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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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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

The month of August is very momentous and meaningful for all of us; it reminds us of the numerous sacrifices made and makes us feel proud of our unity and inclusive development. India's glorious history always inspires the present for a better future. This year's Independence Day celebrations assumes great significance as the nation enters its 75th anniversary. As India heads towards its 75th year of independence, the Government has decided to celebrate it as *Azadi Ka Amrit Mahotsav* and announced several initiatives to lay a strong foundation for a resurgent India. The initiative consists of a series of events organised by the Government of India to commemorate the 75th Anniversary of India's Independence and is being celebrated as a Jan-Utsav in the spirit of Jan-Bhagidari.

By incapacitating, slowly but continuously, the challenges of the COVID pandemic, India is now on the path of rapid progress. 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 sensitise 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, COVID communications, resources and outreach, along with additional fact-checks 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, ultimately 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.

11 August 2021

Vigyan Prasar

Celebrating Azadi ka Amrit Mahotsav

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

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

Scientists join hands to synthesise compounds to inhibit maturation and propagation of COVID-19 virus, in coordination with DST

Scientists from India, Russia, Brazil, and South Africa will work together to repurpose, validate and synthesise lead compounds against main protease and RNA replicas, the enzyme that catalyses the replication of RNA, of SARS-CoV-2. The approach, which could inhibit both maturation and propagation of viruses during the infection in the host cells can help produce new COVID-19 medicines with improved production methods.

The area of multistage targeted inhibitors of SARS-CoV-2 has emerged a few months back after WHO announced COVID-19 as a global emergency. The multistage process involves viral genome replication, and transcription and maturation are the multistage processes, which are interlinked in the viral machinery and promote viral propagation. They are regulated by the enzymes protease and RNA replicase. Inhibiting these effects would be crucial to complete the dream of millions of people on this earth to develop/repurpose a drug molecule against COVID-19.

A consortium consisting of Dr Dhruv Kumar, Professor from Amity Institute of Molecular Medicine and Stem Cell Research, Dr Brijesh Rathi, Assistant Professor, Hansraj College, the University of Delhi from India, Dr Lindomar José Pena, Virologia e Terapia Experimental (LAVITE) from Brazil, Av. Professor Moraes Rego, s/n – Campusda UFPE – Cidade Universitária, Brasil, Russia, Dr Vladimir Potemkin, South Ural State University, Russia, and Dr Anil Chuturgoon, University of KwaZulu-Natal South Africa will identify and synthesise phytochemicals against main protease and RNA-dependent RNA polymerase of SARS-CoV-2. They will also conduct biochemical assays, including cytotoxicity lead compounds against main protease and RNA dependent RNA polymerase of SARS-CoV-2, and conduct target validation of lead compounds through molecular dynamics simulation and biochemical methods.

While efforts have been made to selectively inhibit a single target enzyme of SARS-CoV-2, effective potential inhibitors against both replication and maturation machinery of SARS-CoV-2 is yet to be found.

Contact info:

Professor Dhruv Kumar, Amity Institute of Molecular Medicine & Stem Cell Research

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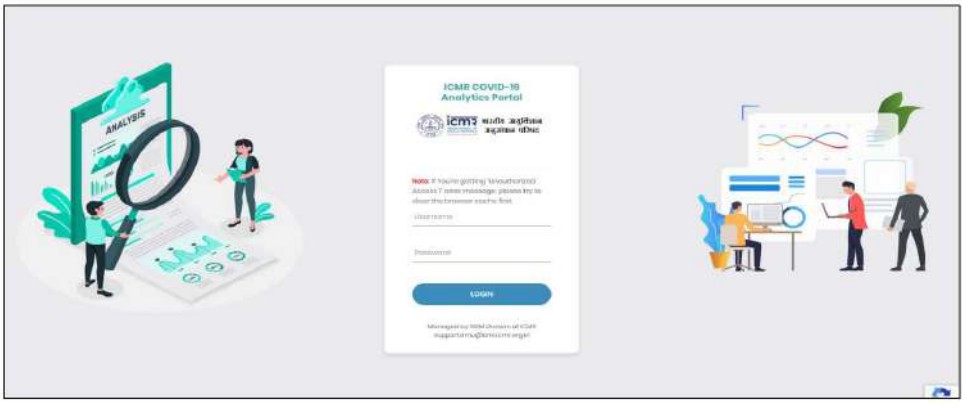
Website link:

https://dst.gov.in/scientists-join-hands-targeting-synthesize-compounds-inhibit-maturation-propagation-covid-19-virus

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1739145

COVID-19 analytics portal for setting up the rationale developed and maintained by ICMR

Indian Council of Medical Research (ICMR) has made a COVID-19 analytics portal for the use of the general public. Different private and government labs that are testing COVID-19 samples will upload the data on this portal, which includes all information about COVID-19 patients. The Union Ministry of Health and Family Welfare (MoHFW), uses the data to formulate its dynamic testing strategy for states. This portal is managed by ISRM division of ICMR.



Contact info:

support.dmu@bmi.icmr.org.in

Website link:

https://cvanalytics.icmr.org.in/

IISc develops an AI tool – CoviHawkes – for district-wise forecasting and monitoring of COVID-19 infections in India

In the last one and a half years, more than 17 crore cases and 37 lakh deaths have been reported worldwide due to COVID-19. This has been a devastating time for everyone. Recently, the sudden rise in cases in India, and the second wave of infections prompted strict lockdowns across the country. While these lockdowns effectively curb the spread of the virus, they often come with severe emotional and financial consequences that tend to outlast the lockdown itself.

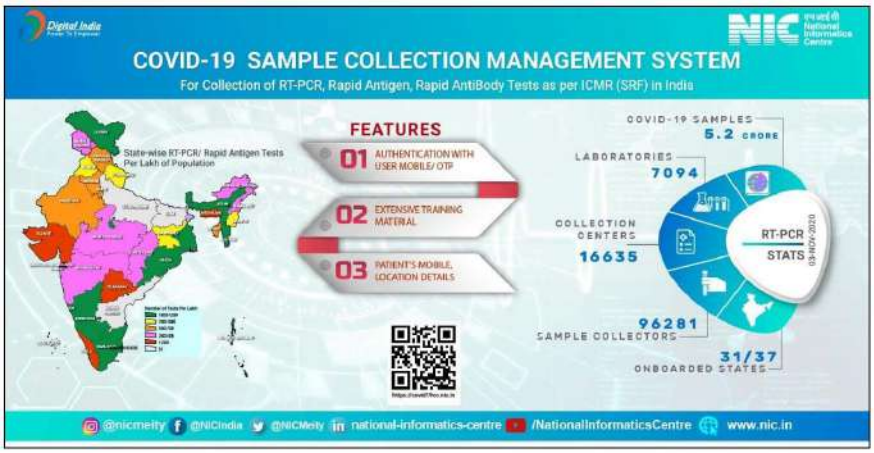
Science-based and data-driven policies for enacting lockdowns at the local levels are the need of the hour. CoviHawkes can help policymakers identify local regions that must go into lockdown mode to control the infection rate. Arguably, such local lockdowns would offer a sounder alternative to state-wide or nationwide lockdowns. This tool combines the observed patterns in the case counts from the past with additional factors like demographics (population density) and mobility (decrease in the percentage of people travelling for work due to lockdown) of the region.

