26TH SEPTEMBER 2021

FORTNIGHTLY EDITION

COVID-19

Science & Technology Efforts in India

VOL. IV | ISSUE 11

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

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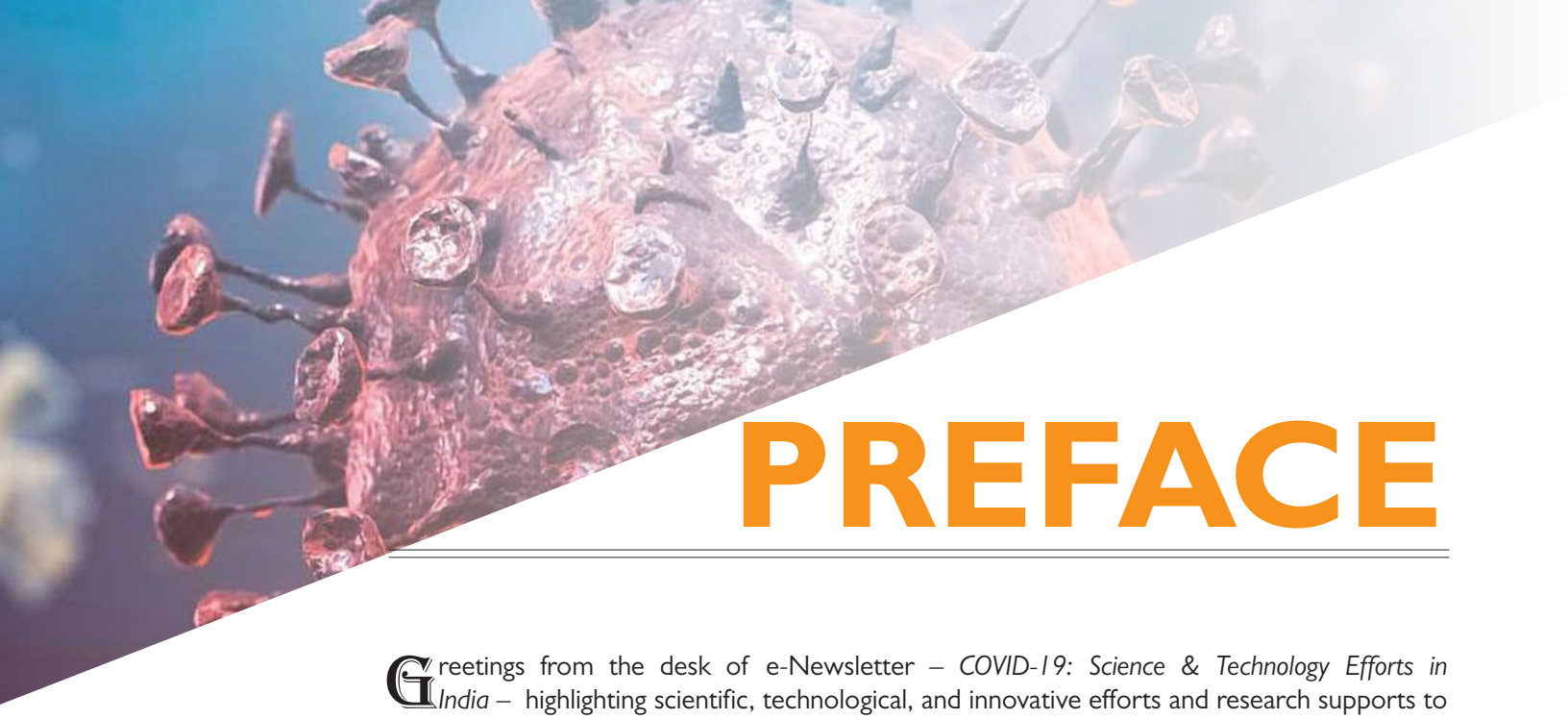
Although we have made the best effort to keep the information updated, the accuracy, completeness or adequacy of information will depend on what is made available by the third party or the same being up-to-date.

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

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



PREFACE

Greetings from the desk of e-Newsletter – *COVID-19: Science & Technology Efforts in India* – highlighting scientific, technological, and innovative efforts and research supports to mitigate and minimise the pandemic. Now we are armed with various weapons in our armour, like vaccines, therapeutics, immune boosters, and so on, to tackle the situation. A very encouraging and precise trend is now visible as the positivity rate is declining every day.

