

COVID-19

Science & Technology Efforts in India



Trending in
India @COVID-19
Pandemic



Efforts
Impacting
COVID Mitigation



Research
Supports



Industry
Spotlights



COVID
Resources
& Outreach



COVID
Fact-checks



In the Face of Adversity We Have a
Choice - Stay Updated with Scientific Facts

COVID REPOSITORY

SCIENCE & TECHNOLOGY EFFORTS IN INDIA



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VIGYAN PRASAR

INDIA SCIENCE, TECHNOLOGY &
INNOVATION (ISTI) PORTAL

Reflecting Science, Technology & Innovation in India





PREFACE

The onset of New Year is an opportunity to make new resolutions. The last month of the current year is also significant as it provides a chance to review the year in retrospect. As India fought the two waves of the pandemic tooth and nail, the nation is all geared up to defeat its new variant-of-concern OMICRON if it assumes the form of a wave in the coming days. With more than 50 per cent vaccinated population, India is in a better position to combat the intrusion of successive waves compared to earlier when the world was caught unawares. Since then, India has come a long way – augmentation of healthcare infrastructure, manifold increase in vaccine production, establishing new plants for medical oxygen and capacity enhancement, increased production of masks, PPE kits, and other essentials.

Though we have strong armour and enough in our quiver to beat any successive wave COVID-19 before it deluges us, there is no substitute for COVID-appropriate behaviours (CABs) – our first protection against the sub-microscopic agent and its variants. Remember, every individual who follows CAB is a warrior against COVID and contributes significantly to defeating its waves by keeping the virus at bay.

The pandemic has been superimposed on unresolved tensions between people and technology, between people and the planet, between the haves and the have-nots. These tensions were already shaping a new dimension of inequalities of enhanced capabilities and the novel necessities. But the response to the crisis carries the potential to shape strategies on how those tensions can be addressed and how inequalities in human development are reduced. The pandemic has also revealed something profound about how societies should treat knowledge and information.

We hope our readers will contribute to defeating the virus and not let the new variant trouble us. As the newsletter goes into the monthly mode with new look and vigour, we add a new component as communication articles on trending in science in the pandemic world. We look forward to suggestions and feedback from our readers at covidnewsletter@vigyanprasar.gov.in. It's time to nail the virus; let's fix it hard!

As the New Year 2022 approaches us with hopes anew, Vigyan Prasar wishes all its readers and their near and dear ones a wonderful year ahead.

20 December 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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TRENDING IN INDIA @COVID-19 PANDEMIC

All you want to know about OMICRON

Recently, a new variant of COVID-19, the Omicron, has spread to many countries worldwide in the last few days since it was first identified in Africa almost a month back. After nearly two years of its emergence, the SARS-CoV-2 virus, causing the COVID-19 disease, mutated once again, and the new variant has been termed the omicron variant. Referred to as a COVID-19 Variant of Concern (VoC) by World Health Organization (WHO), it has triggered global travel restrictions, a race to accelerate booster vaccination programmes and renewed calls to address vaccine disproportion. The VoC has emerged after initial variants of the virus infected an estimated 26 crore people and 50 lakh casualties globally. Since December 2020, several coronavirus strains have emerged and become dominant in many countries, creating a new endemic-like situation, with alpha, beta, gamma, and delta variants being most prominent until November 2021.


The COVID-19 pandemic has put a strain on all the healthcare systems worldwide and left an atmosphere rife with anger and frustration due to its widespread negative impacts on social, mental, and economic well-being. Unlike prior variants, Omicron has emerged in an era when vaccine immunity is increasing around the globe. However, the amount of changes in omicron variant means that the effectiveness of antibodies produced by COVID-19 vaccines would be reduced. Fears that the variant may undermine the efficacy of COVID-19 vaccines have led the world to announce an acceleration of booster jab roll-outs in the hope that more antibodies will provide better protection. India reported its first case of the Omicron variant of COVID-19 in Andhra Pradesh on 12th December 2021. Since then, around 200 people have been diagnosed with the disease, in a week, containing the variant; however, its spread is more than 2000 per day globally.

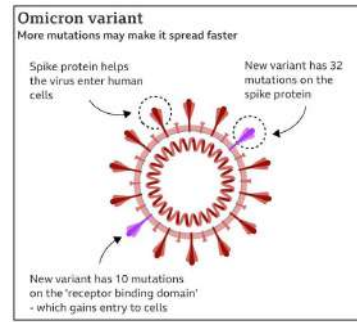
How to stop the spread of **COVID-19**

-  Get **vaccinated** if you're eligible
-  Get **tested** if you have symptoms of illness
-  Wear a **mask** indoors
-  Choose **outdoor** gatherings instead of indoor ones
-  Wash your **hands** frequently
-  Practice **physical distancing** – the more the better
-  **Disinfect** high-touch surfaces

VARIANTS OF SARS-COV-2

O Omicron B.1.1.529	Δ Delta B.1.617.2	Γ Gamma P.1	B Beta B.1.351	A Alpha B.1.17
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According to WHO, there is no concrete evidence that symptoms associated with omicron mutations differ from other mutations. Currently, the available anecdotal data from clinicians at the front lines suggest that patients with Omicron are younger people with a clinical presentation similar to past variants. Although no alarming clinical concerns have been raised thus far, this anecdotal information should be treated with caution given that severe COVID-19 cases typically present several weeks after the initial symptoms associated with mild disease. Omicron strains cause symptoms similar to other COVID-19 strains, like headache, cough, shortness of breath, fever, fatigue, sore throat, muscle or body aches, a loss of taste or smell, a runny nose. However, WHO indicated that omicron mutations might increase mortality rates compared to other COVID-19 mutations.

The following strategy may help prevent the aggressive spread of Omicron and subsequent VoCs: Increase the COVID-19 testing, impose travel bans, avoid crowded places, increase COVID-19 vaccinations, increase medical infrastructure and facilities. Importantly, existing public health prevention measures, popularly termed as COVID Appropriate Behaviours (CABs), like mask-wearing, physical-distancing, avoidance of enclosed spaces, outdoor preference, and hand hygiene, have remained effective against past variants should be just as effective against the omicron variant. Preliminary observations, which need to be interpreted with caution, indicate that Omicron might spread faster and might escape antibodies more readily than previous variants, thereby increasing cases of reinfection and cases of mild breakthrough infections in people who are vaccinated.

In conclusion, along with several other nations, India also needs to take strict action to prevent the spread of the Omicron variant of SARS-CoV-2 by implementing strategies such as ban on international travel, enhanced genomic surveillance, and sequencing to identify the strains. Finally, more studies are needed to understand better its transmissibility, immunity escape potential, clinical presentation and severity of the disease, and the role of other available diagnostic and therapeutic countermeasures. Further studies are needed to examine the potential efficacy of the currently available vaccines. Several previous studies have stated that anticancer or antiviral drugs could be effective for the delta variant or other variants. Still, more studies are required to explore the efficacy of anticancer or antiviral drugs against the omicron variant.

