



VIGYAN PRASAR

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FORTNIGHTLY EDITION

COVID-19

Science & Technology Efforts in India

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

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

This will depend on the availability of the same.

The e-Newsletter is continuously evolving and the aggregation of information is an unceasing process.

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



PREFACE

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.

We continue compiling new information every fortnight on the pandemic to continue sensitising our readers about COVID-related latest developments. The aim is to inform the readers and strengthen the usefulness of the information. This edition contains compilation and coverage of information related to research outputs, industry collaborations, COVID communications, resources and outreach, along with additional fact-check questionnaires.

Hopefully, the coverage about how the country is overcoming challenges with the help of knowledge will instil in you confidence and trust in the country’s scientists and scientific administrators that would ultimately result in inculcating scientific temper among the general public. The collective strength of the nation and the service spirit of the frontline workers have ensured that we are coming out of the perilous situation.

We wish an engaging reading to our audiences across all strata of the society and look forward to their suggestions and feedback at covidnewsletter@vigyanprasar.gov.in. Additionally, feedback questionnaires have been included, and a link has been provided for submission. This, in turn, would help our readers in finding desired and more relevant compiled information in subsequent editions.

26 July 2021

Vigyan Prasar

New Delhi



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

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EFFORTS IMPACTING COVID MITIGATION

The efforts made by various agencies, apex bodies, domain institutions, and so on, who 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

Government establishes a network of COVID-19 biorepositories

IIT Mandi develops an antibacterial self-cleaning material for face masks and PPE

ICMR invites expression of interest for validation of rapid antigen detection assays for COVID-19

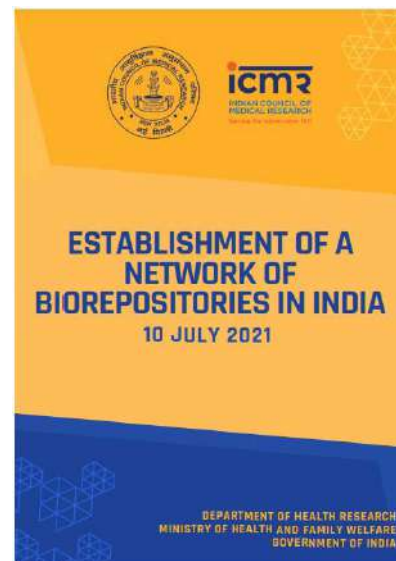
Serum Institute of India gets DCGI's nod to manufacture Sputnik V in India for test and analysis

ESIC felicitates donors to ESIC hospitals during COVID-19 pandemic

DBT-BIRAC supports setting up of a viral BSL-3 facility and COVID-19 vaccine testing centre at IISc

Government establishes a network of COVID-19 biorepositories

In the backdrop of the COVID-19 pandemic, while it is of paramount importance to provide early diagnosis and treatment to all infected individuals, it is also critical to promote research and development for larger public health benefits. For the development and validation of new diagnostics, therapeutics, or vaccines, access to different kinds of clinical samples from infected patients is an essential requirement. Currently, there is no structured mechanism for collecting and storing these valuable clinical samples. So, it is important to create designated biorepositories for collecting, storing, and maintaining clinical samples (oropharyngeal/nasopharyngeal swabs, bronchoalveolar lavage, sputum, blood, urine, and stool) of COVID-19 patients. The samples will be used to develop validated diagnostics, therapeutics, vaccines, etc. The samples will also be a valuable resource for research and development-related activities to understand the early predictors of disease severity, the immunopathogenesis of the disease, etc. In this context, the Indian Council of Medical Research (ICMR) released a document on COVID-19 biorepositories. This document lays down the brief processes and operational mechanisms for establishing COVID-19 biorepositories in the country. The objectives of this document are:



1. To establish organised and dedicated biorepositories of well-characterised clinical samples of COVID-19 patients.
2. To judiciously use these samples to promote research and development towards indigenous diagnostics, therapeutics and vaccines in line with the Make in India initiative.
3. To promote Indian academia, industry and commercial entities for developing novel solutions for COVID-19 prevention, control and treatment.
4. To conduct research, to better understand COVID-19 disease in the Indian scenario.

Website link:

<https://www.icmr.gov.in/cbiorn.html>

IIT Mandi develops an antibacterial self-cleaning material for face masks and PPE

Indian Institute of Technology (IIT) Mandi has developed a virus-filtering, self-cleaning and antibacterial material that can be used to make face masks and other PPE equipment. This path-breaking development by Dr Amit Jaiswal, Assistant Professor, School of Basic Sciences, IIT Mandi, along with his research scholars, Mr Praveen Kumar, Mr Shounak Roy, and Ms Ankita Sarkar comes at a time when it is imperative to develop techniques to stop the repetitive waves of the COVID-19 pandemic in the country.

Considering the urgency of the pandemic situation and cost-effectiveness, IIT Mandi has developed a strategy to repurpose existing PPEs, especially face masks, by providing an antimicrobial coating to these protective clothing/textiles. For this, nanomaterials were used to confer antimicrobial properties to polycotton fabric. Dr Jaiswal and his team incorporated nanometre sized sheets of molybdenum disulphide, MoS₂, the sharp edges and corners of

which act as tiny knives that pierce bacterial and viral membranes, thus killing them. “The ‘nanoknife’-modified fabrics demonstrated excellent antibacterial activity even after 60 cycles of washing,” said the lead researcher. All this makes it an excellent way to reuse masks and reduce biological waste generation.

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http://www.iitmandi.ac.in/news/articles/files/Facemask_Apr2021.pdf



ICMR invites expression of interest for validation of rapid antigen detection assays for COVID-19

ICMR invites applications for validation of rapid antigen detection tests for COVID-19 from all manufacturers who have developed rapid antigen test (RAT) kits. Requirements for validations are based on various categories, like first-time validation, revalidation, and validation with alternate sample types.

The gold standard RT-PCR diagnostic test for COVID-19 has limitations in terms of widespread availability. In view of this, there is urgent requirement for reliable and convenient rapid point-of-care antigen detection assays with high sensitivity and specificity. Such assays could be used as potential diagnostic tests in all possible public and private healthcare settings and made available for mass testing.

Deadline: Open till next announcement

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Website link:

https://www.icmr.gov.in/pdf/tender/Revised_EOI_for_Ag_kit_validation_28062021.pdf

Serum Institute of India gets DCGI's nod to manufacture Sputnik V in India for test and analysis

The DCGI has granted permission to the Serum Institute of India (SII) to manufacture the Sputnik COVID-19 vaccine in India for examination, test and analysis with certain conditions, official sources said.

The Pune-based firm has collaborated with Gamaleya Research Institute of Epidemiology and Microbiology, Moscow in Russia to develop Sputnik V at its licensed Hadapsar facility.

According to the four conditions set by the DCGI, the Serum Institute will have to submit a copy of the agreement between SII and the Gamaleya Research Institute of Epidemiology and Microbiology for transfer of cell bank and virus stock and a copy of agreement for technology transfer with Gamaleya. The SII has to submit a copy of the RCGM permission to import cell bank and virus stock and a copy of the RCGM permission to initiate research and development of viral vector vaccine Sputnik V.

The RCGM has raised some queries over SII's application and has sought a copy of material transfer agreement between the Pune-based firm and the Gamaleya Research Institute of Epidemiology and Microbiology. Russia's Sputnik V vaccine is currently being manufactured by Dr Reddy's Laboratories in India.

The SII plans to seek restricted emergency use permission of the vaccine in India.

Website link:

<https://ableindia.in/news/details/1135>

ESIC felicitates donors to ESIC hospitals during COVID-19 pandemic

Union Minister for Labour & Employment and Environment, Forests and Climate Change Shri Bhupender Yadav felicitated the donors who made generous donations of different equipment and material to ESIC hospitals during the COVID-19 pandemic.

A total of 33 ESIC hospitals with around 4000 dedicated COVID beds having 400 ventilators provided exclusive COVID-19 medical services to the infected patients and the general public of the area as either dedicated COVID-19 hospital or as a hospital with dedicated COVID-19 beds, as per the requirement of the local administration. From April 2020 till date, more than 50,000 COVID-19 patients have been provided in-patient treatment services through ESIC hospitals across the country. Plasma therapy, which is shown to save the lives of serious COVID-19 patients was also started in ESIC Medical College & Hospital, Faridabad (Haryana) and ESIC Medical College & Hospital, Sanath Nagar (Telangana).

ESIC made alternate provisions for providing routine medical services to ESI beneficiaries through tie-up hospitals, in case an ESIC hospital was declared as a dedicated COVID-19 hospital. In such cases, ESI beneficiaries could be referred to tie-up hospitals for prescribed secondary / SST consultation / admission / investigation. ESI beneficiaries were also allowed to seek emergency/non-emergency medical treatment from tie-up hospitals directly without referral letter, in accordance with his/her entitlement.

In addition to the existing cash benefits under ESI Act, a COVID-19 relief scheme has been launched, in which periodic payment @ 90 per cent of average wages of the deceased insured worker is paid to the eligible dependents. Till date, the periodic payment was payable only against the death of the insured worker caused by employment injury. Now death caused by COVID-19 has also been included. Against the abstention of insured worker being infected with COVID-19, sickness benefit @ 70 per cent of average daily wages for 91 days for the period of abstention can be claimed. In case of insured worker being rendered unemployed, he/she can avail relief under Atal Beemit Vyakti Kalyan Yojana (ABVKY) @ 50 per cent of average per day earning for a maximum 90 days. For availing this relief, the insured worker can submit the claim online at www.esic.in.



The Employees' State Insurance Corporation is a pioneer social security organisation providing comprehensive social security benefits like reasonable medical care and a range of cash benefits in times of need such as employment injury, sickness, death, etc. It covers about 3.4 crore of family units of workers and provides matchless cash benefits and reasonable medical care to its 13.24 crore beneficiaries. Today, its infrastructure has increased manifold with 1502 dispensaries (including mobile dispensaries) / 308 ISM units and 159 ESI hospitals, 744 branch/pay offices and 64 regional and sub-regional offices. The ESI scheme today stands implemented in 566 districts in 34 states and union territories of the country.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1735901>

DBT-BIRAC supports setting up of a viral BSL-3 facility and COVID-19 vaccine testing centre at IISc

The Biotechnology Industry Research Assistance Council under the Department of Biotechnology (DBT-BIRAC) has funded the establishment of a COVID-19 vaccine testing centre at the viral bio safety level-3 (BSL-3) facility in the Centre for Infectious Diseases Research (CIDR) at the IISc.