Website link:

https://sml.csa.iisc.ac.in/covihawkes/

ICMR develops COVID-19 sample collection management system for rapid antigen, antibody and RT-PCR tests

Timely collection of correct data is very important during these tough times. Data relating to COVID-19 RT-PCR, rapid antibody, and rapid antibody tests are being collected by the government with the help of authorised collection centres spread throughout the country. This COVID-19 sample collection management system portal is primarily to transfer RT-PCR, rapid antigen, and rapid antibody tests data to the ICMR portal for probable positive and negative cases, through mobile phones. Only authorised government officials will be able to use this portal.

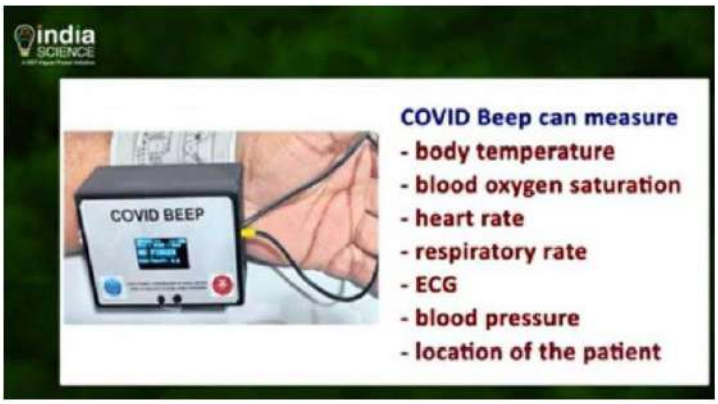


Website link:

https://covid19cc.nic.in/ICMR/Login.aspx

COVID BEEP is India's first indigenous, cost effective, wireless physiological parameters monitoring system for COVID-19 patients

The Union Minister of State (Independent Charge) Science & Technology, Minister of State (Independent Charge) Earth Sciences, MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said the government is taking steps to undertake the production of COVID BEEP on a large scale. In a statement laid on the table of the Lok Sabha in reply to a question, the Minister said that COVID BEEP is India's first indigenous, cost effective, wireless physiological parameters monitoring system for COVID-19 patients, developed by ESIC Medical College Hyderabad in collaboration with Electronics Corporation of India Ltd. (ECIL) and the Department of Atomic Energy.



So far, 40 COVID BEEP's were supplied as part of ECIL CSR activities to government hospitals in Hyderabad for deployment and feedback in financial year 2020-2021. Further, additional 100 are being prepared for dispatch to ESIC, Hyderabad by mid-August, 2021.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1739880

Research on AYUSH medicine system for treatment of COVID-19

Under various research organisations and national research institutes, 126 studies have been initiated in 152 centres in the country, to identify effective medicine for managing patients with symptoms of COVID-19. It includes 42 prophylactic studies, 40 interventional studies, 11 observational studies, 22 pre-clinical/experimental studies, one systematic review, eight survey studies and two monographs preparation. The system-wise research studies include 66 from Ayurveda, 26 from Homoeopathy, 13 from Siddha, eight from Unani and 13 from Yoga and Naturopathy. A total of 90 studies have been completed and 10 manuscripts have been published.

The Ministry of AYUSH has formed an inter-disciplinary AYUSH R&D task force having representation from Indian Council of Medical Research (ICMR), Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR), All India Institute of Medical Sciences (AIIMS) and AYUSH Institutions. The Inter-disciplinary AYUSH R&D Task Force has formulated and designed clinical research protocols for prophylactic studies and add-on interventions in COVID-19 positive cases for studying four different interventions viz. Ashwagandha, Yashtimadhu, Guduchi + Pippali and a poly herbal formulation (AYUSH-64).

Through robust clinical trials conducted by the Ministry in collaboration with CSIR and Central Council for Research in Ayurvedic Sciences (CCRAS) and national institutes under the Ministry, AYUSH 64, a poly herbal formulation has been scientifically found to be useful in the treatment of asymptomatic and mild cases as standalone and for the management of mild and moderate COVID-19 infection as an adjunct to standard care. AYUSH 64 is also recommended in 'national clinical management protocol based on Ayurveda and Yoga for management of COVID-19' prepared by the national task force in consensus with various expert committees.

Further, the Ministry had invited research proposals under the Modified Extra Mural Research Scheme for SARS-CoV-2 infection and COVID-19 disease from 21 April 2020 to 10 May 2020. Twenty one such research projects on Ayurveda medicine have been funded under the scheme, of which eight are by private institutions and 13 by government institutions.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1741914

Approval of COVID-19 related medicines under AYUSH

AYUSH-64 and Kabasur Kudineer have been identified for COVID-19 treatment. Kabasur Kudineer, a siddha preparation was subjected to clinical trials for studying the efficacy in

COVID-19 patients by CCRS under the Ministry of AYUSH. It is also found useful in the treatment of mild to moderate COVID-19 infection.

To provide maximum benefit of AYUSH systems of medicine, a nationwide campaign has been undertaken for distribution of AYUSH-64 and Kabasura Kudineer through the research councils and the national institutes under the Ministry of AYUSH across the country.

The Ministry has issued orders to all the state AYUSH Licensing Authorities/Drug Controllers and Expert Committees there under to allow the licensed manufacturers for AYUSH-64 under their jurisdiction to include new indication of AYUSH-64 for repurposing as an intervention for the management of asymptomatic, mild to moderate COVID-19 in addition to existing indication(s) and to expedite the process of the licensing/approval of such applications for the manufacturing of AYUSH-64 medicine, provided the prescribed standards and relevant provisions of the Drugs & Cosmetics Rules, 1945, are fulfilled. So far, 37 manufacturing units of 11 states have been transferred AYUSH-64 technology by CCRAS through National Research Development Corporation (NRDC).