In the meantime, we continue compiling new information every fortnight on the pandemic to continue sensitising our readers about COVID-19-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 industry collaborations, significant research outputs, COVID communication, 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.

26 September 2021

Vigyan Prasar

New Delhi

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

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1

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

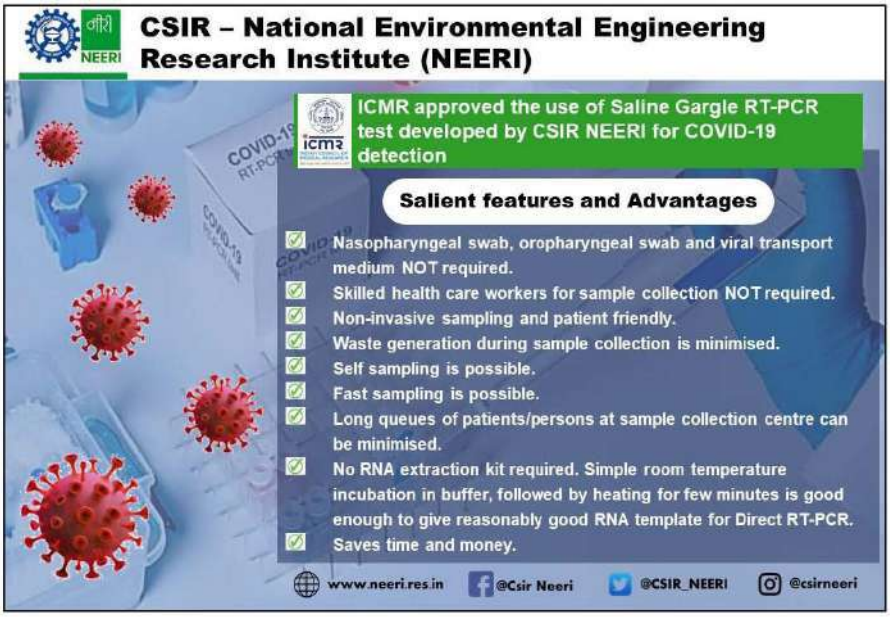
Saline gargle RT-PCR innovation by CSIR can be licensed to all eligible parties, for mass production

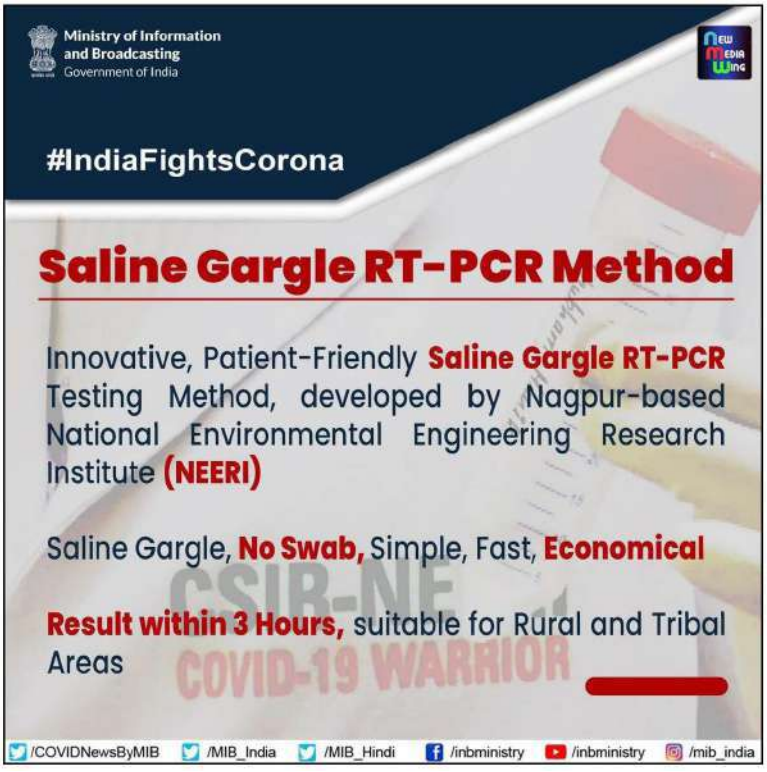
Umifenovir drug proves successful in clinical trials for COVID-19 treatment

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

Saline gargle RT-PCR innovation by CSIR can be licensed to all eligible parties, for mass production

In a notable step forward in India's fight against COVID-19, Nagpur-based National Environmental Engineering Research Institute (NEERI) under the Council of Scientific and Industrial Research (CSIR) has transferred the know-how of indigenously developed saline gargle RT-PCR technique, used for testing COVID-19 samples. The saline gargle RT-PCR technology is simple, fast, cost-effective, patient-friendly and comfortable. It also provides instant test results and is well-suited for rural and tribal areas, given its minimal infrastructure requirements.