At this centre, solutions to tackle COVID-19 – vaccines, antivirals, materials and equipment – from academic and industry partners will be tested via a fee-for-service model.

Before the COVID-19 pandemic hit, the Division of Biological Sciences at IISc headed by Umesh Varshney, Professor in the Department of Microbiology and Cell Biology (MCB) had commissioned the establishment of a dedicated viral BSL-3 facility at CIDR with funding from DBT-IISc partnership, to support research on highly pathogenic human viruses. The construction of the facility was completed in October 2020. It became operational in January 2021 with all the necessary standard operating procedures (SOPs), under the guidance of Usha Vijayraghavan, Dean, Division of Biological Sciences. Shashank Tripathi, Assistant Professor in MCB, was designated the nodal person in charge of the facility. It was made available to academic labs (within and outside IISc) and industry, for training personnel and carrying out antiviral research.

By February 2021, Tripathi's lab – which studies emerging viral pathogens – began working on establishing cell culture and animal models to study SARS-CoV-2 in the viral BSL-3 facility on priority. This included isolation, growth and characterisation of SARS-CoV-2 viruses from COVID-19 patient samples, and the establishment of a Syrian hamster model for evaluating COVID-19 vaccines and antivirals.



These reagents and models were used to identify SARS-CoV-2 antivirals, and evaluate the COVID-19 thermostable sub-unit vaccine candidate being developed by a team led by Raghavan Varadarajan, Professor at the Molecular Biophysics Unit, IISc, in collaboration with IISc-incubated start-up Mynvax. In addition, Tripathi's lab has been helping industry partners GeNext Genomics in evaluating COVID-19 antibodies, Biomoneta in testing sterilisation technologies, and Glycovax in evaluating a COVID-19 peptide conjugate vaccine in animal models.

To expand these operations, Tripathi and KN Balaji (Convenor, CIDR and Professor at MCB), applied for and received funding under the DBT-BIRAC's Mission COVID Suraksha, which aimed to support labs with well-established models to study SARS-CoV-2.

The DBT-BIRAC support will allow the augmentation of the existing facility with high-end equipment and initial support for personnel operating the facility. Research will also be conducted to develop high-throughput assays for evaluating antivirals and vaccines against SARS-CoV-2.

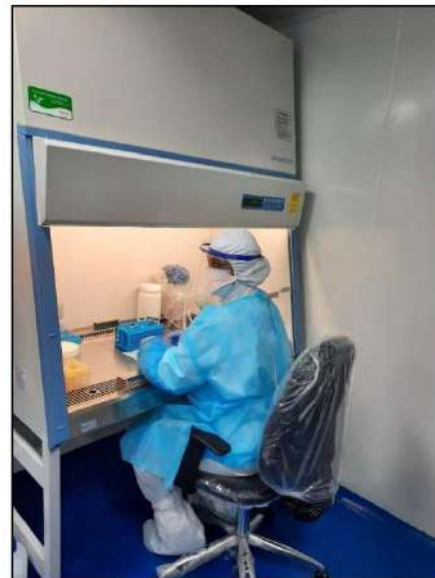
In addition to SARS-CoV-2, this facility will also support the development of antivirals and vaccines against other viral pathogens responsible for diseases like influenza, dengue, chikungunya and HIV, through similar fee-for-service collaborations with academic and industry partners.

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Website link:

<https://www.iisc.ac.in/events/viral-bsl-3-facility-and-dbt-birac-covid-19-vaccine-testing-centre-at-iisc/>





2

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

IIT Mandi reveals the structure of a key protein in the COVID-19 virus in the host cell environment

Plant derived active compounds as potential anti SARS-CoV-2 agents, finds an in-silico study by IIT Indore

IIT Patna has developed a deep learning empowered COVID-19 diagnosis technology using chest CT scan images or collaborative edge cloud computing platform

An update on antiviral therapy against SARS-CoV-2: An IIT Indore study

Tissue engineering and its significance in healthcare during the COVID-19 pandemic: Potential applications and perspectives

IIT Indore performs mutational analysis of structural proteins of SARS-CoV-2

IIT Indore studies insights into Plasmodium and SARS-CoV-2 co-infection driven neurological manifestations

Cloud computing to solve problems of COVID-19 pandemic

Advancements in biosensor technologies for medical field and COVID-19 pandemic: A study by NIT Jalandhar

How artificial intelligence and internet of things (IoT) can aid in the distribution of COVID-19 vaccines: A perspective

IISc studies conformational flexibility and structural variability of SARS-CoV-2 S-protein

IIT Gandhinagar contributes in prevalence study of SARS-CoV-2 in communities through wastewater surveillance: A potential approach for estimation of disease burden

Antidrug resistance in the Indian ambient waters of Ahmedabad during the COVID-19 pandemic: An IIT Gandhinagar study

Coalescence of co-infection and antimicrobial resistance with SARS-CoV-2 infection: The blues of post-COVID-19 world

IIT Mandi reveals the structure of a key protein in the COVID-19 virus in the host cell environment

A team of researchers from IIT Mandi, led by Dr Rajanish Giri has elucidated the structure of a key protein in the COVID-19 virus. This helps in understanding its mode of action, its role in the spread and severity of the disease and development of antiviral therapeutics.

The team has experimentally studied the structural conformations of SARS-CoV-2 NSP1 under various conditions – in an organic solvent, membrane mimetic environment, and inside liposomes. Using various analytical techniques and molecular dynamic simulations, the researchers have shown the dynamic changes in the conformation of the IDR of the NSP1, in response to its surroundings, due to hydrophobic and electrostatic interactions between the protein and the environment.

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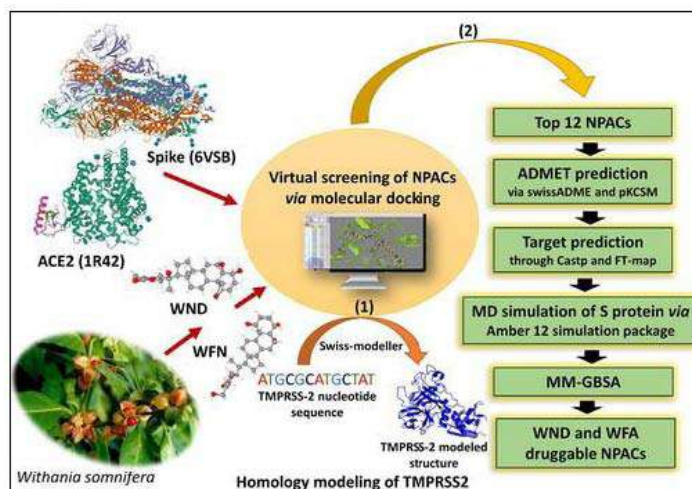
Website link:

http://www.iitmandi.ac.in/news/articles/files/RG_covid19_NSPI_C.pdf

Plant derived active compounds as potential anti SARS-CoV-2 agents, finds an *in-silico* study by IIT Indore

Plants are a valued potential source of drugs for a variety of diseases and are often considered less toxic to humans. Antiviral compounds that may potentially target SARS-CoV-2 antigenic spike (S) and host proteins – angiotensin-converting enzyme2 (ACE2), and transmembrane serine protease2 (TMPRSS2) – were investigated; and 36 phytochemicals were scrutinised from 15 Indian medicinal plants known to be effective against RNA viruses via molecular docking. Besides, the TMPRSS2 structure was modelled and validated using the SWISS-MODEL. Docking was performed using AutoDock Vina and 4.2 followed by visualisation of the docking poses on Pymol version 2.4.0 and Discovery Studio Visualizer. Molecular docking showed that 12 out of 36 active compounds interacted efficiently with S, ACE2, and TMPRSS2 proteins. The ADMET profile generated, using the swissADME and pkCSM server, revealed that these compounds possessed druggable properties. The Amber 12 simulation package was used to carry out energy minimisations and molecular dynamics (MD) simulations. The total simulation time for both S protein – WFA and S protein – WND complexes was 300 ns (100 ns per replica). A total of 120 structures were extracted from the last 60 ns of each MD simulation for further analysis. MM-PBSA and MM-GBSA were employed to assess the binding energy of each ligand and the receptor-binding domain of the viral S-protein. The methods suggested that WND and WFA showed thermodynamically

favourable binding energies, and the S protein had a higher affinity with WND. Interestingly, Leu455 hotspot residue in the S protein, also predicted to participate in binding with ACE2, was engaged by WND and WFA.



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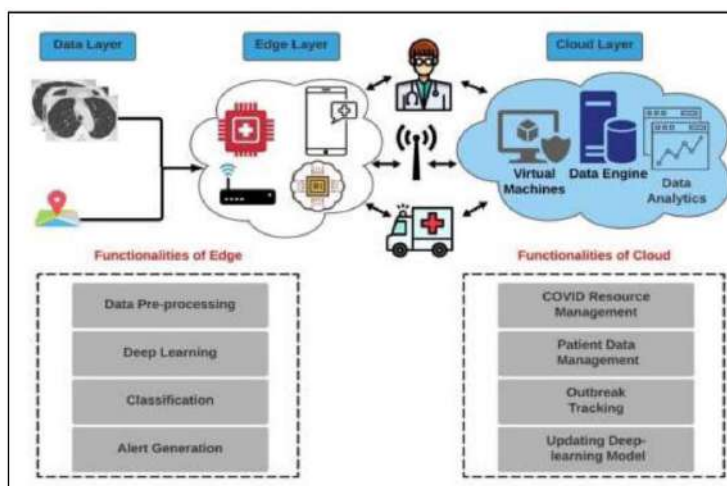
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<https://www.tandfonline.com/doi/pdf/10.1080/07391102.2021.1947384?needAccess=true>

IIT Patna has developed a deep learning empowered COVID-19 diagnosis technology using chest CT scan images for collaborative edge cloud computing platform

The novel coronavirus outbreak has spread worldwide, causing respiratory infections in humans, leading to a huge global pandemic COVID-19. According to WHO, the only way to curb this spread is by increasing the testing and isolating the infected. Meanwhile, the clinical testing currently being followed is not easily accessible and requires time to give the results.



