1.617.2) been classified as a VoC?**

**A.** It has been classified as a VoC because of the following characteristics:

- Increased transmissibility
- Stronger binding to receptors of lung cells
- Potential reduction in monoclonal antibody response
- Potential post vaccination immune escape

**Q. How often are these mutations studied in India?**

**A.** Indian SARS-CoV-2 Genomics Consortium (INSACOG), coordinated by the Department of Biotechnology (DBT) along with the Union Health Ministry, ICMR, and CSIR, monitors the genomic variations in SARS-CoV-2 on a regular basis through a pan-India multi-laboratory network. It was set up with 10 national labs in December 2020 and has been expanded to 28 labs and 300 sentinel sites from where genomic samples are collected. The INSACOG hospital network looks at samples and informs INSACOG about the severity, clinical correlation, breakthrough infections and re-infections.

More than 65,000 samples have been taken from states and processed, while nearly 50,000 samples have been analysed of which 50 per cent have been reported to be VoCs.

**Q. On what basis are the samples subjected to genome sequencing?**

**A.** Sample selection is done under three broad categories:

1. International passengers (during the beginning of the pandemic)
2. Community surveillance (where RT-PCR samples report CT value less than 25)
3. Sentinel surveillance where samples are obtained from labs (to check transmission) and hospitals (to check severity)

When there is any public health impact noticed because of genetic mutation, then the same is monitored.

**Q. What is the trend of VoCs circulating in India?**

**A.** As per the latest data, 90 per cent of samples tested have been found to have Delta variants (B.1.617). However, B.1.1.7 strain, which was the most prevalent variant in India in the initial days of the pandemic, has decreased.

**Q. Why is action regarding public health not taken immediately after noticing mutations in the virus?**

**A.** It is not possible to say whether the mutations noticed will increase transmission. Also, until there is scientific evidence that proves a correlation between the rising number of cases and

variant proportion, we cannot confirm there is a surge in the particular variant. Once mutations are found, it is analysed every week to find out if there is any such correlation between the surge of cases and variant proportion. Public health action can be taken only if scientific proofs for such correlation are available.

Once such correlation is established, it will help greatly to prepare in advance when such a variant is seen in another area/region.

### **Q. Do Covishield and Covaxin work against the variants of SARS-CoV-2?**

**A.** Yes, Covishield and Covaxin are both effective against the Alpha, Beta, Gamma and Delta variants. Lab tests to check vaccine effectiveness on Delta Plus variants are ongoing.

Delta Plus variants: The virus has been isolated and is now being cultured at ICMR's National Institute of Virology, Pune. Laboratory tests to check vaccine effectiveness are ongoing and the results will be available in 7 to 10 days. This will be the first result in the world.

### **Q. What are the public health interventions being carried out to tackle these variants?**

**A.** The public health interventions needed are the same, irrespective of the variants. The following measures are being taken:

- Cluster containment
- Isolation and treatment of cases
- Quarantining of contacts
- Ramping up vaccination

### **Q. Do public health strategies change as the virus mutates and more variants arise?**

**A.** No, public health prevention strategies do not change with variants.

### **Q. Why is continuous monitoring of mutations important?**

**A.** Continuous monitoring of mutations is important to track potential vaccine escape, increased transmissibility and disease severity.

### **Q. What does a common man do to protect self from these VoCs?**

**A.** One must follow COVID appropriate behaviour, which includes wearing a mask properly, washing hands frequently and maintaining social distancing. The second wave is not over yet. It is possible to prevent a big third wave provided individuals and society practice protective behaviour. Further, test positivity rate must be closely monitored by each district. If the test positivity goes above 5 per cent, strict restrictions must be imposed.

### **Source:**

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1730875>



### 3. COVID-19 vaccination for pregnant women

#### Q. Why is COVID-19 vaccine being recommended for pregnant women?

**A.** Pregnancy does not increase the risk to COVID-19 infection. Most pregnant women will be asymptomatic or have mild disease, but their health may deteriorate rapidly and that might affect the foetus too. It is important that they take all precautions to protect themselves from COVID-19, including taking the vaccination against the same. It is, therefore, advised that a pregnant woman should take the COVID-19 vaccine.