Based on the data from previous VoCs, people who are vaccinated are likely to have a lower risk of severe disease from omicron infection. A combination prevention approach of vaccination and public health measures is expected to remain an effective strategy.

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<https://www.indiascienceandtechnology.gov.in/featured-science>





2

EFFORTS IMPACTING COVID MITIGATION

The 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

C-CAMP sequences SARS-CoV-2 Omicron primers by using negative selection method

Ministry of Health provides answers to frequently asked questions on SARS-CoV-2 variant Omicron for public convenience

IIT Delhi develops RT-PCR-based assay for diagnosis of Omicron variant of SARS-CoV-2

Government releases guidelines for international arrivals, in view of the surge in spread of Omicron variant of COVID-19

IIT Hyderabad creates COVID-19 tracker for Coronavirus updates in 10 Indian languages

MoHFW releases list of 'At-Risk' countries in view of COVID-19 new variant Omicron

Measures taken by Government to minimise threat of any resurgence of COVID-19 pandemic

Ministry of Health undertook several steps for the well-being of COVID-19 warriors including life insurance benefits

Government sanctions 1,563 PSA oxygen generation plants for improving public health facilities

PM-ABHIM launched to strengthen pandemic research

Air Suvidha portal assisting international passengers with all COVID-19 related guidelines

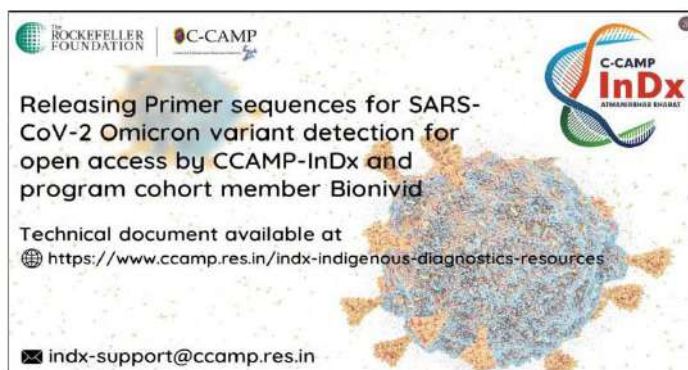
CFTRI lab to handle bulk of RT-PCR tests

ICMR invites Expression of Interest (EoI) for validation of rapid antigen detection assays for COVID-19

C-CAMP sequences SARS-CoV-2 Omicron primers by using negative selection method

Centre for Cellular and Molecular Platforms (C-CAMP) has designed primer sequences for the Omicron variant to assist diagnostics. The primer sequences designed by Bionivid specifically target a 9bp deletion in the N gene of the SARS-CoV-2 Omicron variant (B.1.1.529). This deletion has been observed in most (> 98%) of the 700 Omicron sequences (Source: GISAID) analysed at Bionivid. The design of the primers is based on two selection methods – positive selection and negative selection method.

In the negative selection method, the primers will bind to all SARS-CoV-2 variants but not to Omicron sequences. So, a positive signal will be received for all SARS-CoV-2 variants except Omicron.



Contact info:

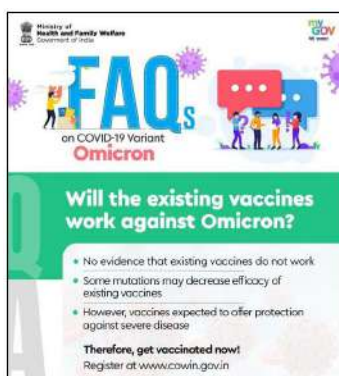
covid@bionivid.com; indx-support@ccamp.res.in

Website link:

https://www.ccamp.res.in/sites/default/files/default_images/Omicron_Primer_sequences.pdf

Ministry of Health provides answers to frequently asked questions on SARS-CoV-2 variant Omicron for public convenience

The Ministry of Health and Family Welfare (MoHFW) has issued a document mentioning FAQs on SARS-CoV-2 variant, Omicron. In this document, the public will get answers to various questions about Omicron. What is Omicron? What are its diagnostics methods? How



concerned should we be about the new VoC? What precautions should be taken? Will there be a third wave? Will the existing vaccines work against Omicron? How is India responding to the Omicron variant? Why do variants occur? All these questions and answers are given in a detailed and simple manner in this document.

Website link:

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

IIT Delhi develops RT-PCR-based assay for diagnosis of Omicron variant of SARS-CoV-2

Kusuma School of Biological Sciences at IIT Delhi has developed an RT-PCR-based assay for the specific detection of the Omicron (B.1.1.529.1) variant of SARS-CoV-2. The assay is based on detecting specific mutations, which are present in the Omicron variant and absent in other currently circulating variants of SARS-CoV-2. Primer sets targeting these unique mutations in the S gene were designed for the specific amplification of either the Omicron variant or other currently circulating variants of SARS-CoV-2 and tested using RT-PCR. Using synthetic DNA fragments, the assays were optimised to distinguish the wild type from the Omicron variant in a dynamic range from 10 million to <100 copies /reaction.



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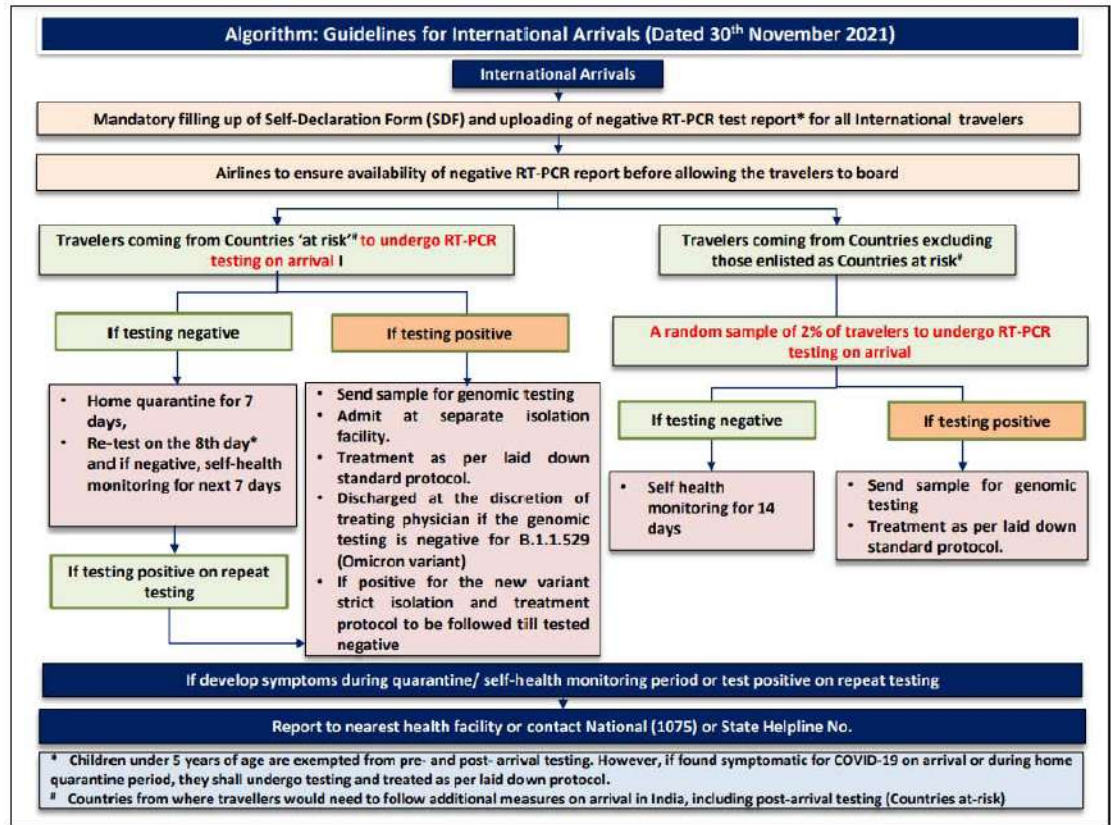
Website link:

https://home.iitd.ac.in/show.php?id=15&in_sections=Research

Government releases guidelines for international arrivals, in view of the surge in spread of Omicron variant of COVID-19

The Ministry of Health and Family Welfare (MoHFW), on 30 November 2021, released guidelines for international arrivals in supersession of all guidelines issued so far. This information document provides protocols to be complied with by international travellers as well those to be followed by the airlines and points of entry (airports, seaports, and land borders) for risk profiling of passengers. This standard





operating procedure (SOP) is valid effective 1 December 2021 till further orders. Based on the risk assessment, this document will be reviewed from time to time. These guidelines for international travel are also given in algorithm form so that it will be easy for people to understand them and follow them.

Website link:

<https://www.mohfw.gov.in/pdf/GuidelinesforInternationalarrivalsdated30thNovember2021.pdf>

IIT Hyderabad creates COVID-19 tracker for Coronavirus updates in 10 Indian languages

IIT Hyderabad has created a COVID-19 tracker for coronavirus updates in 10 Indian languages. The tracker is built using the public code base of the covid19india.org website. The website launched in 2020, and was discontinued in October 2021. Knowing how crucial this information is to Indians in all walks of life (researchers, students, and the public), the Director of IIT Hyderabad authorised a team of developers at the institute to carry on the work. The portal will display daily updates on case numbers, vaccinations, and tests for each state of India. These updates are available in 10 Indian languages.

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Website link:

<https://pcr.iith.ac.in/files/pressrelease/covid19tracker.in%20by%20IITH.pdf>

MoHFW releases list of 'At-Risk' countries in view of COVID-19 new variant Omicron

To contain the spread of the new COVID-19 variant, the Government has, on 9 December 2021, released new travel guidelines to be followed by States and Union Territories. The list of countries from where travellers will need to follow additional measures on arrival in India include the United Kingdom, South Africa, Brazil, Bangladesh, Botswana, China, Mauritius, New Zealand, Zimbabwe, Singapore, Hong Kong and Israel.



Website link:

<https://www.mohfw.gov.in/pdf/ListofCountriestobereferredtoincontextofGuidelinesforinternationalarrivalsdated28thNovember2021updatedon30112021.pdf>

Measures taken by Government to minimise threat of any resurgence of COVID-19 pandemic

The Government of India continues to keep a close watch over COVID-19 situation in the country by strict observance of a five-fold strategy of test-track-treat, COVID-19 appropriate behaviour and vaccination against the pandemic to prevent and mitigate the impact of any resurgence of COVID-19 trajectory in the country. The Government of India has also established an Indian SARS-CoV-2 Genomic Surveillance Consortium (INSACOG) for genomic sequencing and tracking the evolution of variant strains of SARS-CoV-2.

The Department of Biotechnology (DBT) is supporting the implementation of two key programmes, the National Biopharma Mission (NBM) and the Ind-CEPI Mission, which have enabled the strengthening of the national vaccine development ecosystem, so as to effectively respond to pandemics. Furthermore, 'Mission COVID Suraksha – the Indian COVID-19 Vaccine Development Mission', was launched as part of the third stimulus package, Atmanirbhar Bharat 3.0, for promoting research and development of India COVID-19 vaccines. The mission, led by DBT, is implemented by Biotechnology Industry Research Assistance Council (BIRAC).

Support is provided to States/UTs to enhance preparedness and response capacities against COVID-19 and other public health emergencies. Various initiatives have been taken by the Government to provide technical guidance and further strengthen health infrastructure, availability of essential logistics, including drugs and medical oxygen supply to manage COVID-19.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1778832>

Ministry of Health undertook several steps for the well-being of COVID-19 warriors including life insurance benefits

The MoHFW has taken a number of steps to improve the well-being of healthcare workers managing COVID-19. Few of the actions taken in this regard include:

- With the launch of COVID-19 vaccination initiative on 16 January 2021, healthcare workers were identified as one of the first priority group. State Governments/UT administrations have been repeatedly urged to ensure that the medical professionals engaged in COVID-19 related work are suitably vaccinated.
- The MoHFW provided guidelines on infection prevention and control practices to the State Governments to minimise the risk of infection to healthcare workers.
- For high-risk exposures, healthcare workers are provided with a quarantine period initially for one week and thereafter taking the profile of the health worker a decision to be taken for a further period of one week. An advisory to this effect for managing healthcare workers working in COVID-19 and non-COVID-19 areas of the hospital was issued by the MoHFW on 18 June 2020.
- The MoHFW, on 18 June 2020, as per directions issued by the Supreme Court in a batch of writ petitions and in exercise of powers delegated under Section 10(2) of the Disaster Management Act, 2005, directed States/UTs to ensure that salaries of doctors and healthcare workers during COVID-19 related duties shall be released on time.
- The MoHFW, in consultation with the Department of Personnel Training, has also directed State Governments to consider quarantine period of healthcare workers as 'on duty'.
- The Union Ministry of Health & Family Welfare has also issued directions to the Chief Secretary of the States/Union Territories on provision for accommodation facilities for quarantine of healthcare workers. States/UTs were also advised to explore various rostering options.
- In the context of COVID-19, the Epidemic Diseases (Amendment) Ordinance, 2020 was promulgated on 22 April 2020. Further, this ordinance, brought before the Parliament, has been passed and notified on 29 September 2020. The amendment provides for safety and security of healthcare service personnel (HSPs) from acts of violence.
- Life insurance benefits (Rs 50 lakh to Rs 22.12 lakh to healthcare providers) are provided under Pradhan Mantri Garib Kalyan Package (PMGKP): Insurance Scheme for Health Workers Fighting COVID-19. The benefits under the said scheme have been extended w.e.f. 21 October 2021 for a further period of 180 days.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1780152>

Government sanctions 1,563 PSA oxygen generation plants for improving public health facilities

The Government has sanctioned 1,563 pressure swing adsorption (PSA) oxygen generation plants of which 1,463 have been commissioned. These include 1,225 PSA plants, which have been installed and commissioned under PMCARES Fund in every district of the country. Additionally, 338 PSA plants have been set up by PSUs of Ministry of Petroleum & Natural Gas, Ministry of Power, Ministry of Coal, Ministry of Railways, etc. till date. The States have also been asked to install PSA plants in public health facilities and facilitate installation of such plants in private health facilities.