In this scenario, remote diagnostic systems could be a handy solution. Some existing studies leverage the deep learning approach to provide an effective alternative to clinical diagnostic techniques. However, it is difficult to use such complex networks in resource constraint environments. To address this problem, a fine-tuned deep learning model inspired by the architecture of the MobileNetV2 model has been developed. The developed model is further optimised in terms of its size and complexity to make it compatible with mobile and edge devices. The results of extensive experimentation performed on a real-world dataset consisting of 2482 chest computerised tomography scan images strongly suggest the superiority of the developed fine-tuned deep learning model in terms of high accuracy and faster diagnosis time. The proposed model has achieved a classification accuracy of 96.40 per cent, with approximately 10 times shorter response time than the prevailing deep learning models. Further, McNemar’s statistical test results also prove the efficacy of the proposed model.

Contact info:

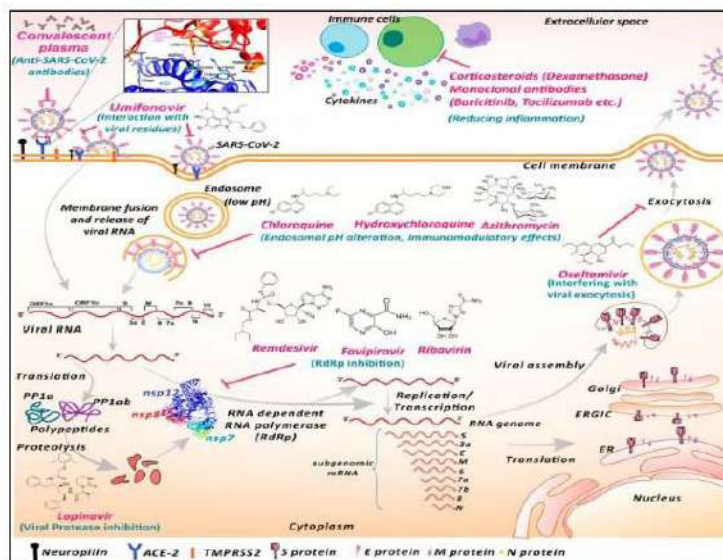
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<https://www.iitp.ac.in/images/pdf/COVID-19-Research-Highlight-Dr-Mahesh-Kolekar-07-07-2021.pdf>

An update on antiviral therapy against SARS-CoV-2: An IIT Indore study

Currently, various drugs are under investigation to treat an enormously increasing number of COVID-19 patients. This dreadful situation clearly demands an efficient strategy to quickly identify drugs for the successful treatment of COVID-19. Hence, drug repurposing is an effective approach for the rapid discovery of frontline arsenals to fight against COVID-19. Successful application of this approach has resulted in the repurposing of some clinically approved drugs as potential anti-SARS-CoV-2 candidates. Several of them are either, antimalarials, antivirals, antibiotics or corticosteroids. They have been repurposed based on their potential to negate virus or reduce lung inflammation. A large number of clinical trials have been registered to evaluate the effectiveness and clinical safety of these drugs, of which a few clinical studies are complete, the results of which are primary. World Health Organization (WHO) also conducted an international, multi-country, open-label,



Proposed mechanisms of repurposed drugs and therapies used against SARS-CoV-2 infection

randomised trial, which was a solidarity trial for four antiviral drugs. However, solidarity trials have a few limitations: no placebos used, any drug may show effectiveness for a particular population in a region, which may get neglected in solidarity trial analysis, etc. The ongoing randomised clinical trials can provide a reliable long-term follow-up result that will establish both clinical safety and efficacy of these drugs with respect to different regions, populations and may aid worldwide COVID-19 treatment research. This review presents a comprehensive update on majorly repurposed drugs namely chloroquine, hydroxychloroquine, remdesivir, lopinavir-ritonavir, favipiravir, ribavirin, azithromycin, umifenovir, oseltamivir as well as convalescent plasma therapy used against SARS-CoV-2. The review also summarises the data recorded on the mechanism of anti-SARS-CoV-2 activity of these repurposed drugs along with the pre-clinical and clinical findings, therapeutic regimens, pharmacokinetics, and drug-drug interactions.

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7982669/pdf/fphar-12-632677.pdf>

Tissue engineering and its significance in healthcare during the COVID-19 pandemic: Potential applications and perspectives

There is a great need for new therapeutic and diagnostic strategies to prevent infectious diseases worldwide. Tissue engineering covers the phenomenon of the evolution of tissue, its behaviour and growth factors that are better supported in the medical environment. This area of tissue engineering can support the treatment of COVID-19 patients and can help fight the current crisis and viral outbreaks in general.

This study aims to identify the significant advancement in tissue engineering for taking up challenges posed by COVID-19. The study discusses the major challenges faced during the pandemic, lists the significant advancements of tissue engineering in the medical field in a chronological order, discusses the positive impact of tissue engineering and finally, identifies and briefs its useful application during the ongoing pandemic situation. The primary importance of this branch of science is to provide biological alternatives that can perform full or partial functions of the damaged, malfunctioned and failing organs or tissues in humans. It is helpful for the supply of convalescent plasma to patients especially during COVID-19. A donor is selected strictly based on a validated case of COVID-19 contagion. The donor must confirm a negative follow-up molecular examination, free from manifestations. The usual good health and other pre-donation screening procedures are to be followed.

Contact info:

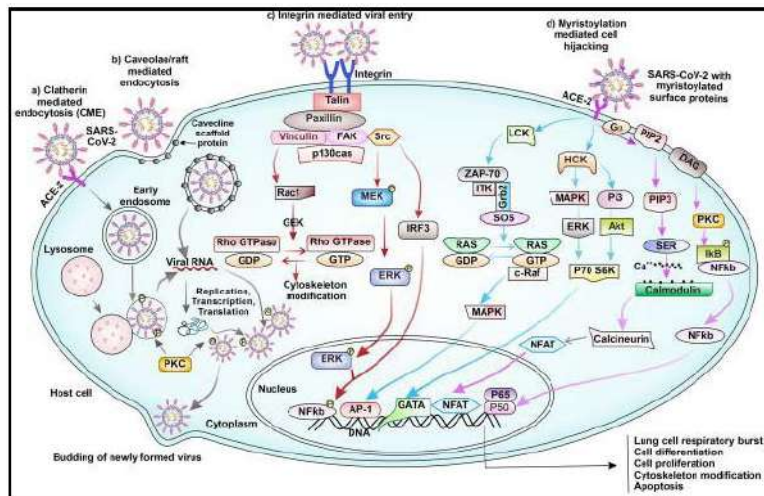
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<https://www.worldscientific.com/doi/epdf/10.1142/S242486222150007X>

IIT Indore performs mutational analysis of structural proteins of SARS-CoV-2

SARS-CoV-2 transmissibility is higher than that of other human coronaviruses. Therefore, it poses a threat to the populated communities. Mutations among envelope (E), membrane (M), and spike (S) proteins from different isolates of SARS-CoV-2 and plausible signalling influenced



Possible signalling pathways utilised by SARS-CoV-2 for cellular hijacking

by mutated virus in a host was investigated. Updated protein sequences from the NCBI virus database were procured. Mutations were analysed in the retrieved sequences of the viral proteins through multiple sequence alignment. Additionally, the data was subjected to ScanPROSITE to analyse if the mutations generated a relevant sequence for host signalling. Unique mutations in E, M, and S proteins resulted in modification sites like PKC phosphorylation and N-myristoylation sites. Based on a structural analysis, the study revealed that the D614G mutation in the S protein diminished the interaction with T859 and K854 of adjacent chains. Moreover, the S protein of SARS-CoV-2 consists of an Arg-Gly-Asp (RGD) tripeptide sequence, which could potentially interact with various members of the integrin family receptors. RGD sequence in S protein might aid in the initial virus attachment. Crucial host pathways, which the mutated isolates of SARS-CoV-2 may alter like PKC, Src, and integrin mediated signalling pathways, were speculated. PKC signalling is known to influence the caveosome/raft pathway, which is critical for virus entry. Additionally, the myristoylated proteins might activate NF-κB, a master molecule of inflammation. Thus the mutations may contribute to the disease pathogenesis and distinct lung pathophysiological changes. Further, the frequently occurring mutations in the protein can be studied for possible therapeutic interventions.

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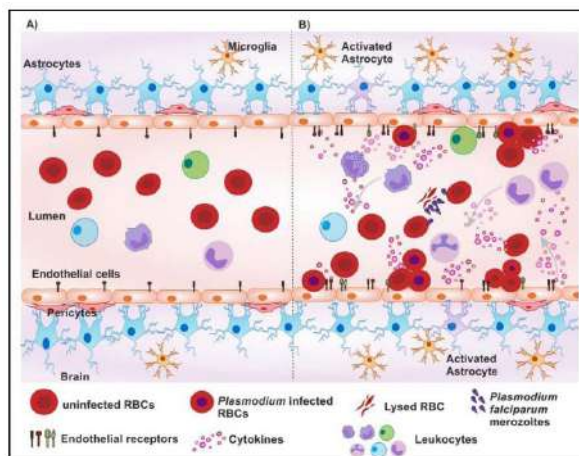
Website link:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7980187/pdf/main.pdf>

IIT Indore studies insights into Plasmodium and SARS-CoV-2 co-infection driven neurological manifestations

In malaria-endemic regions, people often get exposed to various pathogens simultaneously, generating co-infection scenarios. In such scenarios, overlapping symptoms pose serious diagnostic challenges. The delayed diagnosis may lead to an increase in disease severity and catastrophic events. The COVID-19 pandemic caused by SARS-CoV-2 has affected various areas globally, including malaria-endemic regions. The Plasmodium and SARS-CoV-2 co-infection and its effect on health are yet unexplored. The National Institute of Technology (NIT) Jalandhar has presented a case report of a previously healthy, middle-aged individual from the malaria-endemic area who suffered SARS-CoV-2 and Plasmodium falciparum co-infection. The patient developed severe disease indications in a short time period. The patient showed neurological

symptoms, altered haematological as well as liver-test parameters, which resulted in subsequent death in a short time span. NIT Jalandhar discussed the various aspects of this case regarding the treatment and haematological parameters. Further, NIT Jalandhar has also put forward perspectives related to the mechanism behind severity and neurological symptoms in this fatal parasite-virus co-infection case. In malaria-endemic regions, due to overlapping symptoms, suspected COVID-19 patients should also be monitored for diagnosis of malaria without any delay. The SARS-CoV-2 and Plasmodium co-infection could increase the disease severity in a short time span. In treatment, dexamethasone may not help in a severe case that has malaria as well as COVID-19 positive status. This will need further exploration.