The Ministry has constituted an Interdisciplinary Technical Review Committee (ITRC) for COVID-19 for the examination of the applications/claims on patent and proprietary (P&P) ASU&H medicines/ classical ASU& H medicines with new indication or re-purposing of licensed P&P, ASU&H medicines for COVID-19, forwarded by the State Licensing Authorities/Individuals referred by the Drug Policy Section of Ministry of AYUSH. So far, the following applications have been approved in the ITRC with respect to COVID-19 claims:

a. Divya Coronil tablet of Patanjali Research Foundation Trust, Haridwar, Uttarakhand-recommended as supporting measure in the management of COVID-19 without claiming cure.

b. Clevira Tablet of M/s Apex Laboratories Private Ltd., Tamil Nadu has been recommended as a supporting measure for mild to moderate condition of COVID-19.

c. Kabasura Kudineer of Sri Sri Tattva, Sriveda Sattva Pvt. Ltd., Bangalore has been recommended as an intervention for prevention and mild to moderate symptoms of COVID-19.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1741911

Scientists from four BRICS countries, in coordination with DST, carrying out genomic sequencing and mathematical modelling of the COVID-19 pandemic

Indian scientists, in partnership with scientists from China, Russia and Brazil, will carry out genomic sequencing of SARS-CoV-2 and studies on the epidemiology and mathematical modelling of the COVID-19 pandemic. This will help trace genetic mutations, recombinations as well as distribution of the virus and also make projections about the future of its spread.

A whole-genome sequencing is required for identification of genetic mutations and recombinations of the virus, while epidemiological studies can help assess its distribution. Mathematical modelling is required to assess its future spread.

Keeping this in mind, a research plan has been made by including expertise of scientists and engineers from diverse backgrounds. A consortium consisting of Dr. Ch. Sasikala, Professor, Centre for Environment, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad, YuhuaXin, Professorate Senior Engineer Institute of Microbiology, Chinese Academy of Sciences, Beijing, China, Ivan Sobolev, Senior Researcher, Federal Research Center of Fundamental and Translational Medicine, Timakova, Russia, Dr Marilda Mendonça Siqueira, Respiratory Viruses and Measles Laboratory, Oswaldo Cruz Institute, Fiocruz., Rio de Janeiro, Brazil will carry out different arms of this BRICS-Multilateral Research and Development Project.

Under this research supported by the Department of Science and Technology, India and Brazil will assess distribution of SARS-CoV-2 in environmental samples through metagenome analysis for wastewater-based epidemiology (WBE) surveillance. Chinese and Russian scientists will carry out the RT-PCR detection of SARS-CoV-2 in biological material (nasopharyngeal swabs) from patients with symptoms of respiratory diseases and investigate the genomic variability, comparative genomics and phylogenetic analysis. The genomic, metagenomic and epidemiological data from India, China, Russia and Brazil will be integrated to develop mathematical models for mutations analysis, population genetics, phylogenetic relationship, recombination analysis and risk evaluation to reveal spread network and dynamics of the virus. This can help trace spread routes and dynamics of the virus. The database developed by the different groups will also compare the distribution and survival of the virus in the different regions and establish the surveillance of the relevant early warning system.

The collaborative research plan has been developed considering the strengths of international collaborators from the Institute of Microbiology, Chinese Academy of Sciences of China, Federal Research Centre of Fundamental and Translational Medicine of Russia and Respiratory Virus and Measles Laboratory, Oswaldo Cruz Institute of Brazil. The study will provide a common platform to share and analyse the data of four different countries and understand the spread routes and transmission dynamics of virus.

Contact info:

Dr. Ch. Sasikala

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Website link:

https://dst.gov.in/scientists-four-brics-countries-carry-out-genomic-sequencing-and-mathematical-modelling-covid-19

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

Contact info:

guptanivedita.hq@icmr.gov.in, drneetu.vijay@icmr.gov.in

Website link:

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

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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

Fighting COVID-19 viral variants with a heat-tolerant vaccine

NIAB hunts for PAN-Anti-CoronAvirals (PANACeA) against coronaviruses of the past, present and future

IISc receives ILSF grant for developing mRNA vaccine technology

inStem developing natural antimicrobial peptides (AMP) for antiviral immunity

NIBMG, in collaboration with IISc, is developing a novel virus-like particle vaccine against coronavirus

CIAB developing photodynamic therapy as an antiviral treatment for the eradication of SARS-CoV-2

ICGEB working on human monoclonal antibodies for prevention and treatment of COVID-19

RGCB, Thiruvananthapuram is working on new therapeutics against SARS-CoV-2

IIT Indore in collaboration with NCCS pseudotyped SARS-CoV-2 in BSL-2 for candidate vaccine development

Generation of virus-neutralising human monoclonal antibodies (hmABs) against SARS-CoV-2 as potential therapeutics

NIPGR working on a platform for producing COVID-19 related antigens and antiviral proteins through transient expression in plants

Examining the potential for use of natural plant products, flavonoids, against SARS-CoV-2

Immune memory in mild COVID-19 patients and unexposed donors reveals persistent T cell responses after SARS-CoV-2 infection

NII working on identification of potential anti-COVID-19 compounds targeting the RNA dependent RNA polymerases

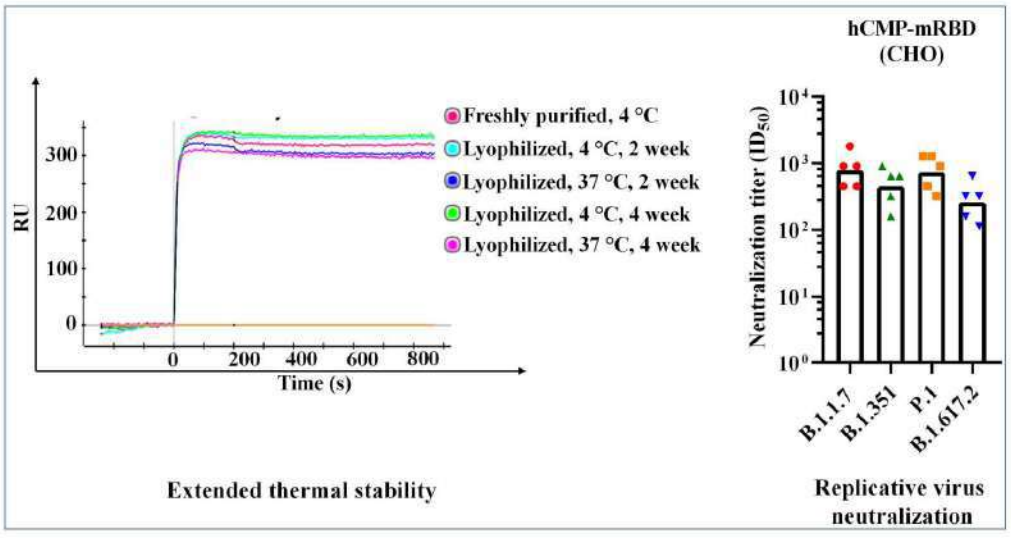
Fighting COVID-19 viral variants with a heat-tolerant vaccine

A 'warm' COVID-19 vaccine candidate being developed by an Indian Institute of Science (IISc) and Mynvax team was found to trigger a strong immune response and protection in mice and hamster models. These results were recently published in *ACS Infectious Diseases*. Crucially, the vaccine formulation also triggered neutralising antibodies – those that bind to the virus and prevent infection – against all four current SARS-CoV-2 variants of concern: Alpha, Beta, Gamma and Delta.