The empowered group constituted by the Government on Emergency Management Plan and Strategy recommended that for calculation of oxygen demand, the required rates of oxygen flow in non-ICU and ICU setting are 10 and 24 litres per minute per day per case, respectively.

Based on the above, these plants can support more than 1,00,000 beds/day.

The PSA plants under PMCARES have been supplied and commissioned by the Central Government. States provided for space, three-phase power supply, DG set for uninterrupted power supply and availability of medical gas pipeline system (MGPS) for interconnection with PSA plant.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1780145>

PM-ABHIM launched to strengthen pandemic research

A new scheme, 'Prime Minister Ayushman Bharat Health Infrastructure Mission (PM- ABHIM)', has been approved with an outlay of Rs 1,347.00 crore for the Department of Health Research/ Indian Council of Medical Research (ICMR) towards bio-security preparedness and strengthening pandemic research and multi-sector national institutions and platform for the period 2021-22 to 2025-26 to fill the gaps in the healthcare system during the COVID-19 pandemic.

Major activities approved under the initiative include setting up of nine BSL-3 labs; regional research platform of the South East Asia Region Countries; four zonal National Institutes of Virology (NIVs); division for research on disease elimination sciences & health at National AIDS Research Institute (NARI), Pune; strengthening already functional Viral Research & Diagnostic Laboratories (VRDLs) and support for various other research institutes/centres to strengthen research on the pandemic.

Besides, the Department of Science and Technology (DST) has taken several steps to strengthen research on the pandemic. These initiatives include:

- A special call on scientifically identifying relevant yoga and meditation practices for immunity boosting, respiratory toning and stress reduction.
- Formation and support to a group across several IITs and artificial intelligence (AI) start-ups to find artificial intelligence solutions to COVID-19 diagnostics and predictions.
- Linked with technology industry such as International Business Machines Corporation (IBM), NVIDIA, etc., which have agreed to provide resources, such as supercomputing time and software stacks pro bono for COVID-19 research.
- Activation of relevant DST autonomous institutions in providing solutions. A particularly successful institute has been Sree Chitra Tirunal Institute of Medical Science and Technology, which has already come up with over 10 effective products, several of which are of a breakthrough nature and are being commercialised rapidly.
- Centre for Augmenting War with COVID-19 Health Crisis (CAWACH) programme of DST for supporting COVID-19 start-up solutions from all over the country.
- A total of 94 projects with total outlay of Rs 20.56 crore were sanctioned by Science and Engineering Research Board (SERB).

Centre for Scientific and Industrial Research (CSIR) is also implementing two kinds of projects for the purpose. Under the New Millennium Indian Technology Leadership Initiative (NMITLI) schemes, a special call for COVID-19 projects, six projects are being implemented. CSIR had given special call to CSIR labs inviting projects related to Coronavirus. In this category, 47 projects were supported. An amount of Rs 7,299.244 lakh has been allocated for these projects.

DBT is supporting the implementation of two key programmes, the National Biopharma Mission (NBM) and the Ind-CEPI Mission, which have enabled the strengthening of the national vaccine development ecosystem, so as to effectively respond to pandemics.

Furthermore, Mission COVID Suraksha, the Indian COVID-19 vaccine development mission, was launched as part of the third stimulus package, Atmanirbhar Bharat 3.0, for promoting research and development of India COVID-19 vaccines. The mission is led by DBT and is implemented by Biotechnology Industry Research Assistance Council (BIRAC), at a total cost of Rs 900 crore.

INSACOG, a multi-agency inter-ministerial consortium from DBT, Indian Council of Medical Research (ICMR), CSIR, and MoHFW, has been established for genomic surveillance of SARS-CoV-2.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1777641>

Air Suvidha portal assisting international passengers with all COVID-19 related guidelines

To ensure the smooth movement of international travellers arriving in India, Ministry of Civil Aviation and Ministry of Health & Family Welfare have mandated contactless self-declaration at Air Suvidha portal. International passengers coming to India can now experience a smooth and hassle-free arrival process, by applying online to fill self-reporting forms. There is no quarantine applicable to passengers arriving with negative RT-PCR report.

Air Suvidha is the first of its kind digital portal for easing international passenger arrival in India. This portal developed by MOCA aids passengers in providing details of their travel and final stay along with RT-PCR, vaccination status, etc. In today's time, this helps state officials in contact tracing. The implementation of Air Suvidha intends to provide hassle-free, queue-free, and convenient air travel to all international passengers arriving in India.

To ensure necessary prevention of the Omicron variant of the COVID-19 virus, the exemption forms from the Air Suvidha portal have been discontinued, and filling of the details have been made compulsory for all international passengers arriving in India. All international passengers arriving in India are mandated to declare their current health status prior to boarding, on the Air Suvidha portal along with the required documents: copy of passport, PCR negative certificate from a test conducted within 72 hours of departure and vaccination certificate.

Website link:

<https://www.newdelhiairport.in/airsuvidha/apho-registration>



CFTRI lab to handle bulk of RT-PCR tests

With COVID-19 testing target in Mysuru increasing from 3,000 to 5,000 a day amid Omicron scare, the bulk of RT-PCR tests are now being handled by the lab at the CSIR-Central Food Technological Research Institute (CFTRI). The Microbiology Department’s Viral Research and Diagnostic Laboratory (VRDL) facility on the premises of KR Hospital is shut for restoration.

The VRDL facility, which has been in the forefront of COVID-19 testing since April 2020, has not been in operation for the last few days over a short-circuit incident and the structure housing the lab requires immediate repairs due to leakage from the roof.

The MMCRI Testing Centre (Viral Research and Diagnostic Laboratory) and the CSIR-CFTRI testing centre are the two public institutions that have been providing services to the public free of cost since the outbreak. The CSIR-CFTRI came forward to support the district administration in the fight against the pandemic by setting up the testing centre and carrying out RT-PCR tests since testing was key for containing the spread of the disease.

VRDL is a part of a network of labs established across the country by the Department of Health Research, Government of India. The rise in the number of viral outbreaks and the resultant mortality from them had been cited as key reasons for the launch of a network of such hi-tech labs. The National Institute of Virology, Pune and the National Centre for Disease Control, Delhi will be the top laboratories for the network while the National Institute of Epidemiology, Chennai will be supervising the data generated by the network of labs.