Schematic representation of possible microenvironment at blood-brain barrier in:
A) normal individual, B) malaria and COVID-19 positive individual

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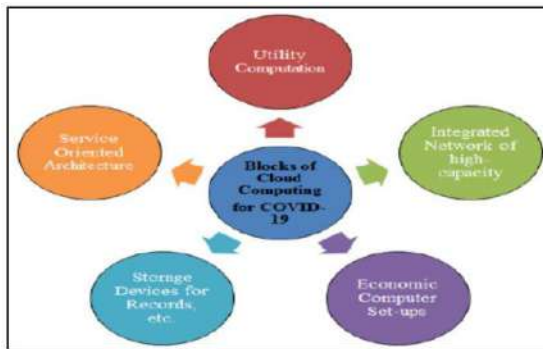
Website link:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8084910/pdf/main.pdf>

Cloud computing to solve problems of COVID-19 pandemic

Cloud computing facilitates collaboration, communication, and essential online services during the COVID-19 crisis. The current situation of the COVID-19 pandemic has compelled people to work from their homes, but they have to communicate and collaborate online. Thus, researchers from NIT Jalandhar see an essential role of cloud computing in taking up this challenge of working from home and delivering efficiently. A brief review of cloud computing service in the context of COVID-19 pandemic has been done using recent papers by searching keywords such as ‘cloud computing’ and ‘COVID-19’ from PubMed’s database SCOPUS and Google Scholar. During the lockdown situation, cloud computing technology helped provide commendable service in the healthcare domain. It provides an advanced infrastructure for facilitating digital transformation. A brief discussion has been initiated on how cloud computing components are vital for overcoming the ongoing situation. This paper also studies the remote working of cloud computing for the COVID-19 pandemic and finally it also identifies significant cloud computing applications for the COVID-19 pandemic. All countries are focussed on reducing this virus’s spread. So, this technology helps minimise the spread of this virus by providing online services. It provides an innovative environment that enhances the creativity and productivity of healthcare workers. This technology is efficient in detecting, tracking, and monitoring newly infected patients. In the future, this technology will insight and provide control over this infection

to save millions of lives worldwide. This technology is also quite helpful to forecast the future impact of the SARS-CoV-2 virus.



Success blocks in implementing cloud computing for solving COVID-19 related issues

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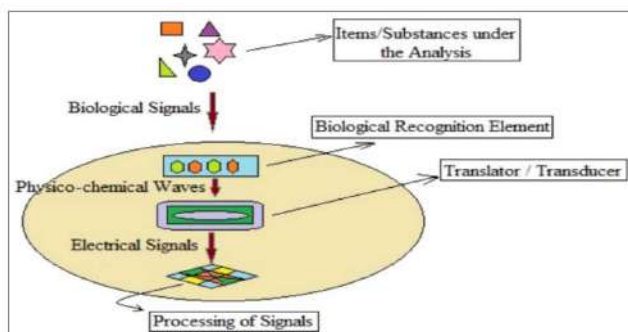
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<https://www.worldscientific.com/doi/epdf/10.1142/S2424862221500044>

Advancements in biosensor technologies for medical field and COVID-19 pandemic: A study by NIT Jalandhar

The World Health Organization (WHO) declared the COVID-19 outbreak as a public health emergency of international concern and then as a pandemic on 30 January and 11 March 2020, respectively. After such concern, the world scientific communities have rushed to search for solutions to bring down the disease’s spread, fast-paced vaccine development, and associated medical research using modern technologies. Biosensor technologies play a crucial role in diagnosing various medical diseases, including COVID-19. The present paper describes the major advancement of biosensor-based technological solutions for medical diagnosis, including COVID-19. This review-based work covers the biosensors and their working principles in the context of medical applications. The paper also discusses different biosensors and their applications to tackle medical issues, including this ongoing pandemic.



Working structure of biosensors

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<https://www.worldscientific.com/doi/epdf/10.1142/S2424862221500081>

How artificial intelligence and internet of things (IoT) can aid in the distribution of COVID-19 vaccines: A perspective

Prior to the COVID-19 pandemic, challenges related to our aging population and a shortage of healthcare professionals had already accelerated the deployment of artificial intelligence (AI) in healthcare. This trend has been hastened by the pandemic. Real time contact tracing applications are only one of the many AI applications being used to control the virus's spread and bolster public health response. Since the beginning of the COVID-19 crisis, artificial intelligence and the internet of things (IoT) have played an important role, convincing that they can be very useful tools in dealing with this type of crisis. As the world begins to get vaccinated against COVID-19, some important logistics and access questions arise. Indeed, in a country like India, where there are more than 1.3 billion people and limited resources, distributing the COVID-19 vaccine to the people can be a difficult task. The Indian government has approved two COVID-19 vaccines (Oxford-AstraZeneca's Covishield and Bharat Biotech's Covaxin), and the challenge of administering the two-dose vaccine to everyone will be a massive task.

In the first phase of India's vaccination campaign, priority was given to all healthcare and frontline workers. In the second phase, which began on 1 March 2021, people over 60 and those between the ages of 45 and 59 who have specific co-morbidities were given the doses. In the third phase, from 1 April 2021, everyone over the age of 45, regardless of co-morbidity status, is eligible for vaccination. The majority of COVID-19 vaccines necessitate temperature controlled storage. For example, Oxford-AstraZeneca's Covishield and Bharat Biotech's Covaxin require a storage temperature of 2-8°C. Sensor-based IoT technology, which enables continuous monitoring of data in real time, can be useful in ensuring an effective storage system. In the event of a temperature change, the sensors will read it and give a device warning for the next shipment of vaccines.

Furthermore, the whole process requires a large amount of data that must be handled and maintained in a cloud that is open to all stakeholders. The big issue is also monitoring real time details about the vaccine supply chain in remote areas of a country. The government can minimise this problem by using location-based analytics, which can assist in any form of vaccine supply chain problems.

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8087841/pdf/main.pdf>

IISc studies conformational flexibility and structural variability of SARS-CoV-2 S-protein

A research team from the Indian Institute of Science (IISc) has made a crucial breakthrough by successfully visualising different conformations or forms of the S protein of the SARS-CoV-2, the virus causing Covid-19, which exists in mainly two conformations: open and closed.

The work led by Somnath Dutta, assistant professor at the Molecular Biophysics Unit (MBU) of IISc has been published in Structure, a peer-reviewed scientific journal.

A salient feature of SARS-CoV-2 is the presence of the spike (S) proteins on the surface of the membrane that envelops the genetic material of the virus. They appear as characteristic crown-like spikes on the viral surface. And, the S protein is significant for multiple reasons: It

mediates the entry of the virus into the host cell and is also the site where neutralising antibodies produced by the host cells bind to the virus in order to inactivate it.

The team observed that around 68 per cent of the S proteins exist in open conformation at physiological pH 7.4, but their proportion decreases when the pH is slightly higher (pH 8.0) or lower (pH 6.5). This suggests that the interaction between the S protein and receptor is more favoured at physiological pH (pH 7.4) than on either side of the biological pH scale. The study will assist in developing novel therapeutic measures against SARS-CoV-2.

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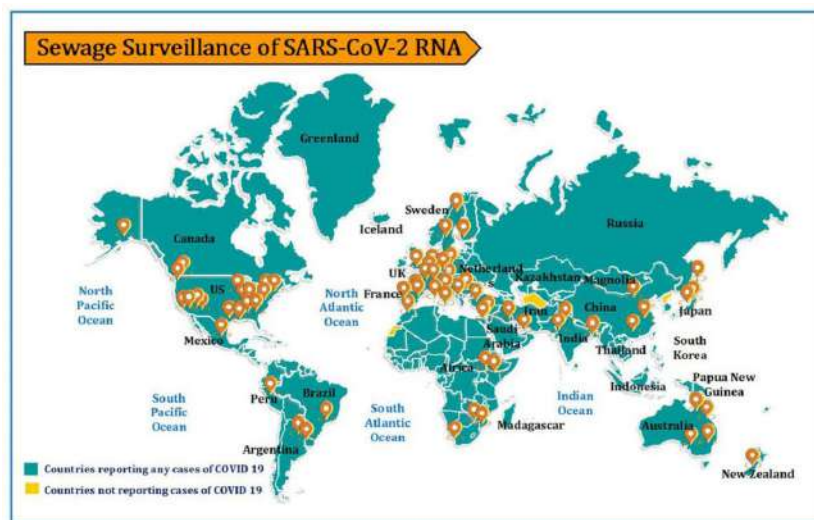
Website link:

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

<https://pubmed.ncbi.nlm.nih.gov/33932324/>

IIT Gandhinagar contributes in prevalence study of SARS-CoV-2 in communities through wastewater surveillance: A potential approach for estimation of disease burden

The episodic outbreak of COVID-19 due to SARS-CoV-2 is severely affecting the economy, and the global count of infected patients is increasing. The actual number of patients had been underestimated due to limited facilities for testing as well as the asymptomatic nature of the expression of COVID-19 on an individual basis. Tragically, for emerging economies with high population density, the situation has been more complex due to insufficient testing facilities for diagnosis of the disease. However, the recent reports about persistent shedding of viral RNA of SARS-CoV-2 in the human faeces have created a possibility to track the prevalence and trends of the disease in communities, known as wastewater-based epidemiology (WBE).