The vaccinated sera (blood) samples from animal models were tested for their neutralising ability against the variants by researchers at CSIR-IMTech, Chandigarh and the Australian Centre for Disease Preparedness, run by CSIRO, Australia's national science agency.

The vaccine candidate has been designed by genetically engineering a domain of the surface spike glycoprotein of SARS-CoV-2, called the Receptor Binding Domain (RBD), which plays a key role in facilitating viral entry and infection. Most of the neutralising antibodies produced by our body target the RBD.

In previous reports, an earlier version of the vaccine candidate was found to be stable at 37°C for a month without losing its shape, and withstand transient exposure to temperatures as high as 100°C. This was also true of the current, improved versions. Such vaccines are especially useful in countries like India where cold storage and transportation are expensive and challenging. One of the improved formulations is being rapidly moved to clinical development.



Website link:

https://www.iisc.ac.in/fighting-covid-19-viral-variants-with-a-heat-tolerant-vaccine/

NIAB hunts for PAN-Anti-CoronAvirals (PANACeA) against coronaviruses of the past, present and future

The National Institute of Animal Biotechnology (NIAB) collaborates with THSTI to test antivirals without culturing coronaviruses. The idea is to make the backbone of coronaviruses artificially without critical elements essential for virus replication. The system can be used for screening multiple compounds simultaneously, against coronaviruses of all time – past, present and future.

It aims to facilitate faster progression for the identification of potential compounds through rapid preliminary screening of several compounds.

Contact info:

Nagendra Hegde (hegde@niab.org.in), Madhuri Subbiah (madhuri@niab.org.in)

IISc receives ILSF grant for developing mRNA vaccine technology

A team of researchers from IISc has received a grant from the Ignite Life Science Foundation (ILSF) to develop platform technologies for mRNA vaccine development. The team comprises Prof Raghavan Varadarajan, Prof Mrinmoy De and Prof Siddharth Jhunjhunwala from IISc, as well as Dr Amit Awasthi at the Translational Health Science and Technology Institute (THSTI) Faridabad. The investigators will attempt to develop methods for the generation of thermostable RNA vaccines, including variants of SARS-Cov-2, which would be critical for resource poor tropical regions of the world.

ILSF, a Section 8 not-for-profit, was launched in 2020 by Nobel Laureate Dr Venki Ramakrishnan. It aims to promote a vibrant ecosystem for scientific research in India.

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Website link:

https://www.iisc.ac.in/events/iisc-team-receives-ilsf-grant-for-developing-mrna-vaccine-technology/

https://ignitelsf.in/PDF/Press%20Release%20-%20IISc%20Funding%20by%20Ignite%20-%20July%205,%202021.pdf

inStem developing natural antimicrobial peptides (AMP) for antiviral immunity

The Institute for Stem Cell Science and Regenerative Medicine (inStem), an autonomous institute of Department of Biotechnology (DBT), is exploring if the body's immune system can be harnessed to block or protect from SARS-CoV-2 infection. A specific class of molecules of the immune system called antimicrobial peptides (AMPs), produced in many parts of the body, form the focus of this effort. The hypothesis that AMPs are likewise capable of killing the virus that causes COVID-19 is being tested. These AMPs have the potential to block the initial infection and could, if practical, limit the spread of the virus in people already infected to reduce the severity of the disease.

This approach will be an additional level of protection along with COVID-19 appropriate behaviour. Additionally, it would complement the vaccines currently being administered (or in development) to help combat viral strains potentially mutated to decrease the vaccine's efficacy.

Contact info:

Colin Jamora (colinj@instem.res.in)

NIBMG, in collaboration with IISc, is developing a novel virus-like particle vaccine against coronavirus

National Institute of Biomedical Genomics (NIBMG), an autonomous institute of DBT, in collaboration with IISc, is working on a project to design virus-like particles (VLP) specific to the Indian strain of SARS-CoV-2 and further study the possibility of development of a vaccine against the SARS-CoV-2 virus using the same.

Contact info:

Saumitra Das (sdas@nibmg.ac.in)

CIAB developing photodynamic therapy as an antiviral treatment for the eradication of SARS-CoV-2

A team of researchers from the Center of Innovative and Applied Bioprocessing (CIAB) is developing a series of photosensitiser nano formulations. One formulation showed very high efficacy (equivalent to Ramdesivir) to destroy SARS-Cov-2 *in vitro*.

Contact info:

Jayeeta Bhaumik (jayeeta@ciab.res.in)

ICGEB working on human monoclonal antibodies for prevention and treatment of COVID-19

Human monoclonal antibodies have the potential to be used for both prevention and treatment of infection. Over 200 human monoclonal antibodies from single-cell sorted memory B cells derived from COVID-19 recovered individuals in India have been generated and analysed for their neutralising activity on SARS-CoV-2. Several potent neutralisers have been identified.

This work showed that nearly half of the COVID-19 recovered individuals developed neutralising antibodies. These individuals can be identified by simple to use SARS-CoV-2 RBD ELISA's. The work is being done by ICGEB in collaboration with NIMR-ICMR and Emory University.

Contact info:

Dr Anmol Chandele (chandeleanmol@gmail.com)

RGCB, Thiruvananthapuram is working on new therapeutics against SARS-CoV-2

Rajiv Gandhi Centre for Biotechnology (RGCB) establishes cell-based assays targeting viral entry mediated by the spike protein and evaluates the functional activity of viral main protease (Mpro), also known as 3C-like protease (3CLPro). Also, these assays are being used to identify potential hits by screening newly in-house synthesised small molecules, focusing on entry inhibitors that are derivatives of Arbidol.

The project aims to develop cell-based assays to identify inhibitors of SARS-CoV-2 entry and inhibitors of viral protease. It also plans to screen derivatives of Arbidol as virus entry inhibitors. The results will lead to the subsequent development of potential drug candidates against COVID-19.

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IIT Indore in collaboration with NCCS pseudotyped SARS-CoV-2 in BSL-2 for candidate vaccine development

With the development of the COVID-19 pandemic, there is an urgent need to establish a system for determining the effectiveness and neutralising activity of vaccine candidates in biosafety level 2 (BSL-2) facilities. IIT Indore, in collaboration with NCCS-Pune set the pseudovirus production. Mice were immunised with the pseudovirus, and their antibody response was tested. The research initiative is being supported by Biotechnology Industry Research Assistance Council (BIRAC). The research outcome is expected to help in vaccine development.

Contact info:

Dr Akanksha Chaturvedi (akankshac@nccs.res.in)

Generation of virus-neutralising human monoclonal antibodies (hmABs) against SARS-CoV-2 as potential therapeutics

National Centre for Cell Science (NCCS), in partnership with IIT Indore, PredOmix Technologies Pvt. Ltd., Bharat Biotech International Ltd. (BBIL) and AFMC, Pune is working on virus-neutralising human monoclonal antibodies (hmABs) against SARS-CoV-2 as potential therapeutics.