#### Q. Who are at higher risk of getting infected with COVID-19?

**A.** Higher risk of infection involves with:

- A healthcare worker or a frontline worker
- A community with high or increasing rate of COVID-19 infections
- Those frequently exposed to people outside the household
- Those who have difficulty in complying with social distance if living in a crowded household

#### Q. How does COVID-19 affect the health of a pregnant woman?

**A.** Although most (>90 per cent) infected pregnant women recover without hospitalization, rapid deterioration in health may occur in a few. Symptomatic pregnant women appear to be at increased risk of severe disease and death. In severe disease, like all other patients, pregnant women may also need hospitalisation. Pregnant women with underlying medical conditions, for example, high blood pressure, diabetes, obesity, and age over 35 years are at higher risk of severe illness due to COVID-19.

#### Q. How does COVID-19 infection of pregnant women affect the baby?

**A.** Most (over 95 per cent) of newborns of COVID-19 positive mothers have been in good condition at birth. In some cases, COVID-19 infections in pregnancy may increase the possibility of a premature delivery; the baby's weight may be less than 2.5 kg; and in rare situations, the baby might die before birth.

#### Q. Which pregnant women are at a higher risk of developing complications after COVID-19 infection?

**A.** Pregnant women who are:

- Older than 35 years of age
- Obese
- Have an underlying medical condition such as diabetes or high blood pressure
- Have a history of clotting in the limbs

#### Q. If a pregnant woman has already had COVID-19, when should she be vaccinated?

**A.** In case a woman is infected with COVID-19 during the current pregnancy, then she should be vaccinated soon after the delivery.

**Q. Are there any side effects of the COVID-19 vaccines that can either harm the pregnant woman or her foetus?**

**A.** The available COVID-19 vaccines are safe and the vaccination protects pregnant women against COVID-19 like other individuals. Like any medicine a vaccine may have side effects, which are normally mild. After getting the vaccine, she can get mild fever, pain at the injection site, or feel unwell for 1-3 days. The long-term adverse effects and safety of the vaccine for the foetus and the child born is not established yet. Very rarely, (one in one to five lakh people) the beneficiary may, after the COVID-19 vaccination, experience some of the following symptoms within 20 days after getting the injection, which may need immediate attention.

**Q. When should the vaccine be given to the pregnant woman?**

**A.** The COVID-19 vaccination schedule can be started any time during pregnancy.

**Q. What other precautions should the pregnant woman take after vaccination?**

**A.** Counsel the pregnant woman and her family members to continue to practice COVID appropriate behaviour: wearing double masks, frequent hand washing, maintaining physical distance, and avoiding crowded areas, to protect themselves and those around from spreading the COVID-19 infection.

**Q. How does a pregnant woman register herself for the Covid-19 vaccination?**

**A.** All pregnant women need to register themselves on the Co-WIN portal or may get themselves registered on-site at the COVID-19 vaccination centre. The process of registration for pregnant women remains the same as of the general population and as per the latest guidelines provided by the Ministry of Home and Family Welfare (MoHFW) from time to time.

**Source:**

<https://www.mohfw.gov.in/pdf/OperationalGuidanceforCOVID19vaccinationofPregnantWoman.pdf>

## 4. The third wave of COVID-19 in India and protecting children

**Q. What is the possibility of a third wave of COVID-19 in the coming months?**

**A.** Pandemics are likely to occur in multiple waves, and each wave could vary in the number of cases and its duration. Eventually, most of the population may get immune by asymptomatic or symptomatic infections (herd immunity). Over time, the disease may die out or may become endemic in the community with low transmission rates.

**Key Message:** There is a possibility of a third wave, but it is difficult to predict its timing and severity.

**Q. Are children at greater risk if the third wave strikes?**

**A.** In the first wave, primarily the elderly and individuals with co-morbidities were affected with severe disease. In the current (second) wave, a large number of younger population (30-45 years) have developed severe disease as also those without co-morbidities. After the second

wave is over, if we do not continue following COVID appropriate behaviour, the third wave, if it occurs, is likely to infect the remaining non-immune individuals and that may include children also. The latest sero survey (December 2020 to January 2021) showed that the percentage of infected children in the age group of 10-17 years was around 25 per cent, the same as adults. This indicates that while children are being infected like adults, they are not getting the severe disease.