Location of institutions in the world, including the emerging economies, conducting sewage surveillance for early detection of SARS-CoV-2 outbreak

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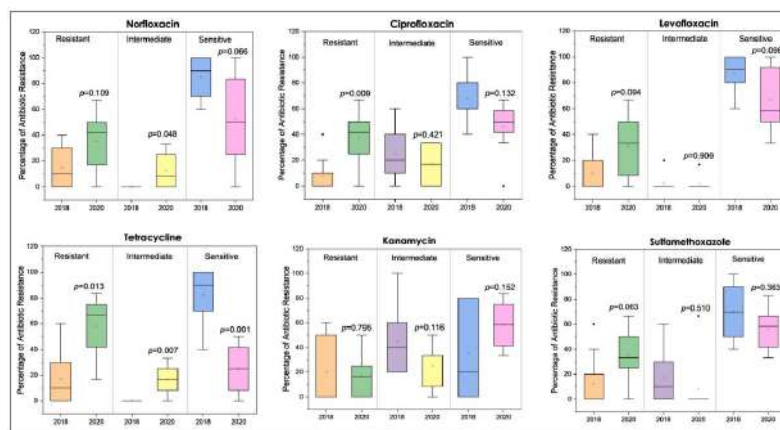
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<https://link.springer.com/content/pdf/10.1007/s40726-021-00178-4.pdf>

Antidrug resistance in the Indian ambient waters of Ahmedabad during the COVID-19 pandemic: An IIT Gandhinagar study

The ongoing COVID-19 pandemic increases the consumption of antimicrobial substances (ABS) due to the unavailability of approved vaccine(s). To assess the effect of imprudent consumption of ABS during the COVID-19 pandemic, IIT Gandhinagar has compared the 2020 prevalence of antidrug resistance (ADR) of Escherichia coli (E. coli) with a similar survey carried out in 2018 in Ahmedabad, India using SARS-CoV-2 gene detection as a marker of ABS usage. Researchers found a significant ADR increase in 2020 compared to 2018 in ambient water bodies, harbouring a higher incidence of ADR E.coli towards non-fluoroquinolone drugs. Effective SARS-CoV-2 genome copies were found to be associated with the ADR prevalence. The prevalence of ADR depends on the efficiency of WWTPs (wastewater treatment plants) and the catchment area in its vicinity. In the 2018 study, prevalence of ADR was discretely distributed, and the maximum ADR prevalence recorded was ~ 60 per cent; against the current homogenous ADR increase, and up to 85 per cent of maximum ADR among the incubated E.coli isolated from the river (Sabarmati) and lake (Chandola and Kankaria) samples. Furthermore, wastewater treatment plants showed less increase in comparison to the ambient waters, which eventually imply that although SARS-CoV-2 genes and faecal pollution may be diluted in the ambient waters, as indicated by low Ct-value and E.coli count, the danger of related aftermath like ADR increase cannot be nullified. Also, non-fluoroquinolone drugs exhibited overall more resistance than quinolone drugs. Overall, this is probably the first-ever study that traces the COVID-19 pandemic imprints on the prevalence of antidrug resistance (ADR) through wastewater surveillance and hints at monitoring escalation of other environmental health parameters. This study will make the public and policy holders concerned about the optimum use of antibiotics during any kind of treatment.



Comparison of antibiotic (antidrug) resistance against various antibiotics in 2018 and 2020 with the results of a statistical T-test

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8142275/pdf/main.pdf>

Coalescence of co-infection and antimicrobial resistance with SARS-CoV-2 infection: The blues of post-COVID-19 world

In viral respiratory infections, bacterial co-pathogens are widely known to co-infect, and they significantly increase the morbidity and mortality rate. During the influenza season, the advent of 2019-nCoV (novel coronavirus) has led to the widespread use of oral and intravenous antibiotics

and inhibitors of neuraminidase enzyme. Owing to causes such as extended intubation, the ubiquitous use of intrusive catheters, and compromised host immunity, coronavirus disease (COVID-19) patients are at heightened risk of secondary bacterial and fungal infections, leading to difficulty in their treatment. Apart from the pandemic, the primary risk is a likely surge in multidrug resistance. In this work, IIT Gandhinagar evaluated the coalescence of the present co-infection along with the COVID-19 and post-pandemic antimicrobial resistance due to high ongoing drug use for the treatment of COVID-19. They found that while there is currently limited evidence of bacterial infections in COVID-19, available proof supports the restricted use of antibiotics from an antibiotic stewardship viewpoint, primarily upon entry. Paramount attempts should be made to collect sputum and blood culture samples as well as pneumococcal urinary antigen monitoring in order to endorse stringent antibiotic usage. For antimicrobial stewardship, inflammatory markers like procalcitonin have been added, but such biomarkers are typically upraised in COVID-19. Antimicrobials cannot be completely removed in WWTPs and once they enter the water environment, possesses a great risk of inducing resistance to drugs in microbes. Hence, their prescription and administration should be regulated and alternate solutions such as vaccines, preventive measures and personal hygiene should be given top priority. It is imperative to establish an antimicrobial strategy discrete to COVID-19, as this pandemic has caused an outbreak of numerous other associated diseases and has the potential to drive microbial resistance. Coordinated plans are essential for this at the citizen, healthcare and policy levels.



Pernicious cycle of COVID-19, co-infection and AMR

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7897456/pdf/main.pdf>





3

INDUSTRY 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

Nosch Labs, CSIR-IICT ink pact for transfer of process knowhow to make anti-COVID-19 drug 2-DG

C-CAMP in collaboration with ABB Power Grids and Blackfrog Technologies develops cold chain technology for vaccine delivery

C-CAMP supported by Huawei India hands over life-saving innovations to Karnataka Government to counter COVID-19 emergency

C-CAMP is augmenting Karnataka's healthcare infrastructure for COVID-19 with support from Mercedes Benz R&D India

Nosch Labs, CSIR-IICT ink pact for transfer of process knowhow to make anti-COVID-19 drug 2-DG

CSIR-Indian Institute of Chemical Technology (IICT) and Nosch Labs have entered into a non-exclusive agreement for transfer of the process knowhow for synthesis of anti-Covid-19 drug 2-DG (2-Deoxy-D Glucose).

A press release said as per the pact signed on 11 June, Nosch Labs would commence manufacture of 2-DG drug after obtaining regulatory clearances from the Drugs Controller General of India (DCGI). The company intends to make the drug available at an affordable price, the release said.

Srivari Chandrasekhar, Director of CSIR-IICT, said the institute has been instrumental in addressing numerous societal challenges and providing innovative solutions to Indian industries in the area of drugs and pharmaceuticals, agrochemicals, lipids, catalysis, functional materials, environmental, analytical, biological and engineering sciences.

Website link:

<https://covid19csir.urdip.res.in/>

C-CAMP in collaboration with ABB Power Grids and Blackfrog Technologies develops cold chain technology for vaccine delivery

The Centre for Cellular and Molecular Platforms (C-CAMP), in partnership with Blackfrog Technologies and Hitachi ABB Power Grids in India, will provide public healthcare systems in the Southern metros of Bengaluru, Mysuru, and Chennai with an indigenously developed, innovative, portable cold chain transport device for efficient vaccine delivery.

This C-CAMP-supported innovation integrates an emerging technology in cold chain with easy accessibility and operability features that can address the critical issue of last mile vaccine spoilage due to thermal degradation in commonly used iceboxes. Having already made some inroads in remote locations of north-eastern India with the technology, the CSR grant received from Hitachi ABB Power Grids in India will help C-CAMP introduce it to urban, semi-urban and rural primary healthcare centres (PHCs) in southern India.

The innovation is a portable battery-operated medical-grade refrigeration unit whose unique selling propositions are pre-set temperatures, strict temperature-control and easy portability. Its thermoregulation properties are further boosted by advanced algorithms that have been proven to maintain a stable and uniform WHO-prescribed 2-8°C temperature environment despite heavy handling and high/low ambient temperatures.

C-CAMP and Hitachi ABB Power Grids come together
To aid India's immunization drive with cold chain technology to counter vaccine wastage.



- Battery operated
- Portable
- Thermo-regulated Refrigeration unit
- For last mile vaccine delivery





To be deployed in Chennai, Mysore and Bangalore.

C-CAMP
Hitachi ABB Power Grids
BLACKFROG TECHNOLOGIES

The patented technology assures vaccine viability for up to 12 hours, which in turn guarantees efficacious vaccine administration as well as better reuse and recycling of unused vaccines from any batch. Being geolocation tagged can considerably increase flexibility, tracking and traceability in the last-mile supply chain, making it ideal for variable demand as well as remote locations. Previous smaller deployments in remote PHCs in the north-east have demonstrated maximisation of vaccine usage to 99 per cent, making it a must-have technology to help India succeed in the world's most massive vaccination effort.

Website link:

<https://www.ccamp.res.in/efficient-last-mile-covid-19-vaccine-delivery-south-india-c-camp-and-hitachi-abb-power-grids-india>

C-CAMP supported by Huawei India hands over life-saving innovations to Karnataka Government to counter COVID-19 emergency

C-CAMP has received CSR support from leading ICT solutions provider Huawei to put to use two C-CAMP marquee COVID-19 innovations. These are in the form of non-invasive ventilator devices and state-of-the-art remote vitals monitoring technologies in public health hospitals and facilities in the state of Karnataka.

In response to the massive surge of COVID-19 cases in the second wave, Huawei has partnered with C-CAMP to accelerate the facilitation of urgent medical supplies to support those most affected. The project has been fulfilled with the guidance from the Office of Principal Scientific Adviser, Government of India. In a bid to further boost existing oxygen capacity, the joint initiative will also facilitate oxygen concentrators to the deployment.

C-CAMP, as a premier bio innovation hub with a decade long experience in deep tech life sciences innovation and entrepreneurship in India, is helping contribute in this hour of need by deploying and scaling up of innovative technologies to strengthen India's public healthcare facilities. It has been joined by several other partners, both national and international, in this crucial fight back.

Being based in Karnataka, a majority of these C-CAMP efforts are centred on the State, which also happens to be one of the worst afflicted in India. As a part of this support the following three life-saving technologies will be provided to the public health facilities across the State:

1. **High Flow Nasal Cannula (HFNC) and Continuous Positive Airway Pressure (CPAP) Oxygen therapy system:** Bangalore-based and C-CAMP portfolio start-up Coeo Labs/Innaccel Technologies' Saans Pro CPAP and HFNC system is an all-in-one unit compatible with multiple patient interfaces, including protective continuous interfaces such as helmet/hood for CPAP.
2. **Remote Vital Parameter Monitoring:** Another Bangalore-based C-CAMP supported start-up Turtle Shell Technologies' product Dozee is a contactless remote vitals monitoring and AI based triaging system that can convert non-ICU beds into step-down ICUs thereby virtually increasing ICU grade bed capacity in hospitals.
3. **Oxygen Concentrators:** Oxygen concentrators using pressure swing adsorption (PSA) technology are a portable and cost-efficient source for providing oxygen for patients requiring medical oxygen due to low oxygen levels in their blood.

Website link:

<https://www.ccamp.res.in/c-camp-supported-huawei-india-hands-over-life-saving-innovations-karnataka-govt-counter-covid>

C-CAMP is augmenting Karnataka’s healthcare infrastructure for COVID-19 with support from Mercedes Benz R&D India

C-CAMP has received CSR funding from Mercedes Benz Research & Development India (MBRDI) towards deploying about 110 oxygen concentrators from Germany in public healthcare centres across Karnataka.