Serum samples from patients are being screened for the presence of antibodies that specifically bind to the receptor-binding domain (RBD) of the virus. B cells grown and selected B cell clones are being tested for specific antibodies against the RBD. Of the approximately 150 B cell clones obtained in the lab, two were transferred to BBIL earlier for further development. The neutralisation efficacy of other potent clones is being analysed at IIT Indore. Supernatant from these clones was transferred to Bharat Biotech International Limited (BBIL) to test for virus neutralisation. Almost 10 other clones showed neutralisation with the actual virus, which is being characterised further.

Contact info:

Dr Arvind Sahu (arvindsahu@ncs.res.in)

NIPGR working on a platform for producing COVID-19 related antigens and antiviral proteins through transient expression in plants

Researchers from National Institute of Plant Genome Research (NIPGR) are working on a plant vaccine to help in controlling the coronavirus infection. Compared to conventional vaccination processes, the recombinant vaccines produced in plants are heat stable, lack animal pathogen contamination, are economically practical, and can be made in large amounts. The target is to produce an experimental plant-based vaccine for COVID-19 against S-glycoprotein protein of coronavirus.

Contact info:

Dr Manoj Prasad (manoj_prasad@nipgr.ac.in)

Examining the potential for use of natural plant products, flavonoids, against SARS-CoV-2

To tackle the pandemic, there is an immediate need to find a therapeutic against SARS-CoV-2. NIPGR contributes to research preparedness in the fight against this virus. Dr Ashutosh Pandey and his team from NIPGR are working to find drugs against SARS-CoV-2. The group is rigorously involved in exploring natural plant products, specifically flavonoids that are potentially

antiviral. The potential activity of the identified molecule/s against SARS-CoV-2 will be tested in collaboration with Regional Centre for Biotechnology (RCB), Faridabad.

Contact info:

Dr Ashutosh Pandey (ashutosh@nipgr.ac.in)

Immune memory in mild COVID-19 patients and unexposed donors reveals persistent T cell responses after SARS-CoV-2 infection

Understanding the causes of the diverse outcome of the COVID-19 pandemic in different geographical locations is essential for the worldwide vaccine implementation and pandemic control responses. A research study conducted at National Institute of Immunology (NII) analysed 42 unexposed healthy donors and 28 mild COVID-19 subjects up to five months from recovery for SARS-CoV-2 specific immunological memory. Using HLA class II predicted peptide megapools, SARS-CoV-2 cross-reactive CD4+ T cells were identified in around 66 per cent of the unexposed individuals. Moreover, detectable immune memory was found in mild COVID-19 patients several months after recovery in the crucial arms of protective adaptive immunity, CD4+ T cells and B cells, with a minimal contribution from CD8+ T cells.

Interestingly, the persistent immune memory in COVID-19 patients is predominantly targeted towards the Spike glycoprotein of SARS-CoV-2. The NII study provides evidence of high magnitude pre-existing and persistent immune memory in the Indian population. By providing the knowledge on cellular immune responses to SARS-CoV-2, work implies the development and implementation of vaccines against COVID-19.

Contact info:

Dr Nimesh Gupta (nimesh.gupta@nii.ac.in)

NII working on identification of potential anti-COVID-19 compounds targeting the RNA dependent RNA polymerases

Aiming to identify anti-COVID-19 compounds, researchers from NII have found that using structural and biochemical approaches, three widely used kinase inhibitors (sorafenib, sunitinib, and SU6656) significantly circumvent the kinase-like activity exhibited by the NiRAN domain of SARS-CoV-2 RdRP.

The fundamental research on an essential drug target (viral polymerase) has led to identifying a novel small molecule with anti-COVID-19 activity. Thus, this may find application in COVID-19 treatment.

Contact info:

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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

C-CAMP's Blackfrog Technologies gets H T Parekh Foundation's support to deliver vaccines to north-east India

C-CAMP's Blackfrog Technologies gets H T Parekh Foundation's support to deliver vaccines to north-east India

Bengaluru-based Centre for Cellular and Molecular Platforms (C-CAMP)'s start-up, Blackfrog Technologies has received CSR support for cold chain supply of vaccines from the H T Parekh Foundation. The Foundation will support the cost of manufacturing and dissemination of 100 Emvólio units.

The support from H T Parekh will help the deployment of 100 units of portable vaccine carriers in high-priority locations across north-east India. Vaccines need to be kept at a temperature between 20C and 80C from when they leave the factory till they are delivered for vaccination. Ice-based refrigeration causes wastage of vaccines worth 7.5 million dollars. Blackfrog will replace ice-boxes used in immunisation and bring about an assured, controlled and accountable cold chain in the last mile.

Emvólio is a portable, battery-operated medical-grade refrigeration system that can be used to transport biological specimens, vaccines, etc. This will address the pressing issue of cold chain supply disruption that affects the last-mile delivery of vaccines across the country.

Website link:

https://www.psa.gov.in/psa-prod/psa_custom_files/CCAMP-HTParekh-cold%20chain%20supply.pdf

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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

Government takes initiative to identify effective medicines under AYUSH to cure patients with symptoms of COVID-19

PIB reaches out to lactating mothers for COVID-19 appropriate behaviour

Government releases guidelines for buffer stock management of COVID-19 to state governments and UT administrations

COVID-19 vaccination dramatically reduces infection, finds AFMS study

Ministry of AYUSH strongly denies baseless claim by NICE on COVID-19 treatment protocol

Lessons learnt from the COVID-19 crisis being incorporated in ongoing as well as in future programmes and policies: DST Secretary

Government takes initiative to identify effective medicines under AYUSH to cure patients with symptoms of COVID-19

The Ministry of AYUSH has formed an inter-disciplinary AYUSH R&D task force with representation from ICMR, DBT, Council of Scientific and Industrial Research (CSIR), All India Institute of Medical Sciences (AIIMS) and AYUSH institutions. The task force has formulated and designed clinical research protocols for prophylactic studies and add-on interventions in COVID-19 positive cases through a thorough review and consultation with highly reputed experts from different organisations across the country to study four different interventions viz. Ashwagandha, Yashtimadhu, Guduchi + Pippali and a poly herbal formulation (AYUSH-64). Under various research organisations and national research institutes, 126 studies are going on in 152 centres in the country to identify effective medicine to cure patients with symptoms of COVID-19.