**Key Message:** Children are as susceptible as adults and older individuals to develop an infection but not a severe disease. It is highly unlikely that the third wave will predominantly or exclusively affect children.

**Q. Are children likely to suffer from severe disease as being witnessed in the adult population in the current wave?**

**A.** Fortunately, children have been relatively less affected so far due to several factors. The most important reason is the lesser expression of specific receptors to which this virus binds to enter the host and also the immune system of the children. A very small percentage of infected children may develop moderate to severe disease. If there is a massive increase in the overall numbers of infected individuals, a larger number of children with moderate to severe disease may be seen. Apart from the infection, parents should watch out for mental health issues in children and keep a watch to prevent child abuse and violence. Also, it is worth limiting screen time and prepare children for safe school reopening as per the Indian Academy of Pediatrics (IAP) guidelines.

**Key Message:** Almost 90 per cent of the infections in children are mild/asymptomatic. Therefore, the incidence of severe disease is not high in children.

**Q. Can we rule out the possibility of severe infections in children in the third wave?**

**A.** As explained, the spectrum of illness is likely to be much less severe in children than adults; there is only a remote possibility of children being more severely affected than adults in the next wave. As per data collected during the first and second waves, severe COVID-19 infections in children were not reported and only in few cases they were admitted to ICU. However, we need to be watchful about how the mutant strains will behave. The dictum here is: better be ready and prepared for the worst and hope for the best!

**Key Message:** Severe COVID-19 cases in children are rare. Further, there is no evidence indicating that children will have severe disease in the third wave.

**Q. Severe disease due to COVID-19 is already occurring in children. Why it is so?**

**A.** Yes, a severe illness related to COVID-19 is known to occur in children. This includes pneumonia and multisystem inflammatory syndrome in children (MIS-C). However, COVID-19 pneumonia in children is uncommon as compared to adults. In some cases, after 2-6 weeks of asymptomatic or symptomatic COVID-19 infection, MIS-C may be seen due to immune dysregulation with the incidence of 1-2 cases per 100,000 population; some of these cases also may be severe. It's a treatable condition with a good outcome if diagnosed early. Also, most children suffering from MIS-C cannot transmit the infection to others.

**Key Message:** Children occasionally get the severe disease and may need ICU care, both during the acute illness and after 2-6 weeks due to MIS-C caused by COVID-19. But the majority are likely to recover if treated on time.

**Q. What preparations are being made in case the third wave comes and affects the children?**

**A.** Most affected children get a mild disease with fever and need supervised home care with monitoring. We have learned a lot about COVID-19 illness from our shared experiences in adult medicine in the last 15 months. IAP guidelines on the management of COVID-19 in children are in place, and paediatricians have been sensitised and trained on its management. We need to be ready for a more significant number of patients seeking consultations; educating the parents on different platforms regarding illness and warning signs; and arranging more COVID-19 wards for children with more special wards such as high-dependency units (HDUs) and intensive care units (ICUs). The preventive behaviours are the same for children. Parents should also be ideal role models for their children regarding mask etiquette, hand hygiene, and social distancing. Children above the age of two to five years can be trained to use a mask; however, the adults have to follow the COVID-appropriate behaviour. IAP has also set guidelines for the safe reopening of schools for the safety of the children.

**Key Message:** We need to be prepared with more in-patient beds and intensive care beds for children. IAP has already developed the management protocol for disease categories in children. There is no reason to panic. Our preparations are in full swing.

**Q. What is the plan for vaccinating children?**

**A.** So far, the global data show that compared to children, older adults are a thousand times more likely to die from COVID-19 disease. So, it has been a priority to vaccinate the high-risk elderly age group first. Thereafter, the emphasis should be on adults who also have more severe diseases as compared to children. When there is the remote possibility of children getting affected, some countries consider vaccinating children and adolescents. The same vaccines being used in adults can be used in children only after adequate trials. One of the India-made vaccines will soon undergo trials in children, and if proven immunogenic and safe, it could be fast-tracked for mass vaccination in children.

**Key Message:** Children do get the severe disease, even if the number is small. Thus, there is no harm in considering vaccination for them. The safety and efficacy, however, are being assessed in trials for this age. The national expert group on vaccine administration for COVID-19 will develop a plan as and when new scientific data emerge.