The effort that has been facilitated by Nayonika Eye Care Charitable Trust, the German Consulate General, Bangalore and Indian Embassy in Germany is one of the many national and international CSR fundraising initiatives being coordinated by C-CAMP to aid India’s COVID-19 response with life-saving technologies and innovations.

Dr Taslimarif Saiyed, then C-CAMP CEO & Director said, “Oxygen concentrators have the potential to address the critical gap in oxygen supply that we are witnessing across India. Lives can be saved with this technology. C-CAMP is happy to contribute to Karnataka’s ongoing combat by bringing this much needed resource to the State. We are planning on collaborating with the Government of Karnataka on deployment in public healthcare centres including makeshift hospitals and COVID care facilities, which especially lack infrastructure for cryogenic oxygen.”

Given the prohibitive cost and logistics associated with liquid oxygen tankers and the dearth of pressurised medical oxygen, oxygen concentrators have emerged as a less expensive, more convenient and foolproof alternative. Oxygen concentrators concentrate the oxygen from ambient air by selectively removing nitrogen to supply an oxygen-enriched gas stream using pressure swing adsorption (PSA) technology. The consignment of 110 concentrators imported by C-CAMP have been manufactured by Phillips, are lightweight, easy-to-use and low maintenance.

Speaking on the importance of such multi-partner PPP collaborations in rapid mobilisation during this time of emergency, Dr Taslim remarked that “The C-CAMP-MBRDI partnership was turned around in unprecedented urgency and definitely shows the way for greater ecosystem participation in order to bring forward more helping hands from India and abroad in this hour of need.”

C-CAMP is no stranger to multi-partner coalitions for emergency response to the pandemic. As India’s premier bio innovation hub, it has implemented, anchored and expressly mobilised three of India’s most crucial multi-partner innovation programmes, C-CIDA, N-BRIC and InDx to give teeth to the public healthcare system in the form of diagnostics, therapeutics, vaccine delivery, etc.



Website link:

<https://www.ccamp.res.in/c-camp-augmenting-karnataka%E2%80%99s-healthcare-infrastructure-covid-19-support-mercedes-benz-rd-india>





4

COVID COMMUNICATIONS

The section contains information about various aspects of the COVID-19 pandemic communicated by different reliable media houses, like Press Information Bureau (PIB). Also, the efforts made by multiple agencies and institutions in compiling the information and releasing the knowledge products in print or digital form are gathered here for one point, ready-to-use evidence.

SECTION GUIDELINES

PM chairs high level meeting to review ramping up of oxygen supply across the country

Breastfeeding mothers should get themselves vaccinated against COVID-19 without any hesitation: Dr Samiran Panda, Head, Division of Epidemiology and Communicable Diseases, ICMR

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

MoHFW reaches out to the common public through an infographic on COVID-19 vaccination for pregnant women

Press Information Bureau releases daily bulletin on COVID-19

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

TRIFED and UNICEF is leveraging 45,000 Van Dhan Vikas Kendras to promote COVID-19 vaccines among tribals to clear all vaccine related misconceptions

Steps taken by the Government to support out of school children and children orphaned due to COVID-19

B.1.617.2, known as the Delta variant, is around 40-60 per cent more transmissible than the Alpha variant: INSACOG

PM chairs high level meeting to review ramping up of oxygen supply across the country

PM Narendra Modi reviewed the progress of oxygen augmentation and availability across the country.

Officials briefed the PM about the progress on the installation of PSA oxygen plants across the country. More than 1500 PSA oxygen plants are coming up across the nation, which includes contribution from PM CARES as well as various ministries and PSUs.

PSA oxygen plants contributed by PM CARES are coming up in all the states and districts of the country. The PM was informed that once all PSA oxygen plants coming up through PM CARES are functional, they would support more than four lakh oxygenated beds.

The PM instructed the officials to ensure that these plants are made functional at the earliest and to work closely with the state governments for the same. Officers apprised the PM that they are in regular touch with the officers from state governments regarding fast-tracking the oxygen plants.

The PM asked officials to ensure that the hospital staff is adequately trained on operation and maintenance of oxygen plants. He also directed officials to ensure that each district has trained personnel available. Officials informed him that there is a training module prepared by experts and they are targeting the training of around 8000 people across the country.

The PM also said that we should deploy advanced technology like IoT to track performance and functioning of these oxygen plants at a local and national level. The officials apprised the PM about a pilot being done using IoT for monitoring the performance of the oxygen plants.

The Principal Secretary to the PM, Cabinet Secretary, Secretary Health, Secretary MoHUA and other important officials were present in the meeting.



Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1734152>

Breastfeeding mothers should get themselves vaccinated against COVID-19 without any hesitation: Dr Samiran Panda, Head, Division of Epidemiology and Communicable Diseases, ICMR

Breastfeeding mothers should get themselves vaccinated against COVID-19 without any hesitation. The antibodies that are developed in the mother as a result of the vaccination get passively transferred to the baby while breastfeeding and could be helpful to the child, says Dr Samiran Panda, Head, Division of Epidemiology and Communicable Diseases, Indian Council for Medical Research (ICMR).

The vaccines available now are largely effective against the new variants of COVID-19: Many people are concerned whether our vaccines will be effective against the newer strains of SARS-CoV-2 virus. According to Dr Panda, the vaccines available now are largely effective against the new variants. He further explains that vaccines are not infection preventing, but disease-modifying. Experiments at ICMR have proved that the vaccines presently available in India are effective against the new variants as well. However, the efficacy may differ for different strains.

People are also wary that the vaccines that they are receiving now may not be effective after a while, as the virus is mutating rapidly. However, Dr Panda points out that mutation are normal for all viruses when they proliferate. Experts suggest that the COVID-19 virus will reach its endemic stage like influenza after a while and then vulnerable population may have to take the vaccine shot annually. Dr Panda explains influenza commonly known as flu was a pandemic 100 years ago but today it is endemic. Similarly, in case of COVID-19, we expect that it will gradually become endemic from its current state of being a pandemic. Currently, we recommend the elderly to take annual flu shots. As the influenza virus keeps mutating, minor changes in the vaccine are made simultaneously. So, there is no need to panic.

It is futile to go for antibody tests: Dr Panda further says that it is futile to go for antibody tests as the immunity does not depend only on antibodies. He adds, the antibodies that are seen using the commercial kits available in the market are not necessarily the antibodies that can protect from COVID-19. Dr Panda explains that whenever a person gets vaccinated, two types of immunity emerge. One is known as the neutralising antibody or antibody mediated immunity. The second one is cell mediated immunity. The third and most important one is immune memory. An immune memory is generated after vaccination and is present in cells and whenever the virus enters the body, this gets activated.

“Vaccines are absolutely safe”: Dr Panda clarifies that people with normal allergies like asthma, dust allergy, allergy of pollen grains, etc. can take the vaccine. Patients with co-morbidities can take the vaccine if they are stable. It is advisable for people suffering from



diabetes and other immuno-suppressed conditions to get vaccinated because they are at a higher risk. “All the vaccines that are currently available in India have gone through three phases of clinical trials. Safety is tested in the first phase itself. Immunity and efficacy are tested in the later phases. So, I assure everyone that the vaccines are absolutely safe.” Dr Panda added that blood clotting events or AEFI (adverse event following immunisation) following COVID-19 vaccination are miniscule in India.

Dr Panda also suggests that the best option is to take the vaccine available in the country now, rather than waiting for other vaccines that are available globally and may come to India after some time. Dr Panda explains, “please understand that while people may be waiting for other vaccines, which they may consider more convenient or superior, the virus is not waiting. The virus is still spreading in the country. What if you get infected, while you wait?”

Dr Panda says there is no change suggested in preventive measures and treatment of COVID-19 in light of the new variants. “All the mutants, whether it is circulating strains of the virus or the newer variants, the mode of spread is the same. Precautions like wearing masks, avoiding crowded places, hand sanitation are still the effective methods to control the spread of the virus,” he says.

He feels there is no need to change the current standard treatment methods in wake of the new variants of coronavirus, as far as the treatment of COVID-19 is concerned.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1734159>

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

MoHFW reaches out to the common public through an infographic on COVID-19 vaccination for pregnant women

The MoHFW has published information in the form of posters for pregnant women regarding the COVID-19 vaccination. Stating that the COVID-19 vaccine is safe for both the pregnant woman and her child, it also says that symptomatic pregnant women are at great risk of severe disease, which might affect the foetus too. Hence COVID-19 vaccine is recommended for pregnant women.

Ministry of Health and Family Welfare
Government of India

Help us to help you

COVID-19 Vaccination During Pregnancy

- All individuals above 18 years of age including pregnant women are now eligible for COVID-19 vaccination.
- Symptomatic pregnant women are at an increased risk of severe diseases and it might affect the foetus too. Hence, the COVID-19 vaccine is recommended for pregnant women.
- Pregnant women at increased risk of COVID-19 complications include:**
 - Older than 35 years of age
 - Obese women
 - Have an underlying medical condition such as diabetes or high blood pressure
 - Have a history of clotting in the limbs
- COVID-19 increases the risk of:**
 - Pre-mature delivery
 - Baby's weight might be less than 2.5 KG
 - In rare situations, the baby might die before birth
- COVID-19 vaccine can be taken anytime during the pregnancy and it should be taken at the earliest.
- In case a woman has been infected with COVID-19 infection during the current pregnancy, then she should be vaccinated soon after the delivery.
- COVID-19 vaccine is safe in pregnancy. Minor side effects like mild fever, pain at the injection site or feeling unwell for 1-3 days can occur.
- The long-term adverse effects and safety of the vaccine for foetus and child is not established yet.

If you get any of the following symptoms after COVID-19 vaccination, please refer to a health care facility

Shortness of breath, chest pain, pinhead size red spots or bruising of skin in an area beyond the injection site, severe or persistent headache, persistent abdominal pain with or without vomiting, or fits, or blurred vision.

Please continue following COVID Appropriate Behaviour

- Wear your mask properly
- Maintain physical distancing
- Wash hands frequently and thoroughly with soap and water

For more information, visit <https://www.cowin.gov.in/faq>

#LargestVaccineDrive #Unite2FightCorona

Website link:

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

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19, starting from the early days of the COVID-19 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 21 July 2021.