Central Council for Research in Ayurvedic Sciences (CCRAS) has undertaken four collaborative research studies in COVID-19 in which the Ayurvedic formulations have been administered as add on to conventional standard care. Further, four collaborative studies have Ayurvedic formulations as standalone treatment, of which two studies have conventional standard care as control arm and remaining two studies are standalone Ayurveda intervention.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1738146

PIB reaches out to lactating mothers for COVID-19 appropriate behaviour

Dr Manju Puri, Head, Department, Obstetrics and Gynaecology, Lady Hardinge Medical College, New Delhi talks about the recent decision to administer COVID -19 vaccination during pregnancy, and what precautions women should take to protect herself and her child.

It has now been approved that a woman can take COVID-19 vaccine even during pregnancy. How will it help?

During the second wave, many women contracted COVID-19 during pregnancy compared to the first wave. COVID-19, if severe, can lead to serious complications during pregnancy, especially during the last trimester as the uterus is enlarged and presses on the diaphragm, compromising a woman's ability to cope with a fall in oxygen saturation. This may lead to a sudden fall in blood oxygen saturation and risk the lives of both the mother and the child. Vaccines will help prevent severe disease in pregnant women.

Also, vaccinating a mother is likely to give some degree of protection to the newborn as the antibodies developed in the mother's body post-vaccination will pass on to the developing foetus through her blood. In the case of lactating mothers, an infant gets these antibodies through the mother's milk.

Some people believe that vaccines can cause infertility among women. Is it true?

These are rumours that get circulated on ubiquitous social media. Misinformation is far more dangerous than the virus itself.

Though the COVID -19 vaccines are relatively new, these have been developed using time tested techniques. Vaccines help the body develop immunity against a specific pathogen. It does not affect any other body tissue. In fact, we give some vaccines such as hepatitis B, Influenza, pertussis vaccine to women even during pregnancy to protect them and their unborn child from various diseases.

Besides, our regulators have approved the administration of the vaccines during pregnancy only after they were confident of their safety. There is no scientific data or studies that show that vaccines can cause infertility. These vaccines do not affect the reproductive organs in any way.

What precautions should a pregnant woman take to protect herself from COVID-19?

Pregnancy and childbirth are social events in our society. But, during the pandemic, it may mean exposing the mother and child to infection. We recommend that an expectant mother should wear a mask and maintain physical distance even when at home, amongst her family members. It is because she may not be going out, but her family members could be going out for work and she can contract the infection from them.

So, women should use all COVID-19 appropriate precautions during pregnancy and after childbirth as it can prevent them from infection and related complications.

What should a pregnant woman do if she shows symptoms of COVID-19?

First, if they have any symptoms of COVID-19, they should get themselves tested at the earliest. The sooner we diagnose, the better we can manage the disease. The management of COVID-19 is almost the same during pregnancy as it is for others, but it should be done only under the strict supervision of a doctor.

A woman should isolate herself, drink plenty of fluids, and check her temperature and oxygen saturation every four-six hours. If the temperature does not come down even after taking paracetamol, she needs to contact the doctor. If there is a fall in oxygen concentration or if there is a decreasing trend, for example if it is 98 in the morning, 97 in the evening, and then drops further the next day, she needs to get in touch with her doctor.

Besides, women who have associated illnesses such as diabetes, high blood pressure, cardiovascular disease, obesity, etc, need to be more careful, as they may need hospitalisation. So, consult your doctor and keep in touch with your doctor throughout the recovery period.

We strongly recommend an overall health check-up post- COVID-19 recovery to ensure that the mother and the foetus are doing fine.

Can a foetus contract COVID-19 from the mother?

There is no evidence to support this concern. We have done a couple of studies and found that the placenta, an organ that is formed in the uterus in which a foetus grows, acts as a protective barrier. There are a few cases where the newborn were found infected but we are not sure whether those babies got the infection inside the mother's womb or soon after the birth.

Having said that, as I have explained earlier also, pregnant women must take all possible precautions to prevent the infection as COVID-19 can affect her and her child in many other ways.

What precautions should a COVID-19 positive mother take to protect her newborn?

A mother should continue to breastfeed the baby but is advised to keep the baby at a distance of six feet from her when she is not breastfeeding. A caregiver who is tested negative can also help in taking care of the newborn. Before breastfeeding the newborn, she should wash her hands, wear protective gear such as a mask, face shield. She should also sanitise her surroundings frequently.

If there is no one else to take care of the child, a mother should wear a mask all the time, and maintain physical distance from the child as much as possible. The mother and the child should stay in a well-ventilated room, wash her hands regularly and sanitise the surroundings.

Postpartum depression and anxiety are common among women. Do you see an increase in mental health issues among women during the pandemic?

Certainly, there is an increase in mental health problems among women during pregnancy and post-childbirth. These are times when a woman undergoes a lot of hormonal and physiological changes. She has poor coping skills and needs social support. In the absence of this social support, she can feel lonely, helpless, and depressed.

Isolation for 15 days is difficult for everyone, more so for pregnant women and postnatal mothers. During this time, the additional anxiety about her child's health can severely affect her mental status.

So, it is important to provide constant support and assurance to women during this time. The family should stay in touch through video calls, and observe any change in her mood and seek medical help if she looks and feels depressed.

We always ask our pregnant women and mothers two simple screening questions: One, does she have little or no interest in doing her routine chores? And second, does she feel sad or feel like crying without any specific reason anytime in the previous two weeks? If the answer is yes to any of these questions it means she needs further evaluation by a psychologist. Doctors, as well as family members, need to watch the woman's behaviour carefully during this time.

What advice would you like to give to your women patients?

We ask them to stay safe, take adequate precautions and follow COVID-19 appropriate behaviour. Take vaccine as and when it is available to them. Avoid meeting many people.

If they have symptoms suggestive of COVID-19 such as fever, sore throat, loss of taste or smell or exposure to a COVID-19 positive person, they need to seek medical help immediately, should not delay the diagnosis and should not self-treat. Lastly, we also counsel all our pregnant women about various contraceptive methods during pregnancy and offer them postpartum intra-uterine device (Cu T), which can be inserted immediately after childbirth or caesarean delivery. It saves them of an unnecessary visit to the hospital after childbirth and reduces the risk of an unplanned pregnancy.

Website link:

https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1738998

Government releases guidelines for buffer stock management of COVID-19 to state governments and UT administrations

MoHFW has issued 'Guidelines for Buffer Stock Management of COVID-19' to state governments/UT administrations requesting them to initiate the necessary procurement process on priority, with a view to ensure continuous availability of drugs for any possible future surge in cases.