**Source**

[https://iapindia.org/pdf/hA5Gnpt\\_IQv63Bk\\_IAP%20view%20point%20for%203rd%20wave%20Covid%2022%20May%202021.pdf](https://iapindia.org/pdf/hA5Gnpt_IQv63Bk_IAP%20view%20point%20for%203rd%20wave%20Covid%2022%20May%202021.pdf)

## 5. COVID-19 and White Fungus infection

**Q. What is White Fungus?**

**A.** White Fungus, also known as candidiasis, is an opportunistic infection, which could spread fast to various body parts and, if not treated, could be serious. According to the Centre for Diseases Control and Prevention (CDC), White Fungus or invasive candidiasis can affect the blood, heart, brain, eyes, bones, or other parts of the body.

**Q. Who are at high risk to get White Fungus infection?**

**A.** White Fungus is all around us as it is found naturally in the environment. It primarily affects people with low immunity, who come in contact with objects that contain these fungal spores.

For instance, COVID-19 patients on oxygen support can come in contact with these fungal spores if their ventilators and oxygen support equipment are not sanitised properly. Further, overuse of steroids and use of tap water in the humidifier attached to an oxygen cylinder can also heighten the risk of contracting White Fungus.

## **Q. Who can get infected by white fungus?**

**A.** Invasive candidiasis is caused by a yeast (a type of fungus) called Candida. Candida can normally live inside the body, in areas like the mouth, throat, gut, and vagina, without causing any problems. However, individuals with low immunity, like patients recovering from a serious COVID-19 infection, are particularly at risk of contracting this fungal infection. In their bodies, the fungus can enter the bloodstream or internal organs to cause an infection.

People who are at high risk for developing this infection include those who:

- Have been admitted in the intensive care unit (ICU) for a prolonged period.
- Have weakened immune system (for example, people on cancer chemotherapy, people who have had an organ transplant, and people with low white blood cell counts).
- Have recently had surgery, especially multiple abdominal surgeries.
- Have recently received lots of antibiotics or steroids in the hospital.
- Receive total parenteral nutrition (food through a vein).
- Have kidney failure or are on hemodialysis.
- Have diabetes.
- Have a central venous catheter.

## **Q. Is White Fungus contagious?**

**A.** White Fungus is not contagious in most cases, as it cannot spread directly from person to person. However, there exist some species of fungus that cause this infection on the skin. In such instances of external infection, the fungus can possibly be transferred from the patient to another individual who is at risk.

## **Q. What are the symptoms of White Fungus?**

**A.** Only CT scans or X-rays can reveal and completely confirm the White Fungus infection. Health experts report that it is more dangerous than Black Fungus, as it affects the lungs as well as other parts of the body like the nails, skin, stomach, kidney, brain, private areas, and mouth.

Moreover, the White Fungus can also infect the lungs the same way COVID-19 does. In fact, patients who get infected with White Fungus displayed COVID-19-like symptoms despite having tested negative for the virus. According to some reports, the oxygen saturation level of one of the four patients infected with White Fungus dropped from normal levels. However, the oxygen levels became normal after the antifungal medication was administered.

## **Q. How can White Fungus be treated?**

**A.** Patients infected with White Fungus should be examined carefully, perhaps with a fungus culture test of their phlegm or mucus, to detect the extent of fungal infection in their body. After detection of the infection, antifungal medications can be used to treat the patients. Such medications have led to an improvement in their condition. The type and dose of antifungal medication used to treat White Fungus will depend on the patient's age, immune status, location, and severity of the infection.



## 6. Related to use of oxygen during current COVID-19 pandemic

### Q. What is the normal respiratory rate of a healthy adult person?

A. Standard respiratory rates for a healthy adult range from 12 to 20 breaths per minute.

### Q. Are 8 breaths per minute normal?

A. No. A patient needs to be evaluated medically.

### Q. How many litres of oxygen per minute do we breathe?

A. The average tidal volume, i.e., the average amount of air inhaled and exhaled per breathing cycle, is 0.5 litre (500 ml). Minute Ventilation (VE) is the total volume of air entering the lungs in a minute, which is 6 litres per minute.