41.54 Cr. Vaccine Doses administered so far under Nationwide Vaccination Drive
 3,03,90,687 total recoveries across the country so far
 Recovery Rate currently at 97.36%
 36,977 patients recovered during last 24 hours
 India reports 42,015 new cases in last 24 hours
 India's Active Caseload currently at 4,07,170
 Active cases constitute 1.30% of total cases
 Weekly Positivity Rate remains below 5%, currently at 2.09%
 Daily positivity rate at 2.27%, less than 3% for 30 consecutive days
 Testing capacity substantially ramped up – 44.91 crore tests conducted(Total)

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1737531>

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 41 crore vaccine doses (41,78,51,151) to States/ UTs.

India's coronavirus cases have crossed three crore, and as of 22 July 2021, 08:00 AM it stands at 3,12,57,720 cases, of which 3,04,29,339 have recovered. The recovery rate stands at 97.35 per cent while the case fatality rate stands at 1.34 per cent.



Website link:

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

TRIFED and UNICEF is leveraging 45,000 Van Dhan Vikas Kendras to promote COVID-19 vaccines among tribals to clear all vaccine related misconceptions

Shri Arjun Munda, Minister of Tribal Affairs, virtually launched a nationwide campaign 'COVID Teeka Sang Surakshit Van, Dhan aur Uddyam' to accelerate the pace of COVID-19 vaccination among tribals, in India. The Minister of State for Steel, Shri Faggan Singh Kulaste; Ministers of State for Tribal Affairs, Shri Bishweswar Tudu and Smt Renuka Singh too were present virtually during the launch. Other dignitaries present during the launch were Shri Pravir Krishna, Managing Director, Tribal Co-operative Marketing Development Federation of India (TRIFED); WHO representative Dr Roderico Ofrin; UNICEF India representative Dr Yasmin Ali Haque; and senior officers of TRIFED as well as partners of Tribal Affairs Ministry and TRIFED in states.

Shri Munda launched the campaign through a video conferencing link-up with field camps in Mandla in Madhya Pradesh and Bastar in Chhattisgarh. During the launch, Bastar Collector Shri Rajat Bansal and Mandla District Collector Smt Harshika Singh gave details about the preparations for vaccination being done in their respective districts.



The campaign will leverage the 45,000 Van Dhan Vikas Kendras (VDVK) of the TRIFED, a national level cooperative body under the administrative control of Ministry of Tribal Affairs, Government of India.

The campaign is being launched in partnership with UNICEF and WHO. The goal is to connect over 50 lakh tribals by emphasising that COVID-19 vaccination is free, available in the nearby centres and that it not only protects people from hospitalisation cost and death but also helps to continue with livelihood activities.



The campaign highlighted the three key Js:

- *Jeevan* (life) – Every life and livelihood is precious, so vaccination is key to life and is free.
- *Jeevika* (livelihood) – You can continue with your Van Dhan Vikas Kendra and livelihood activities without any fear of getting the disease if you are vaccinated. It also saves you from hospitalisation and other opportunity costs.
- *Jaagrookta* (awareness) – Simplification of the process of registration for vaccination, place, accessibility to different audiences and age groups, especially women and elderly population. Van Dhan Vikas Kendras collaborate and work with other stakeholders with service as a motto and with dedication and commitment that they have a key role to make panchayats and villages coronavirus free.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1735934>

Steps taken by the Government to support out of school children and children orphaned due to COVID-19

The Department of School Education & Literacy (DOSE&L) has developed an online module for compiling the data of out of school children (OoSC) identified by each state/UT and their mapping with special training centres (STC) on the PRABANDH portal (<http://samagrashiksha.in>). The concerned state/UT validates the childwise information of the identified OoSC and STC uploaded by the concerned block resource centre of the state to monitor the progress of OoSC mainstreaming. For the first time in 2021-22, under Samagra Shiksha, financial assistance up to Rs 2000 per annum has been envisioned to support out of school children in the age group of 16-19 to complete their education through NIOS/SIOS, to access course materials and certification.

DOSE&L and Ministry of Women & Child Development have issued a joint letter to facilitate the education of children orphaned due to COVID-19. This will be done by bringing them under the fold of the various schemes run by the DOSE&L, and outlining the role of teachers, district education officers and child welfare committees.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1736861>

B.1.617.2, known as the Delta variant, is around 40-60 per cent more transmissible than the Alpha variant: INSACOG

In a recent interview, Dr NK Arora, co-chair, Indian SARS-CoV-2 Genomics Consortium (INSACOG) elaborates on the standard operating procedure (SOP) for testing and follow-up on variants, what makes the Delta variant so transmissible, how genomic surveillance can help contain its spread, and also reemphasises the importance of COVID-19 appropriate behaviour.

Recently INSACOG expanded its reach. What is the thought behind its expansion?

There is a need to keep a strict vigil on the emergence of variants of concern and outbreaks so that they can be contained before they spread to a larger region. The Indian SARS-CoV-2 Genomics Consortium (INSACOG), established in December 2020, was a consortium of 10 laboratories. Recently 18 more laboratories became part of it.

The idea is to have a strong network of laboratories to do genomic surveillance of SARS-CoV-2 and correlate whole genomics sequencing (WGS) data with clinical and epidemiological data to see: whether or not a variant is more transmissible; causes more severe disease; escapes immunity or causes breakthrough infections; affects vaccine efficacy; and can be diagnosed by current diagnostic tests.

Then the National Center for Disease Control (NCDC) analyses this data. The entire country has been divided into geographical regions and each lab is given the responsibility of one particular region. We have formed 180-190 clusters with around four districts in each cluster. Regular random swab samples and samples of patients, who develop severe illness, vaccine breakthrough infections, and other atypical clinical presentations, are collected and sent to regional laboratories for sequencing. The current capacity of the country is to sequence over 50,000 samples per month; earlier it was approximately 30,000 samples.

What kind of mechanism does the country have for testing and follow up on variants?

India has a well-established mechanism of Integrated Disease Surveillance Programme (IDSP). The IDSP coordinates sample collection and transportation from the districts/sentinel sites to Regional Genome Sequencing Laboratories (RGSL). The RGSLs are responsible for genome sequencing and identification of variants of concern (VOC), variants of interest (VOI), potential variants of interest and other mutations. Information on VOC/VOI is directly submitted to the central surveillance unit for clinical-epidemiological correlation in coordination with state surveillance officers. The samples are then sent to the designated bio banks.

RGSLs, upon identification of a genomic mutation, which could be of public health relevance, submit the same to Scientific and Clinical Advisory Group (SCAG). SCAG, thereafter, discusses the potential variants of interest and other mutations with experts and if necessary, recommends to the central surveillance unit for further investigation.

Sharing of information and clinical-epidemiological correlation is done by IDSP, a unit of NCDC, along with the Ministry of Health, the Indian Council for Medical Research, Department of Biotechnology, Council for Scientific and Industrial Research and state authorities.

Finally, the new mutations/variants of concern are cultured and scientific studies are undertaken to see the impact on infectiousness, virulence, vaccine efficacy and immune escape properties.

The Delta variant has been in focus as a global concern. What makes this variant so virulent?

B.1.617.2, a variant of COVID-19 is known as the Delta variant. It was first identified in October 2020 in India, and was primarily responsible for the second wave in the country. It, today, accounts for over 80 per cent of the new Covid-19 cases. It emerged in Maharashtra and travelled northwards along the western states of the country before entering the central and the eastern states.

It has mutations in its spike protein, which helps it bind to the ACE2 receptors present on the surface of the cells more firmly, making it more transmissible and capable of evading the body's immunity. It is around 40-60 per cent more transmissible than its predecessor (Alpha variant) and has already spread to more than 80 countries, including the UK, the USA, Singapore, and so on.

Does it also cause more severe disease as compared to other variants?

There are studies that show that there are some mutations in this variant that promote syncytium formation. Besides, on invading a human cell, it replicates faster. It leads to a strong inflammatory response in organs like the lungs. However, it is difficult to say that disease due

to the delta variant is more severe. The age profile and deaths during the second wave in India were quite similar to that seen during the first wave.

Is Delta Plus variant more aggressive than Delta variant?

The Delta Plus variant – AY.1 and AY.2 – has so far been detected in 55-60 cases across 11 states, including Maharashtra, Tamil Nadu, and Madhya Pradesh. AY.1 is also found in countries like Nepal, Portugal, Switzerland, Poland, Japan but AY.2 is less prevalent. The variant is still being studied for its transmissibility, virulence, and vaccines escape characteristics.

Are the vaccines effective against the Delta variant?

Yes, the current vaccines are effective against the Delta variant as per the studies undertaken by ICMR on the issue.

Some parts of the country are still witnessing a spurt in the number of cases. Why?

Though there is a significant dip in the number of cases in most parts of the country, some regions are witnessing a high-test positivity rate (TPR) particularly in the north-eastern parts of the country and several districts in the southern states, most of these cases could be due to the Delta variant.

Can future waves be prevented?

A virus begins infecting a part of the population, which is most susceptible and also exposed to the infection. It diminishes after it successfully infects a large proportion of the population and strikes back when the immunity developed in the people post-natural infection fades. The cases may go up if a new, more infectious variant comes. In other words, the next wave will be driven by a virus variant to which a significant proportion of population is susceptible.

The second wave is still going on. Any future waves will be controlled and delayed if more and more people get vaccinated and most importantly, people follow COVID-19 appropriate behaviour effectively, especially till a substantial part of our population gets vaccinated.

People need to focus on vaccination and adherence to COVID-19 appropriate behaviour to manage COVID-19.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1736665>





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

MoHFW has published a booklet for frontline workers and vaccinators to counsel pregnant women

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

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

Ministry of AYUSH comes out with Homoeopathic treatment protocol for Black Fungus

PANDEMICS: Past, Present, Future Challenges & Opportunities: Booklet by UNESCO MGIEP reflects upon basic questions encompassing the word 'pandemic'

PGIMER releases infographic booklet on COVID-19-and home based care

DBT has released an e-book on its efforts during COVID-19

Outreach initiatives by India Science Channel

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

MoHFW has published a booklet for frontline workers and vaccinators to counsel pregnant women

A frontline healthcare worker or a vaccinator needs to counsel pregnant women about the availability, value, and precautions regarding the COVID-19 vaccine. Considering the requirement, the Ministry of Health and Family Welfare (MoHFW) has released a booklet for frontline workers and vaccinators to educate pregnant women. This booklet provides the information needed to educate and support pregnant women and help them make an informed decision about getting the COVID-19 vaccine. The document is in question-answer form to make it easier for the workers to inform pregnant women and their families about the most important issues about COVID-19 vaccination. It also mentions the symptoms that could occur within 20 days after receiving any COVID-19 vaccine and the immediate action required after the symptoms surface.