Website link:

<https://www.csir.res.in/sites/default/files/01%20To%2005%20December%20%202021.pdf>

ICMR invites Expression of Interest (Eoi) 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 health care 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





RESEARCH SUPPORTS

The 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

SUTRA: A novel approach to modelling post-Omicron case projections for India

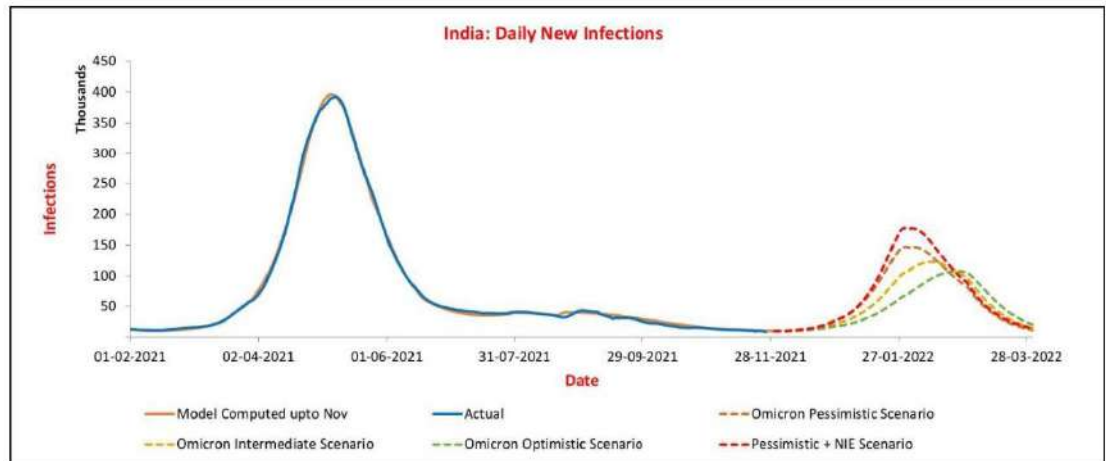
**Multi-label segmentation and detection of COVID-19 abnormalities from chest radiographs using deep learning:
Study by Dr BR Ambedkar National Institute of Technology (NIT) Jalandhar**

Omicron chase set to change genome sequencing game plan, says scientist associated with COVID-19 diagnostics

SUTRA: A novel approach to modelling post-Omicron case projections for India

SUTRA stands for Susceptible, Undetected, Tested (positive), and Removed Approach. A novel feature of our model is that it allows estimation of parameters from reported infection data, unlike most other models that estimate parameter values from other considerations. This gives the model the ability to predict the future trajectory well, as long as parameters do not change. In addition, it is possible to quantify how the model parameter values were affected by various interventions to control the pandemic, and/or the arrival of new mutants.

The SUTRA consortium consists of five members of eminent national institutions. The members are Anurag Agrawal, IGIB; Manindra Agrawal, IIT Kanpur; Pramod Garg, THSTI; Madhuri Kanitkar, MUHS and M. Vidyasagar, IIT Hyderabad.



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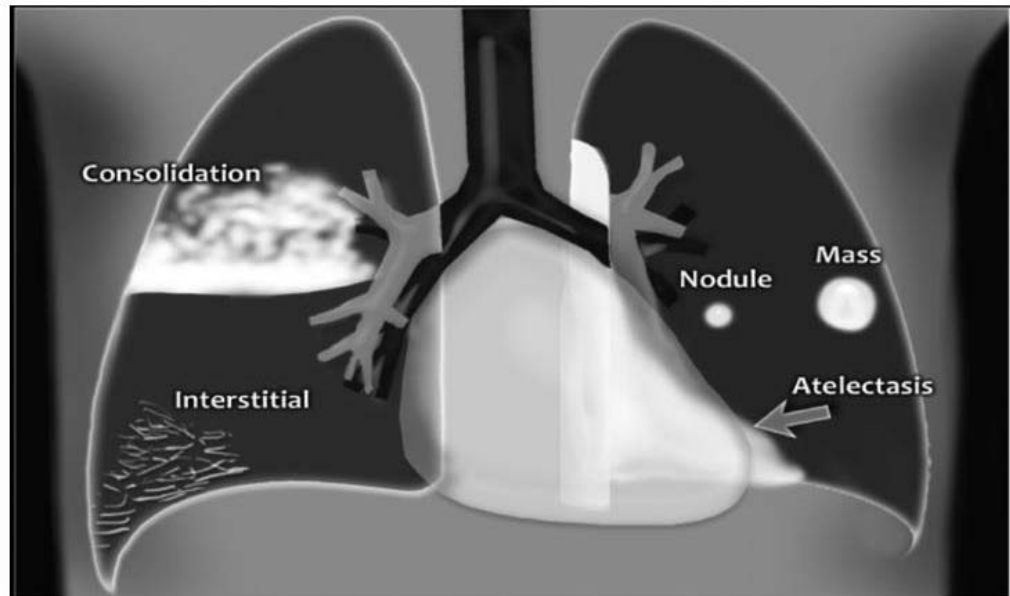
Website link:

<https://sutra-consortium.in/>

Multi-label segmentation and detection of COVID-19 abnormalities from chest radiographs using deep learning: Study by Dr BR Ambedkar National Institute of Technology (NIT) Jalandhar

Due to COVID-19, the demand for chest radiographs (CXRs) has increased exponentially. Therefore, researchers from NIT Jalandhar present a novel and fully automatic modified attention U-net (CXAU-Net) multi-class segmentation deep model that can detect common findings of COVID-19 in CXR images. The architectural design of this model includes three novelties: first, an attention U-net model with channel and spatial attention blocks is designed that precisely localise multiple pathologies; second, dilated convolution applied improves the sensitivity of the model to foreground pixels with additional receptive fields valuation, and third

a newly proposed hybrid loss function combines both area and size information for optimising model. The proposed model achieves average accuracy, DSC, and Jaccard index scores of 0.951, 0.993, 0.984, and 0.921, 0.985, 0.973 for image-based and patch-based approaches respectively for multi-class segmentation on chest X-ray I4 dataset. Also, average DSC and Jaccard index scores of 0.998, 0.989 are achieved for binary-class segmentation on the Japanese Society of Radiological Technology (JSRT) CXR dataset. These results illustrate that the proposed model outperformed the state-of-the-art segmentation methods.



Schematic appearance of various lung abnormalities

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<https://reader.elsevier.com/reader/sd/pii/S003040262101370X?token=43A46924E29B6329E5C4FC6AEB53499B8CE177481AEAE1A4E00F2FD02F86579A1E07B0994E72317506C43BD7DCAC3C3E&originRegion=eu-west-1&originCreation=20211215092752>

Omicron chase set to change genome sequencing game plan, says scientist associated with COVID-19 diagnostics

Research centres across the country are advising genome sequencing of positive samples detected using the RT-PCR kit that uses the S gene target failure (SGTF) strategy.

The Omicron VOC-21NOV-01 (B.1.1.529) genome also contains the spike deletion at position 69-70, which is associated with S gene target failure (SGTF) in some widely used polymerase chain reaction (PCR) tests. Such PCR tests evaluate the presence of three SARS-CoV-2 genes: Spike (S), N and ORF1ab. SGTF is defined as a PCR test where the N and ORF1ab genes are

detected (with Ct values ≤ 30) but the S gene is not. SGTF patterns can be used to assess the spread of Omicron VOC-21NOV-01 (B.1.1.529).