The government has made pro-active arrangements to augment the production capacities of domestic vaccine manufacturers by facilitating technology transfer, providing financial assistance, providing advance payment against supply orders and by streamlining the regulatory pathway for the approval of vaccines. The government has, further placed procurement orders to ensure adequate supply of vaccines to facilitate vaccination of eligible adult citizens.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1739470

COVID-19 vaccination dramatically reduces infection, finds AFMS study

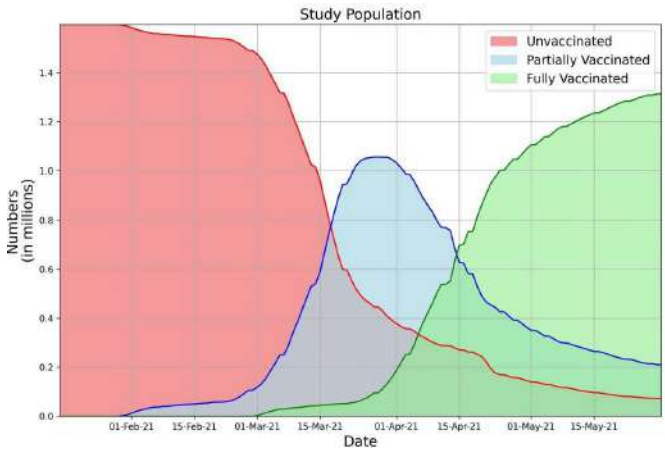
Armed Forces Medical Services (AFMS) published vaccine effectiveness among healthcare and frontline workers of Indian armed forces (VIN-WIN cohort study) in Medical Journal Armed Forces India, a peer reviewed scientific journal on 27 July 2021. The study highlights the impact of protection against COVID-19 by COVISHIELD vaccine by analysing the effect on fresh infections and deaths. According to the study, there was a 93 per cent reduction in fresh

infections and deaths were reduced by 98 per cent. It is possibly the largest study worldwide on COVID-19 vaccine effectiveness, so far.

Director General, AFMS Surgeon Vice Admiral Rajat Datta, a renowned cardiologist and co-author of the study said, 1.59 million healthcare workers and frontline workers of the armed forces were among the first recipients when India launched its vaccination drive against COVID-19 on 16 January 2021. The study was largely conducted on healthy males with few co-morbid illnesses. It did not include children and the elderly. In the VIN-WIN study, authors calculated incident rate and incident rate ration. Vaccine effectiveness was calculated as one-incident ration. Both crude and corrected rates were estimated and adjusted for the force of pandemic, second wave and the changing numbers in the three groups on a daily basis. The study was achieved at no additional cost by analysing available data.

The DG AFMS stated that the VIN-WIN cohort study was carried out on anonymised data from the existing armed forces health surveillance system, which had been enhanced for monitoring COVID-19. The surveillance system had data for daily vaccinations with first and second dose, dates of testing positive for COVID-19 and COVID-19 related deaths, which were analysed.

Despite constraints of terrain and location, the armed forces had managed to vaccinate over 82 per cent of the target population as early as 30 May 2021. The study was possible due to the cooperation by various components of the AFMS. Armed Forces Medical College, the medical directorates of Army, Navy and Air Force collaborated with DG AFMS to complete the study.



Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1739585

Ministry of AYUSH strongly denies baseless claim by NICE on COVID-19 treatment protocol

Some misleading claims have been made by a naturopathy related network Network of Influenza Care Experts (NICE) and have been published by some media platforms without journalistic verification. The main claim is regarding developing a protocol of treatment of COVID-19 that has been approved by the Ministry of AYUSH. The claimant has unethically and misleadingly attributed the Ministry's approval to it. The Ministry strongly denies all such claims of NICE and considers the publication of related news as completely misleading and baseless.

The Ministry further clarifies that the said agency, NICE, has not submitted any application for the so-called protocol to the Ministry. If any proposal related with COVID-19 treatment/ management is submitted to the Ministry by NICE, it will get it thoroughly examined by the

Interdisciplinary Technical Review Committee (ITRC). The committee has a well-established and rigorous scientific screening process for such validation. Without the approval of this committee, no AYUSH streams related agency can claim to have developed a protocol. NICE has done a very unethical, illegal and baseless act in claiming to have developed a Ministry of AYUSH approved naturopathy-based protocol for COVID-19 treatment. Equally serious is its act of using the name of the Ministry without the Ministry's explicit permission.

NICE like false claims fall under a punishable offence according to order no. 40-3/2020-DM-II (A), dated 24 March 2020 of the Ministry of Home Affairs and order no. 1-29/2020-pp (Pt II), dated 24 March 2020 of the National Disaster Management Authority (NDMA). These orders make false claims as punishable offence so as to prevent the spread of COVID-19 in the country. Some media organisations have published the false claim made by NICE without verifying the facts from the Ministry.

National Institute of Naturopathy (NIN) Pune has clearly said that NICE has made some tall and misleading claims. It is further emphasised that NIN, Pune, working under the auspices of the Ministry of AYUSH, has already clarified in the local media that it not only strictly adheres by the guidelines prescribed by the Ministry of Home Affairs for the management, treatment and prevention of COVID-19 but also promotes these guidelines through IEC material and various activities.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1740187

Lessons learnt from the COVID-19 crisis being incorporated in ongoing as well as in future programmes and policies: DST Secretary

Department of Science & Technology Secretary, Professor Ashutosh Sharma highlighted that the crisis created by the pandemic has taught us many lessons, and the lessons are being incorporated in all ongoing programmes as well as in future policies and programmes. He said this at a lecture on the 'Growth of S&T during 21st Century and COVID-19'.

"The pandemic COVID-19 has greatly disrupted the normal life and business, but it has also given us an opportunity to look at things differently and be self-dependent in future to tackle such sudden challenges. Before COVID-19, we were exporting most of the healthcare products that we could have produced in India, but now we ourselves are producing most of the items. We are not dependent on exporting these items from abroad, paving the way towards Atmanirbhar Bharat in health and other sectors," Prof Sharma said at the online lecture organised on 31 July 2021.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1741529

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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

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

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

IIT Tirupati comes up with a collaborative healthcare game, SurviveCovid-19++, towards educating people about safety measures and vaccination for COVID-19

DBT-BIRAC brings out a compendium of Indian products, technologies, and innovations to combat COVID-19

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

Press Information Bureau releases daily bulletin on COVID-19

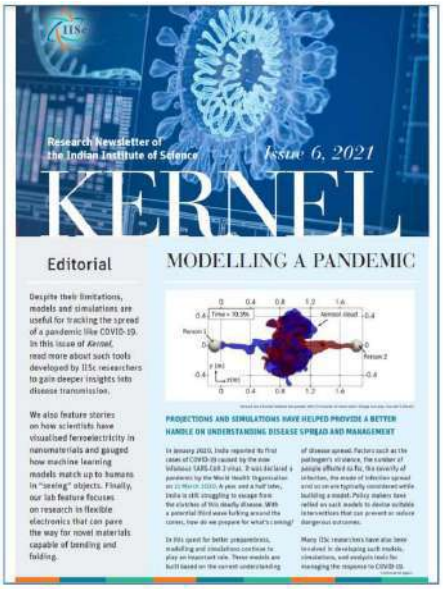
Government of India presents a regular COVID-19 India factsheet and immunisation programme

Outreach initiatives by India Science Channel

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

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

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



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

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

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Website link:

https://kernel.iisc.ac.in/wp-content/uploads/2021/07/Kernel-Issue-6-2021.pdf

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

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

To bridge the gap between scientific contributions, leadership and administrative efforts, and the general public's perspective, Vigyan Prasar is continuously reaching out to its audiences by way of a regular e-newsletter, taking its mandate of science communication, popularisation and extension to the next level. Our effort is firmly based on the fact that "Science gathers knowledge faster than society gathers wisdom." The steady increase in the number of recoveries

and the significant and continuous decrease in positivity rate provide us with the much-needed assurance that this may be the outcome of improving the health infrastructure and making health the cornerstone at the policy level. The e-Newsletter aims to be a handy guide to scientists, researchers, and scholars, especially those interested.