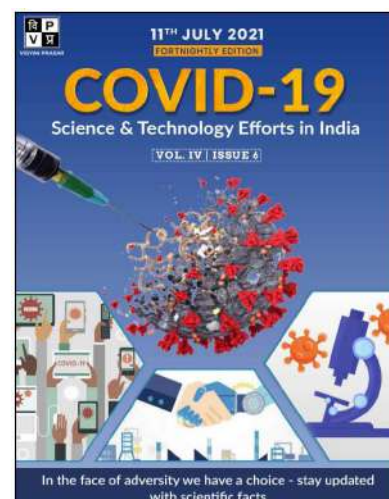
Website link:

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

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

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 provides 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 11 July 2021.

Contact info:

covidnewsletter@vigyanprasar.gov.in

Website link:

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

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

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

In the critical times of the outbreak of the COVID-19 pandemic, 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 numerous institutions spread across the country. The content presented here relies on the best available scientific understanding of the disease and its transmission.

The web portal provides all information related to COVID-19, from presenting symptoms to vaccine science, distribution strategy, and preventive measures initiated for envisaged future waves. It contains content on fact-checks and myth-busters in question and answer format, contributions from the research fraternity, start-up spotlights, industry collaborations, communications and resources, reaching out to society and so on. A dedicated focus has been given to exhibiting funding opportunities catering to the second wave of the COVID-19 pandemic.



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Ministry of AYUSH comes out with Homoeopathic treatment protocol for Black Fungus

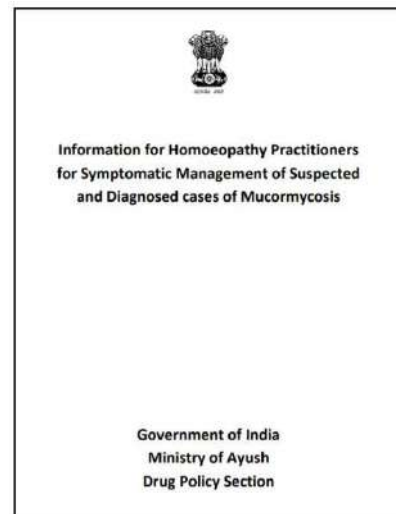
The second wave of COVID-19 pandemic has brought with it not only the detrimental effects of the disease itself but also add on infections following a blow to the immune system of an individual convalescing with the disease. An emerging threat of fungal infections has been noticed recently in immune-compromised patients and following immune-suppressants drugs, which were earlier found in rare cases.

With increasing cases of Mucormycosis (black fungus), the present information has been prepared by experienced senior clinicians treating specific fungal infections and researchers of the system, to efficiently treat suspected and diagnosed cases of Mucormycosis with Homoeopathy. This condition requires hospital-based treatment under supervision, and Homoeopathic medicines can be prescribed in an integrated manner. Since mostly immune-compromised patients get this infection, strict monitoring of blood sugar and other vitals is required.

For Rhinocerebral Mucormycosis, the drug prescribed is Arsenicum album, Aurummetallicum, Cundurango, Fluoricumacidum, Sulphur iodatum, Acid Benzoicum, Hippozaeninum, Kali iodatum, Kaliumbichromicum, Mercuriussolubilis, Nitricumacidum, Phosphorus, and Secalecornutum. Similarly, different drugs are prescribed for other types of Mucormycosis.

Website link:

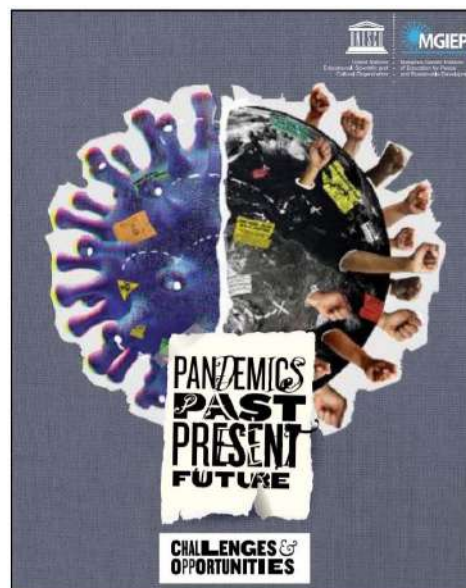
<https://www.ayush.gov.in/docs/Information%20for%20homoeopathic%20management%20of%20Mucormycosis-reg.pdf>



PANDEMICS: Past, Present, Future Challenges & Opportunities: Booklet by UNESCO MGIEP reflects upon basic questions encompassing the word ‘pandemic’

The booklet, PANDEMICS: Past, Present, Future - Challenges & Opportunities comes in handy to answer and reflect upon basic questions encompassing the word ‘pandemic’ – the what, where, when and how of it. The genesis of the book began when UNESCO MGIEP were approached by the Office of Principal Scientific Adviser (PSA) to the Government of India to produce a document that was not meant to be: (i) a compendium for training individuals on pandemic science; (ii) an exhaustive compilation of dos and don’ts with respect to a pandemic; and iii) a commentary on global best versus worst practices to combat the pandemic.

This booklet aims to provide: (i) basic information about key concepts associated with and procedural understanding of the term ‘pandemic’; (ii) a synopsis



of past and present pandemics with focus on lessons learnt – primarily from COVID-19 and preparedness for the future; iii) a brief overview of mitigation policies adopted by countries across the globe to combat the pandemic; iv) an account of direct and indirect impacts of a pandemic on various sectors of the society ranging from health, education to economic; and v) a preliminary inference of its ramifications on progress towards Sustainable Development Goals (SDGs). Therefore, this booklet should be considered as a primer on pandemics with the main objective of familiarising its readers with key concepts, measures, lessons and preparedness on pandemics.

Website link:

<https://static.psa.gov.in/psa-prod/publication/pandemic.pdf.pdf>

PGIMER releases infographic booklet on COVID-19-and home based care

The current wave of COVID-19 in India is a public health emergency on a scale never seen before and is different from last year’s wave. The disease expansion to the rural countryside, which was primarily unaffected in 2020, is worrisome.

The current COVID-19 pandemic has taught us a lot about how primary care can respond to such a crisis. As the first line of protection, primary care reinforces the patient’s ability to manage infection at home, reducing the risk of infection transmission and preventing overcrowding in hospitals. So, home isolation should be provided for mild and asymptomatic COVID-19 cases. During home isolation, patients or caregivers should be in direct contact with doctors and should update their conditions regularly.

The infographic booklet provides information in easy-to-understand graphics on monitoring vital symptoms, including clinical guidance for the management of suspected and confirmed COVID-19 cases in resource-limited settings for both mild and asymptomatic patients. The booklet provides basic education and knowledge on COVID-19 and home-based care. This will enhance home-based care in patients who are suspected or confirmed COVID-19.

This booklet guides about home isolation and provides instruction for caregivers and patients, treatment for patients with mild / asymptomatic disease in home isolation, when you should seek medical help and when you should stop being isolated at home.

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Website link:

https://6c7e24ae-fb40-4331-a67d-c876b179abc8.filesusr.com/ugd/bce95d_7ce9f70f18be43ddb3d7208bc52c763b.pdf



DBT has released an e-book on its efforts during COVID-19

DBT and its autonomous institutes along with public sector undertakings are working relentlessly to mitigate the COVID-19 health crisis through the development of diagnostics, vaccines, monoclonals, and novel protection equipment.

DBT released an e-book on S&T solutions for COVID-19 that showcased the initiatives undertaken by the department for mitigation of the COVID-19 pandemic. From the development of indigenous vaccines, novel point-of-care diagnostics, and therapeutic formulations based on traditional knowledge, to the establishment of research resources and offering services, the department is focused on creating an ecosystem to foster Atmanirbhar Bharat for innovative product development, with societal relevance. The e-book showcased the indigenous COVID-19 interventions developed by DBT-supported initiatives.



Website link:

<https://dbtindia.gov.in/sites/default/files/uploadfiles/DBT%20Response%20to%20COVID%20New.pdf>

Outreach initiatives by India Science Channel

India Science is an Internet-based Over-The-Top (OTT) science TV channel. It is an initiative of the Department of Science and Technology (DST), Government of India, 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 apprises 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 COVID-19.
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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<https://www.indiascience.in/>



myGOV reaching 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>





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

I. 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 behavior.

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 monitor 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>

2. 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, 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>

3. 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 (HDU) and intensive care units (ICU). 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

4. 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.

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

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

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

Q. Are 8 breaths per minute normal?

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

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

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

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

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

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

A. If you do not have a portable finger pulse oximeter in your home, you can also learn how to assess signs and symptoms of low oxygen levels. Two classic signs of a low oxygen level are a rapid heart rate and a fast breathing rate. An average heart rate is 60–100 beats per minute and an average breathing rate is 12–20 breaths per minute. However, under low oxygen conditions, body responses include an increase in heart rate and breathing rate. Another sign of a low blood oxygen level is cyanosis or a bluish colour change on your lips, nose, or fingertips. As your body loses oxygen, the blood cells in your body change colour in your bloodstream to a dark blue, which can be seen from the outside of your skin if it is severe. Cyanosis is typically a late sign of low oxygen levels and is considered a medical emergency. If you notice this bluish 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 22 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 is 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 sets 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 their 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>

6. 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. 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.

7. Related to Black Fungus and COVID-19 disease

Q. What is Black Fungus?

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

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

A. Risk Factors are:

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

Q. Why the sudden increase in Black Fungus cases?

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

Q. How serious is Black Fungus?

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

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

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

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

A. One can take the following precautions:

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

Q. What are the early signs of Black Fungus?

A. Some of the early signs are:

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

Q. Is Black Fungus treatable?

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

Q. Which specialist should I visit for Black Fungus?

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

Source:

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

8. 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 help 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 2021 e-Newsletter, focused on the second wave of the pandemic?

1. The overall appearance

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

2. Ease to read and flow of information

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



For suggestions and feedback, click on:

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

COVID-19

Science & Technology Efforts in India

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

For suggestions and feedback, write to us at: covidnewsletter@vigyanprasar.gov.in



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