“This will reduce the scope of our search for Omicron and make it more focused,” Nagpur based CSIR-NEERI scientist Krishna Khairnar, a key researcher in COVID-19 diagnostics in India, told TOI. There are only a handful of test kits that target S gene. “If a person tests positive using such an RT-PCR kit, we can take his or her sample for whole genomic sequencing on priority. The chances of the variant detection rise manifold. This will save a lot of time and resources as genome sequencing is costly,” he said.

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Website link:

<https://www.csir.res.in/sites/default/files/01%20To%2005%20December%20%202021.pdf>





4

INDUSTRIAL COLLABORATIONS

The information related to contributions from industries, their timely pitching-in and joining the warfare against mitigating the COVID pandemic is provided here to sensitise the larger group of the community.

SECTION GUIDELINES

DRDO frames rules for transfer of technology related to COVID-19 mitigation

Airific Systems develops UV Heal SafeAir to rupture spread-chain of airborne diseases, including COVID-19

Bengaluru based startup Lycon Biotech develops personal air purifier to provide constant supply of filtered air for inhalation

IIT Bombay team led Airth launched antimicrobial air purifier

DRDO frames rules for transfer of technology related to COVID-19 mitigation

Defence Research and Development Organisation (DRDO) has listed numerous technologies related to COVID-19 pandemic for manufacturing, marketing and sale as per the specifications mentioned on its website. The counter COVID-19 technologies, developed by DRDO, are available in every part of the country to fight the pandemic. DRDO strategises to transfer these technologies to industries through licensing agreement for transfer of technology (LToT) between industries and the concerned lab of DRDO with no charges for ToT or for royalty when sold in India.

The signing of LToT will provide industry with the following benefits:

- Industry will become a bona fide ToT holder of DRDO
- Technology transfer document comprising bill of material, complete knowhow, processes, quality processes, etc. will be provided
- Necessary technical support will be provided by scientists of DRDO for technology under transfer
- Usage of DRDO logo will be allowed on the product
- Any new version of technology/product in future will be provided to the industry free of cost
- Ease of export of these products



Contact info:

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Website link:

<https://www.drdo.gov.in/transfer-technology-tot-drdo-developed-counter-covid-19-technologies>

Airific Systems develops UV Heal SafeAir to rupture spread-chain of airborne diseases, including COVID-19

During the pandemic, people refrained from travelling in public transport such as AC buses, cars, trains, and metros. Reason being, the danger of COVID-19 virus that has emerged as the biggest health threat globally is still looming. After the first wave, overcrowding at public places benefitted the virus and its variant led to an increase in mortality rates, especially in India. Till date, 11 efforts have been made to control the spread of the virus, and saving lives has been the biggest challenge. Also, being pre-prepared for the mutant phases where the virus becomes even deadlier is one of the major hurdles that need to be crossed.

To restrict the spread of the virus and to provide safer outdoor air, Airific Systems, a Delhi-based tech start-up in collaboration with CSIR-CSIO, has introduced UVHeal SafeAir, an ultra-modern UV-based HVAC air disinfectant for central air conditioning systems to break the spread of airborne diseases.



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Website link:

<https://www.csir.res.in/sites/default/files/21%20To%2025%20November%202021.pdf>

<https://www.uvhealsafeair.com/product.html>

Bengaluru based startup Lycon Biotech develops personal air purifier to provide constant supply of filtered air for inhalation

Bengaluru-based startup Lycon Biotech developed a personal wearable air purifying device targeted for the Healthcare community that delivers 99.9% purified air, thus minimising their risk of exposure posed by airborne bacteria and viruses. The device is equipped with a battery-powered air circulation unit and filters coated with nano-particles to prevent the penetration of the SARS-CoV-2 Virus into the bloodstream.

The air circulation unit has been designed in consultation with medical experts to ensure a constant supply of air irrespective of the surroundings without compromising on the safety of the user with battery life of 9 hours working on full charge.

Personal air purifier is jointly developed by Team Lycon and Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad.



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Website link:

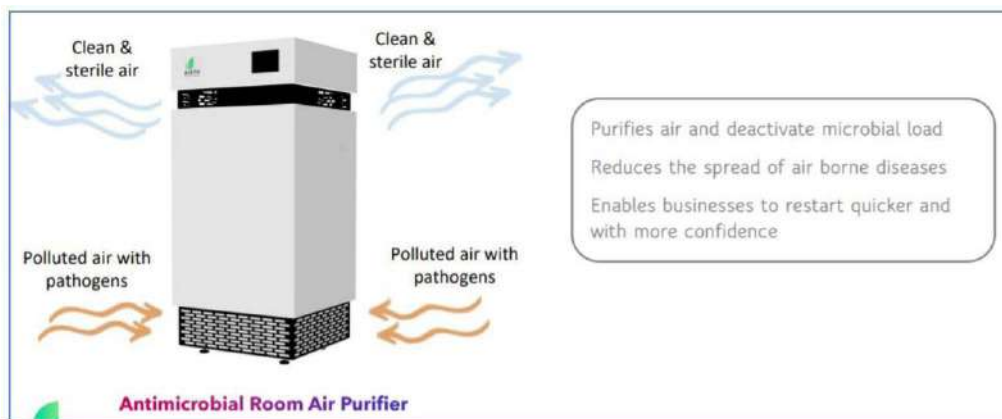
<http://www.lybio.in/>

<https://www.agnii.gov.in/innovation/personal-air-purifier>

IIT Bombay team led Airth launched antimicrobial air purifier

Airth launched the first of its kind antimicrobial air purifier. It is developed by the visionary team from IIT Bombay and uses patent filed & tested technology for protection against airborne diseases such as COVID-19. The device goes ahead of surface sanitisers and protects people within a closed space, such as an office. Airth antimicrobial air purifiers stand by their words to help organisations provide clean and pathogen-free air to their customers and employees.

Airth antimicrobial air purifiers provide a continuous solution installed within an occupied workspace. It further promises reliable and cost-effective protection against COVID-19 and indoor air pollution. Microbial reduction testing for these air purifiers has been done at NABL accredited FICCI lab with an efficiency of 99.87% within 5 minutes and removal of particles having size ~ 100 nm at CSIR – National physical lab.



Website link:

<https://airth.in/>

<https://www.agnii.gov.in/innovation/antimicrobial-airpurifier>





5

COVID RESOURCES AND OUTREACH

The 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

Vaccine Maitri: India exports COVID-19 vaccines to other nations

Government announces portal to register children orphaned by COVID-19

Union Minister launches aerial delivery of COVID-19 vaccines through Octacopter drones in Jammu

Himachal Pradesh: 100 per cent of its eligible population is fully vaccinated against COVID-19 disease

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

Press Information Bureau releases daily bulletin on COVID-19

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

Outreach initiatives by India Science Channel

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

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

CSIR bulletin on COVID news and updates about the pandemic

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

Vaccine Maitri: India exports COVID-19 vaccines to other nations

India is committed to supplying COVID-19 vaccines to other nations. Since the start of Vaccine Maitri programme in January 2021, India has supplied around 10 crore doses of COVID-19 vaccines to 94 countries and two UN entities in the form of grant, commercial export or through COVAX so far.