### Q. What should be the normal oxygen saturation as recorded by a Pulse Oximeter?

A. The normal oxygen saturation level in the blood ( $SpO_2$ ) should be 95 per cent or higher. Some people with chronic lung disease, such as Chronic Obstructive Pulmonary Disease (COPD) or sleep apnea, may have normal levels of around 90 per cent. The ' $SpO_2$ ' reading on a pulse oximeter shows the percentage of oxygen in the blood. If your home  $SpO_2$  reading is lower than 94 per cent, call your healthcare provider.

### Q. How do I check my oxygen level at home without a Pulse Oximeter?

A. If you do not have a portable finger pulse oximeter in your home, you can also learn how to assess signs and symptoms of low oxygen levels. Two classic signs of a low oxygen level are a rapid heart rate and a fast breathing rate. An average heart rate is 60–100 beats per minute and an average breathing rate is 12–20 breaths per minute. However, under low oxygen conditions, body responses include an increase in heart rate and breathing rate. Another sign of a low blood oxygen level is cyanosis or a bluish colour change on your lips, nose, or fingertips. As your body loses oxygen, the blood cells in your body change colour in your bloodstream to a dark blue, which can be seen from the outside of your skin if it is severe. Cyanosis is typically a late sign of low oxygen levels and is considered a medical emergency. If you notice this bluish discoloration, you should immediately visit the nearest hospital.

### Q. Do we see many cases of silent hypoxia in this wave? How can this be addressed?

A. Silent hypoxia or happy hypoxia is referred to as the early stage of COVID-19. As the oxygen level drops, one may start feeling shortness of breath, confusion, and other symptoms. Keep watching for these signs and do not ignore them. This is true for young people as well. If you monitor low oxygen level, change in lip colour from natural to blue or persistent sweating, consult the COVID helpline or doctor. They could be the early sign of silent hypoxia.

### Q. In brief, how can proning help enhance blood oxygen levels?

A. Proning is a medically accepted process to improve the distribution and exchange of oxygen in the lungs. A patient is safely placed from their back onto their abdomen (stomach), i.e., face

down to improve breathing and oxygenation. It has been shown as beneficial for COVID-19 patients with compromised breathing comfort, especially during home isolation.

**Q. Is pure oxygen used in hospitals?**

**A.** Medical oxygen contains high purity oxygen used for medical treatments and is developed for use in human body. Cylinders contain a compressed oxygen gas and no gases are allowed in the cylinder to prevent contamination.

**Q. What is the use of medical oxygen?**

**A.** Oxygen is used for treatment in hospitals. Hence, it is considered a drug or a pharmaceutical product.

**Q. What is the need for medical oxygen?**

**A.** The human body requires oxygen to survive, and typically, we breathe in from air. However, if you have lung disease or other medical conditions such as COVID-19, you may not get enough oxygen due to compromised lungs. That can leave you short of breath and cause problems with your heart, brain, and other parts of your body.

**Q. Can breathing 100 per cent oxygen harm your body?**

**A.** Yes. Breathing 100 per cent oxygen also eventually leads to collapse of the alveoli (atelectasis).

**Q. Can you get excess (more than required) oxygen from an oxygen concentrator?**

**A.** It is possible to get excess (more than required) oxygen from an oxygen concentrator. However, this is quite rare when oxygen concentrators are used as directed and prescribed. All supplemental oxygen requires a prescription from a doctor, who carefully chooses your oxygen requirement.

**Q. What is the role of oxygen during COVID-19 disease?**

**A.** The demand for medical oxygen increases in COVID-19 as the disease primarily affects the lungs and, in severe cases, causes death due to Acute Respiratory Distress Syndrome (ARDS) and pneumonia.

**Q. When does a patient require medical oxygen in a COVID-19 positive case?**

**A.** As per AIIMS/ICMR-Covid-19/National Task Force/Joint Monitoring Group (Dte.GHS), MoHFW, Government of India, Clinical Guidelines for Management of Adult COVID-19 Patient issued on 22nd April 2021, moderate and severe cases of COVID-19 where the infection induces shortage of oxygen in the body due to its impact on lungs require medical oxygen and immediate oxygen therapy. Oxygen acts as a life-saver for COVID-19 patients.