The latest edition was digitally published on 26 July 2021.

Contact info:

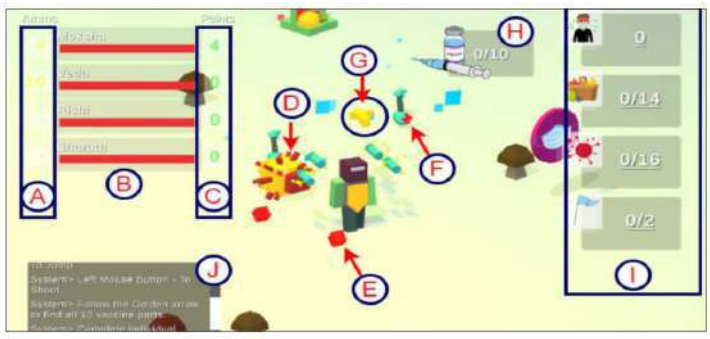
covidnewsletter@vigyanprasar.gov.in

Website link:

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

IIT Tirupati comes up with a collaborative healthcare game, SurviveCovid-19++, towards educating people about safety measures and vaccination for COVID-19

COVID-19 has been affecting the population across the world for more than a year, with diverse strains of this virus being identified in many countries. Vaccines to help in curbing the virus are being developed and administered. Preventing the spread of the disease requires collaborative efforts from everyone. People with varied professional backgrounds have varied responsibilities in controlling the pandemic. It is important that everyone is aware of their respective responsibilities and also empathise with the efforts and duties of other individuals. Researchers from IIT Tirupati wish to leverage the potential of games in healthcare domain to educate about COVID-19; educate people about vaccination against COVID-19; the responsibilities of citizens with varied professional backgrounds, and to emphasise the need for collaboration to fight against the pandemic, by following safety measures. SurviveCovid-19++ is a collaborative multiplayer desktop-based game. The game essentially revolves around four roles – doctor, sanitation worker, citizen, and law enforcer – delivering their duties, following safety measures and collaboratively clearing multiple stages in the game. They have performed a preliminary evaluation of the game through a qualitative and quantitative user survey. The results of the user survey were encouraging, with volunteers expressing their increased empathy towards the efforts of individuals with varied professional backgrounds, and a better understanding of the importance of safety measures against COVID-19.



A snapshot of the game being played by four players

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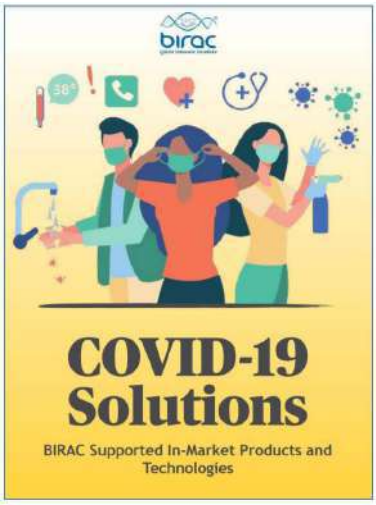
Website link:

https://arxiv.org/pdf/2104.08463.pdf

DBT-BIRAC brings out a compendium of Indian products, technologies, and innovations to combat COVID-19

Biotechnology Industry Research Assistance Council (BIRAC), a non-profit public sector enterprise of the DBT has brought out a compendium that showcases several innovations from all programmes that are being nurtured to move them forward in the innovation pipeline. This compendium provides products, technologies, and innovations developed by various start-ups on multiple aspects of mitigating the COVID-19 pandemic.



The compendium enumerates COVID-19-related products that are already commercialised, to be commercialised within next six months, research pipeline and additional facilitations towards mitigation of the novel coronavirus outbreak.

Website link:

https://birac.nic.in/webcontent/1621919585_COVID_19_solutions_May_2021.pdf

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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Website link:

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

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19, starting from the early days of the 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 are released on 9 August 2021.

50.86 Cr. vaccine doses have been administered so far under Nationwide Vaccination Drive
3,11,39,457 total recoveries across the country so far
Recovery Rate currently at 97.40%
39,686 patients recovered during last 24 hours
India reports 35,499 new cases in last 24 hours
India's Active caseload currently 4,02,188
Active cases constitute 1.26% of total cases
Weekly Positivity Rate remains below 5%, currently at 2.35%
Daily positivity rate at 2.59%; less than 3% for last 14 days
Testing capacity substantially ramped up – 48.17 crore tests conducted(Total)

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1744201

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 50 crore vaccine doses (50,86,64,759) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 9 August 2021, 08:00 AM, it stands at 3,19,69,954 cases, of which 3,11,39,457 have recovered. The recovery rate stands at 97.40 per cent while the case fatality rate stands at 1.34 per cent.

Website link:

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

Outreach initiatives by India Science Channel

India Science is an Internet-based Over-The-Top (OTT) science TV channel. 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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Website link:

https://www.indiascience.in/

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

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

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

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

Last date: 31 December 2021

Website link:

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

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

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

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

Last date: 31 December 2021

Website link:

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

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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.

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1. 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 (VoIs) 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 (VuI).

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 (VoIs).

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

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

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

Q. What are Delta and Delta Plus variants?

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

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

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

The Delta variant (B.1.617) has three subtypes B1.617.1, B.1.617.2 and B.1.617.3, of which B.1.617.1 and B.1.617.3 have been classified as VoI, 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/PressReleseDetailm.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 SpO_2 90 per cent to 93 per cent with ambient air.

Q. What is severe COVID-19 cases?

A. In severe Covid-19 case, a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than 30/minute and SpO_2 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 there lungs. Or they may need a breathing tube if their breathing problem is more serious.

Q. Can mechanical ventilation be given at home?

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

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

A. The six minute walk test (6MWT) is an exercise test that measures functional status in chronic obstructive pulmonary disease (COPD) patients and provides information on oxygen desaturation. This test is also being used for COVID-19. In case of COVID-19 symptoms, SpO_2 level must be checked before taking a walk. Now, walk for six minutes without a break on an even surface and measure the SpO_2 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

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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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