India is one of the largest contributors to the programme aiming at equitable distribution of COVID-19 vaccines from vaccine manufacturing nations to contribute to other countries.

In the fight against the COVID-19 pandemic during the second wave, support in the form of COVID-19 related equipment and medicines were received from more than 50 countries. These included supplies from foreign governments, private companies, Indian associations abroad, etc.

Website link:

<https://www.mea.gov.in/vaccine-supply.htm>



Government announces portal to register children orphaned by COVID-19

The COVID-19 pandemic has severely impacted the world, including India. Children have also been affected in many ways during the pandemic. Their perils range from loss of routine life and inability to go to school to facing anxiety due to loss of loved ones to COVID-19. Many children are reported to have lost both parents to the pandemic.

The Prime Minister has announced PM CARES for Children scheme to support children who have lost both parents or surviving parent or legal guardian or adoptive parents due to the COVID-19 pandemic. The scheme is accessible through an online portal on which applications of such children are uploaded on the portal by the State/UT governments.

As on 2 December 2021, 5,491 applications have been uploaded on the portal out of which, 3,049 have been approved by District Magistrates after following due process and 483 are pending for approval.

The scheme provides support for education and health and will create a corpus of Rs 10 lakh for each child when he or she reaches 18 years of age. This corpus will be used to give a monthly financial support/stipend from 18 years of age, for the next five years to take care of his or



her personal requirements during the period of higher education and on reaching the age of 23 years, he or she will get the corpus amount as one lump sum for personal and professional use. The scheme is accessible through an online portal (pmcaresforchildren.in).

The Ministry is implementing a centrally sponsored scheme, namely Child Protection Services (CPS) scheme, under which support is provided to States and UT Governments for delivering services to children in need and difficult circumstances. The Child Care Institutions (CCIs) established under the CPS scheme support, inter-alia, age-appropriate education, access to vocational training, recreation, healthcare, counselling, etc. and equally covers rural and urban children. As per the scheme guidelines, a quantum of sponsorship of Rs 2,000 per child per month is available for non-institutional care of children in need of care and protection and the provision for maintenance grant of Rs 2,160 per child per month for children living in a child care institution.

The Ministry has asked the States and UTs to take immediate action for care and protection of children adversely impacted by COVID-19, in accordance with the provisions of the Juvenile Justice (Care and Protection of Children) Act, 2015 and Rules thereunder, while leveraging the facilities funded under the Child Protection Services scheme. The Ministry has also issued advisories and guidelines for encouraging COVID-19 appropriate behaviour, monitoring of Child Care Institutions and coping strategies during the pandemic times for mental health support to children and care givers. A responsibility matrix defining the role of primary duty holders at all levels from State to Panchayati Raj Institutions was also shared with States/UTs.

Website link:

<https://pmcaresforchildren.in/>

Union Minister launches aerial delivery of COVID-19 vaccines through Octacopter drones in Jammu

The Union Minister of State (Independent Charge) for Ministry of Science and Technology, Dr Jitendra Singh, has launched a drone-driven aerial delivery facility to transport COVID-19 vaccines and emergency medicines to inaccessible and difficult areas in a short span of time in Jammu. The first consignment of 50 vials of COVID-19 vaccines was dropped by a drone near the international border in Marh area.

CSIR-National Aerospace Laboratories (CSIR-NAL) and CSIR-IIIM have teamed up with the Department of Health and Family Welfare of the Government of Jammu for aerial delivery of COVID-19 vaccines in remote areas.



The Octacopter drone can carry a payload of 10 kg with a range of 20 kilometres and it can fly at an operational altitude of 500 metres AGL (above ground level) at a maximum flying speed of 36 kmph, as per the minister.

On the occasion of the launch, Union Minister Dr Jitendra Singh formally handed over a consignment of COVID-19 vaccines to the drone operators, who then mounted the same on the drone, which took off on its aerial journey. It covered a distance of 15 km in 15 minutes, thereby cutting travel time and making it easier to deliver medical supplies to remote places.

More such demonstrations will be carried out by CSIR in remote hilly areas like Kishtwar, Rajouri, Poonch and Bhadarwah in the near future, Dr Jitendra Singh said.

Website link:

<https://www.csir.res.in/sites/default/files/26%20To%2030%20November%202021.pdf>

Himachal Pradesh: 100 per cent of its eligible population is fully vaccinated against COVID-19 disease

India's vaccination drive crosses another important milestone. Himachal Pradesh has become the first state in the country to fully vaccinate its eligible population against COVID-19. Himachal Pradesh has become the first state in the country to fully vaccinate 100 per cent of its adult population against COVID-19. According to the latest figure on COWIN App, more than one crore (1,13,03,150) COVID-19 vaccine doses have been administered as on 16 December 2021.



Website link:

<https://transformingindia.mygov.in/covid19/100-of-its-eligible-population-now-fully-vaccinated-against/>

<https://dashboard.cowin.gov.in/>

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 COVID-19 outbreak, the web portal serves as a one-stop online information guide to bring together a collection of resources in response to COVID-19. 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 string 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 the 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.

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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 its outbreak. The bulletin contains press releases 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 16 December 2021.



135.25 cr vaccine doses have been administered so far under Nationwide Vaccination Drive
 India's Active caseload currently stands at 87,245
 Active cases account for less than 1% of total cases, currently at 0.25%; Lowest since March 2020
 Recovery Rate currently at 98.38%; Highest since March 2020
 7,948 recoveries in the last 24 hours increases Total Recoveries to 3,41,54,879
 7,974 new cases in the last 24 hours
 Daily positivity rate (0.57%) less than 2% for last 73 days
 Weekly Positivity Rate (0.64%) less than 1% for last 32 days
 66.02 cr Total Tests conducted so far

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1782365>

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, more than 130 crore vaccine doses (1,35,99,96,267) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 17 December 2021, 08:00 AM, it stands at 3,47,26,049 cases, of which 3,41,62,765 have recovered. The recovery rate stands at 98.38 per cent while the case fatality rate has been pegged at 1.37 per cent.



Website link:

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

Outreach initiatives by India Science 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 7 July 2020, COVID-19 bulletin appraises 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 11 April to 6 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 conduct 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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Website link:

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

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 India. 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>

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 and help them, 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

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.

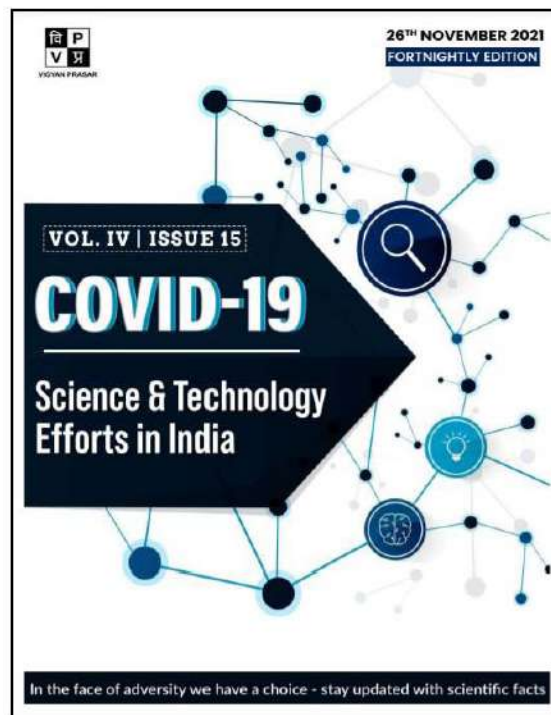


Website link:

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

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 at 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 26 November 2021.