**Q. What are moderate COVID-19 cases?**

**A.** In moderate COVID-19 cases, a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than or equal to 24/minute and SpO<sub>2</sub> 90 per cent to 93 per cent with ambient air.

**Q. What is severe COVID-19 cases?**

**A.** In severe COVID-19 case, a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than 30/minute and SpO<sub>2</sub> less than 90 per cent in room air.

**Q. When does a patient require mechanical ventilator support?**

**A.** A patient may be put on a mechanical ventilator if it becomes very difficult to breathe or get enough oxygen into their blood. This condition is called respiratory failure. Mechanical ventilators are machines that act as bellows to move air in and out of the patient’s lungs. The respiratory therapist and doctor set the ventilator to control how often it pushes air into the lungs and how much air the patient gets. The patient may be fitted with a mask to get air from the ventilator into the lungs. Or, they may need a breathing tube if their breathing problem is more serious.

**Q. Can mechanical ventilation be given at home?**

**A.** Mechanical ventilators are mainly used in hospitals and transport systems such as ambulances and medical evacuation by air transport, etc. In some cases, they can be used at home if the illness is long-term and the caregivers at home receive training and have adequate nursing and other resources at home. Being on a ventilator may make a patient more susceptible to pneumonia, damage to the vocal cords, or other problems.

**Q. What is the six minute walk test for COPD?**

**A.** The six minute walk test (6MWT) is an exercise test that measures functional status in chronic obstructive pulmonary disease (COPD) patients and provides information on oxygen desaturation. This test is also being used for COVID-19. In case of COVID-19 symptoms, SpO<sub>2</sub> level must be checked before taking a walk. Now, walk for six minutes without a break on an even surface and measure the SpO<sub>2</sub> level. It may fall 1-2 per cent, but consult a medical professional if it falls below 93 per cent.

**Source:**

<https://ndma.gov.in/sites/default/files/2021-03/FAQs-on-Use-of-oxygen-.pdf>

**7. Related to drugs and medications to fight the disease**

**Q. Is Remdesivir effective in the treatment of COVID-19?**

**A.** No study has conclusively been able to prove that Remdesivir is beneficial in the treatment of COVID-19. However, India has approved Remdesivir under the National Clinical Management Protocol for COVID-19, which was developed after many interactions by a committee of experts. The protocol acts as the guiding document for the treatment of COVID-19 patients in India. Remdesivir is listed as an investigational therapy in the protocol, i.e., where informed and shared decision-making is essential, besides noting contraindications mentioned in the detailed guidelines.

**Q. What is Remdesivir? How does Remdesivir work?**

**A.** Remdesivir is an investigational drug used to treat viral infections. It is classified as a broad-spectrum antiviral with potential antiviral activity against a variety of RNA viruses.

The drug works against the novel coronavirus by inhibiting replication of the virus in the body. Remdesivir functions as a pro-drug that is modified in the body before it becomes an active drug. It is classified as a nucleoside analog, one of the oldest classes of antiviral medications, and resembles the RNA base adenosine. In general, nucleoside and nucleotide analogues simulate the structure of a true nucleoside or nucleotide. The simulated structure may then be incorporated into the virus. Remdesivir works when the enzyme replicating the genetic material for the novel coronavirus – RNA polymerase – incorporates the adenosine analogue in place of the natural molecule into the growing RNA strand. By introducing the modified agent, Remdesivir, replication of the novel coronavirus is interrupted, and the virus ceases to multiply and cannot infect more cells in the body.

**Q. When should a patient of COVID-19 take Remdesivir?**

**A.** The timing of the drug, when it is administered, is most important. Taking it too early or too late could do more harm than good. Remdesivir is applicable only in hospitalised patients who showed very low oxygen saturation and infiltrated their chest X-ray or CT scan. The optimal timing for Remdesivir is usually after five to seven days of having the virus. Early to mild or asymptomatic patients should not take Remdesivir. Also, it is of no use if it's given very late because it would create a cytokine storm. A cytokine storm is when the immune system goes into overdrive. The body starts to attack its cells and tissues instead of just the virus.

**Q. Can Remdesivir be taken at home?**

**A.** Remdesivir comes in a vial and has to be injected only after prescription and in the presence of a health practitioner. It is for patients who are hospitalised and severe. Therefore, it should not be given at home. It is for patients who need to be admitted and need hospital care.

**Q. Are steroids effective in the treatment of COVID-19?**

**A.** There is no evidence to support the use of steroids in the treatment of COVID-19. The World Health Organization (WHO) recovery trial showed that steroids do have a beneficial effect. But again, the timing is critical. The recovery trial clearly showed that if we give steroids too early, it showed a harmful effect before oxygen saturation. Steroids are most effective during the later part of the disease when there is more inflammation and oxygen saturation is falling. Steroids are only helpful for moderate or severe cases.

**Q. Is plasma a good way to fight off COVID-19?**

**A.** Convalescent plasma has been a therapy devised to passively transfer antibodies from a recovered person to a new patient. While the therapy has been received with different opinions by the medical community, the important aspect is timing. It's better if plasma therapy is used early before clinical worsening. Also, plasma with high titer neutralising antibodies would have better results. Hence, to achieve good results, correct patient selection, timing and a good quality plasma donor are needed for success in this form of treatment.

**Q. Should a person with COVID-19 take Tocilizumab?**

**A.** Tocilizumab is a drug of last resort. It should only be used when a COVID-19 infection in a patient is worsening despite steroids, Remdesivir and other treatments like anticoagulants. Tocilizumab is required in less than 2 per cent of COVID-19 patients. Very few patients need this drug because it's only for treating a cytokine storm and has a limited role.

**Q. Is Favipiravir effective in treating COVID-19?**

**A.** Favipiravir is another antiviral that is being promoted for the treatment of COVID-19. It was initially doled out as a treatment of influenza after the H1N1 pandemic. There is not enough evidence in robust studies to show that it is a good drug. Since it's not a proven treatment, India's national guidelines also don't recommend its use.

**Q. Is it possible to treat COVID-19 without any of the drugs mentioned above?**

**A.** People with mild COVID-19 or those who are asymptomatic will improve with just symptomatic treatment. Mild COVID-19 infection can be treated with paracetamol, good hydration and multivitamins – without any treatment. Giving treatment when it is not required may be doing more harm than good.

**8. Related to Black Fungus and COVID-19 disease**

**Q. What is Black Fungus?**

**A.** Black Fungus, also known as mucormycosis, is a rare fungal infection. It is called 'black' because of the colour of the fungal growth. It is caused by exposure to mucor mold found in soil, manure, and rotten/decaying fruits and vegetables. It is ubiquitous and even present in the nose/mucosa of healthy individuals. This disease usually affects the sinuses, eye orbit, and brain. That is why it is also called 'rhino-orbital-cerebral' mucormycosis. It may be life-threatening in immuno-compromised individuals (cancer patients, HIV/AIDS) and people with uncontrolled diabetes.

**Q. What are the risk factors for acquiring Black Fungus infection?**

**A.** Risk Factors are:

- Uncontrolled Diabetes Mellitus
- Treated for COVID-19 with corticosteroids
- Treated for COVID-19 with immunomodulators
- Treated for COVID-19 with mechanical ventilation
- Prolonged oxygen therapy
- Prolonged ICU stay
- Immuno-compromised state

**Q. Why the sudden increase in Black Fungus cases?**

**A.** It may be triggered by extensive use of steroids, which is a life-saving treatment for moderate to severe COVID-19 infection. Steroids lower the immunity and cause a sudden up-shooting of blood sugar levels in diabetes and non-diabetic patients. For patients on humidified oxygen, care should be taken to make sure there is no water leak to prevent the growth of the fungus.

**Q. How serious is Black Fungus?**

**A.** Black fungus infection causes a vision-threatening and life-threatening condition.

**Q. Do all COVID-19 patients need to be worried about Black Fungus infection?**

**A.** No. As discussed, high-risk patients need to be alert. Also, during COVID-19 recovery, everyone should watch out for early signs and symptoms.



## **Q. What are the precautions one can take to avoid this disease?**

**A.** One can take the following precautions:

- Boost immune system with diet, hydration and exercise.
- Rational use of steroids by follow guidelines.
- Strict blood sugar monitoring and control in all patients who are on steroids.