Contact info:

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Website link:

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





6

COVID FACT-CHECKS

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

I. FAQs on OMICRON

Q. What is Omicron and why is it a Variant of Concern (VoC)?

A. This new variant of SARS-CoV-2, named B.1.1.529 or Omicron (based on Greek alphabets such as alpha, beta, delta, etc.) has recently been reported in South Africa. There are a large number of mutations in this variant, especially more than 30 in the viral spike protein, which is the major target for immune responses. The World Health Organization has declared Omicron as a Variant of Concern (VoC) because of the combination of mutations that previously individually have been associated with increased infectivity or immune evasion, and the sudden rise in number of positive cases in South Africa.

Q. Why is it called Omicron?

A. The WHO named the B.1.1.529 variant Omicron in the tradition of giving variants a Greek letter name.

Q. How easily does Omicron spread?

A. The Omicron variant is more likely to spread than the original SARS-CoV-2 virus. How quickly Omicron spreads, compared to Delta, is unknown. The CDC expects that anyone infected with Omicron will be able to spread the virus to others, even if they have been vaccinated or do not have symptoms.

Q. Can the currently used diagnostics methods, detect Omicron?

A. The RT-PCR method is the most widely accepted and used diagnostic method for SARS-CoV-2 variant. To confirm the presence of the virus, this method detects specific genes in the virus, such as Spike (S), Enveloped (E), and Nucleocapsid (N), among others. However, because the S gene in Omicron is heavily mutated, some of the primers may produce results indicating the absence of the S gene (called S gene drop out). This specific S gene dropout, along with the detection of other viral genes, could be used as an Omicron diagnostic feature. However, genomic sequencing is required for the final confirmation of the Omicron variant.

Q. Should we be concerned about the new VoC?

A. It is important to note that Omicron has been declared as a VoC based on the observed mutations, their predicted characteristics of increased transmission and immune evasion, and preliminary evidence of a negative change in COVID-19 epidemiology, such as increased re-infections. The definitive proof of increased re-infection and immune evasion is still awaited.

Q. Will Omicron cause more severe illness?

A. More research is needed to determine whether Omicron infections, particularly re-infections and breakthrough infections in fully vaccinated people, cause more severe illness or death than infection with other variants.

Q. What precautions should we take?

A. Individuals can reduce the spread of the COVID-19 virus by keeping a physical distance of at least 1 metre from others, wearing a well-fitting mask, opening windows to improve ventilation, avoiding poorly ventilated or crowded spaces, keeping hands clean, coughing or sneezing into a bent elbow or tissue, and getting vaccinated when their turn comes.

Q. Will there be a third wave?

A. Cases of Omicron are increasingly being reported from countries outside of South Africa, and given its characteristics, it is likely to spread to more countries, including India. However, the magnitude and extent of the increase in cases and, more importantly, the severity of the disease that will be caused, are still unclear. In addition, given the rapid pace of vaccination in India and the high exposure to the delta variant as evidenced by the high seropositivity, the severity of the disease is expected to be low. However, the scientific evidence is still evolving.

Q. Will the existing vaccines be effective against Omicron?

A. Although there is no evidence to suggest that existing vaccines do not work on Omicron, some of the mutations reported in the Spike gene may reduce the effectiveness of existing vaccines. However, vaccine protection also involves antibodies and cellular immunity, which should be relatively better preserved. Therefore, vaccines are always expected to provide protection against serious disease, and vaccination with available vaccines is crucial. If you are eligible, but not vaccinated, you must be vaccinated.

Q. Why do variants occur?

A. Variants are an integral part of evolution and as long as the virus is able to infect, replicate, and transmit, they will continue to evolve. Also, not all variants are dangerous and most of the time we don't notice them. It is only when they are more contagious, or can re-infect people, etc., that they gain importance. The most important step in avoiding the generation of variants is to reduce the number of infections.

Q. Is the Omicron transmission capacity higher than that for the COVID-19 Delta variant?

A. The Omicron version has raised alarm amongst epidemiologists who're involved that the mutations within the new version ought to make it greater transmissible than the preceding variants. Further researches are being conducted to decide whether or not the Omicron version is greater transmissible than different variants, which includes the Delta version. The variety of checks for COVID-19 has been regularly growing across the world. Another extreme subject is that the Omicron version has already been detected in numerous countries, which includes Japan, Belgium, Botswana, Hong Kong, Australia, the Netherlands, South Africa, and Israel.

In addition to increasing the variety of COVID-19 checks, epigenetic researchers are urgently trying to make clear any hard elements related to the COVID-19 Omicron version. It is uncertain whether or not the Omicron version will increase COVID-19 severity. However initial researches have pronounced that the Omicron version elevated hospitalisation for COVID-19 sufferers in South Africa, which may be associated with COVID-19 complications. In addition, it remains uncertain as to whether or not the Omicron version might also additionally sell different variants, which includes the Delta version, thereby suggesting that in addition research might be wanted for complete clarification.

Q. Is there any impact of the Omicron variant on the COVID-19 severity in cancer patients?

A. Previous studies have stated that the Delta variant or other variants can sometimes increase the severity of COVID-19 in cancer patients. COVID-19 has been reported to promote cell senescence and oxidative stress, which is linked to complications of COVID-19 in cancer patients. Additionally, various studies have reported that COVID-19 can cause increased

cytokine secretion, which is linked to the aggressiveness of COVID-19. However, more studies are needed to better understand the impact of the Omicron variant in cancer patients.

Q. Is the Omicron variant having an effect on monoclonal antibody treatments?

A. There is currently no virus-specific data available to determine whether monoclonal antibody treatments will continue to be effective against the Omicron variant. Based on data from other variants with significantly fewer changes in the RBD, the Omicron variant is expected to remain susceptible to some monoclonal antibody treatments, while others may be less effective.

Q. How is India responding?

A. The Indian government is monitoring the situation closely and issuing appropriate guidelines from time to time. Meanwhile, the scientific and medical community is prepared for the development and implementation of diagnostics, genomic surveillance, generation of evidence on viral and epidemiological characteristics, and development of therapies.

2. 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>

3. 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 B.1.617.1, 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>

4. 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>

5. 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

6. 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.

7. 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 (SpO₂) 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 ‘SpO₂’ reading on a pulse oximeter shows the percentage of oxygen in the blood. If your home SpO₂ 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 discolouration, 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 SpO₂ 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 SpO₂ 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, SpO₂ level must be checked before taking a walk. Now, walk for six minutes without a break on an even surface and measure the SpO₂ 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>

8. 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.

9. 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/dicolouration
- 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>

10. 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>

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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



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