## **Q. What are the early signs of Black Fungus?**

**A.** Some of the early signs are:

- Facial pain
- Facial swelling/puffiness/discolouration
- Sinus headache
- Stuffy nose
- The blurring of vision/decreased vision
- Double vision
- Drooping of eyelid
- Blood-stained nasal discharge
- Dental pain

## **Q. Is Black Fungus treatable?**

**A.** Yes. Early diagnosis and a prompt multi-speciality team of medical professionals can manage it.

## **Q. Which specialist should I visit for Black Fungus?**

**A.** ENT and eye specialists are central to this disease. The team includes care coordination with neurosurgeon, endocrinologist and microbiologist.

**Source:**

<https://www.eyeqindia.com/frequently-asked-questions-on-covid-and-black-fungus/#toggle-id-9>

## **9. Related to indoor air and COVID-19 disease**

### **Q. Will running an evaporative cooler help protect my family and me from COVID-19?**

**A.** Evaporative coolers (or 'swamp coolers') can help protect people indoors from the airborne transmission of COVID-19 because they increase ventilation with outside air to cool indoor spaces. Evaporative coolers are used in dry climates. They use water to provide cooling and improve relative humidity in indoor microenvironments. When operating as intended (with open windows), these devices produce substantial increases in ventilation with outdoor air. Some evaporative coolers can be performed without using water when temperatures are milder to increase ventilation indoors. Avoid using evaporative coolers if air pollution outside is high and the system does not have a high-efficiency filter.

**Q. Is ventilation important for indoor air quality when cleaning and/or sanitising for COVID-19 indoors?**

**A.** When cleaning and disinfecting for COVID-19, ventilation is essential – in general, increasing ventilation during and after cleaning helps to reduce exposure to cleaning and disinfection products and by-products. Increasing ventilation, for example, by opening windows or doors, can also reduce risks from particles resuspended during cleaning, including those potentially carrying SARS-CoV-2 (or other contaminants). Avoid ventilation with outdoor air when outdoor air pollution is high or when it makes your home too cold, hot, or humid.

**Q. Will an air cleaner or air purifier help protect my family and me from COVID-19 in my home?**

**A.** When appropriately used, air purifiers can help reduce airborne contaminants, including viruses, in a home or confined space.

**Q. How can I increase ventilation at home to help protect my family from COVID-19?**

**A.** Ensuring proper ventilation with outside air is a standard best practice for improving indoor air quality. To increase ventilation in your home, one can:

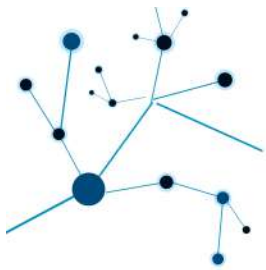
- Open the windows or screened doors, if possible;
- Operate an air conditioner that has an outdoor air intake or vent; and
- Operate a bathroom fan when the bathroom is in use and continuously, if possible.

However, the practices mentioned here are not enough to protect people from COVID-19. When used along with other best practices recommended by the Ministry of Health and Family Welfare, Government of India, the above methods can be part of a plan to protect yourself and your family.

**Source:**

<https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19>





## FEEDBACK FORM

# COVID-19

## Science & Technology Efforts in India

It has been more than a year since the COVID e-Newsletter started reaching you and we want to hear what you think about it. The information product is designed to keep you conversant about the services and efforts the country has put up on the face of the sudden eruption of the COVID-19 pandemic. Your opinion is vital so that we can make sure we are including what you want to read. Please fill in the form below and rest assured that the information you give will help shape future editions of your coveted newsletter.

### I. How do you rate the following aspects of COVID e-Newsletter, focused on the second wave of the pandemic?

#### 1. The overall appearance

😊 Very Good   😊 Good   😐 Average   😞 Poor   😞 Very Poor   😐 No Opinion

#### 2. Ease to read and flow of information

😊 Very easy   😊 Fairly easy   😐 Not very easy   😞 Not at all easy



For suggestions and feedback, click on:

<https://www.indiascienceandtechnology.gov.in/covid-newsletter/feedback-form>

# COVID-19

Science & Technology Efforts in India

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**TOGETHER WE CAN  
AND WE WILL BEAT  
THE PANDEMIC OUT**

For suggestions and feedback, write to us at: [covidnewsletter@vigyanprasar.gov.in](mailto:covidnewsletter@vigyanprasar.gov.in)



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