CSIR-NEERI stated that the innovation developed by the institute has been 'dedicated to the nation' to serve the society. The know-how has been transferred to the Union Ministry of Micro, Small & Medium Enterprises (MSME), on a non-exclusive basis. This would enable the innovation to be commercialised and licensed to all capable parties, including private, government and various rural development schemes and departments.

The licensees are expected to set up manufacturing facilities for commercial production in the form of easily usable compact kits. In the light of the prevailing pandemic situation and probable third wave of COVID-19, CSIR-NEERI fast-tracked the know-how transfer process to potential licensees for its wider dissemination across the nation.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1754297

Umifenovir drug proves successful in clinical trials for COVID-19 treatment

The Central Drug Research Institute (CDRI) claimed that the clinical trials of antiviral drug, Umifenovir, in the treatment of COVID-19 have been successful. The trial of Umifenovir on 132 COVID-19 patients showed that, if proper dose is given twice daily for five days, the drug can effectively reduce viral load to zero in mild or moderate symptomatic and asymptomatic patients by checking multiplication of the virus.

Titled phase III, randomised, double-blind, placebo controlled trial of efficacy, safety and tolerability of antiviral drug Umifenovir vs standard care of therapy in non-severe COVID-19 patients, the clinical trial was conducted at three institutions – King George's Medical University (KGMU), Ram Manohar Lohia Institute of Medical Sciences (RMLIMS) and Era's Lucknow Medical College and Hospital (ELMCH).

In a study, double-blind mode improves reliability of results by preventing bias when doctors evaluate a patient's outcome. The results showed that viral load in mild, moderate or asymptomatic patients after being given two doses of Umifenovir (800mg) twice a day became zero in an average of five days. Patients did not experience any side-effects and their symptoms also did not turn severe.

Studies by CDRI in collaboration with CSIR-IMTECH, Chandigarh, also showed that Umifenovir exhibits good cell culture inhibition of SARS-Cov2, which suggests that the drug inhibits the entry of SARS-CoV-2 virus into human cells, Prof Kundu said.

The Drug Controller General of India (DCGI) has evaluated the clinical trials report and in view of the highly encouraging results, and has asked the team to continue the studies on more mild, asymptomatic patients for grant of emergency approval of the drug.

A team of CDRI chemists, Ajay K Srivastava, Chandra Bhushan Tripathi, Nayan Ghosh and Nilanjana Majumdar, and their students, synthesised the drug and developed the process technology – chemical processing used to refine raw material into finished product – in record time. Finally, after securing ethical approvals and completing stability studies of the drug at CDRI, the team of researchers took the consent of patients and roped them in for the study.

Website link:

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

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

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

Deadline: Open till next announcement

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Website link:

https://www.icmr.gov.in/pdf/tender/Revised_EOI_for_Ag_kit_validation_13082021.pdf

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2

RESEARCH SUPPORTS

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

SECTION GUIDELINES

Homemade face masks – effectiveness varies depending on how they are made, says IISc study

Modelling the impact of sensor performance on epidemic management: A study by IISc

Network-based novel target identification and drug repositioning for novel coronavirus by IIIT Hyderabad and CSIR-IMTECH

AIIMS Delhi studies single-dose oral Ivermectin as a potential treatment for COVID-19 patients

RGCB develops anosmia checker, a rapid and low-cost alternative tool for mass screening of COVID-19

ILBS identifies COVID-19 associated extracellular vesicles as a prognostic tool and an alternative of SARS-CoV-2 infection and transmission

Modelling, analysis and prediction for SARS-CoV-2 infections by IISER Thiruvananthapuram

IISc studies droplet generation from eyes for pathogen transmission

IIT Palakkad develops an automated lung ultrasound workflow for diagnostic assistance in COVID-19

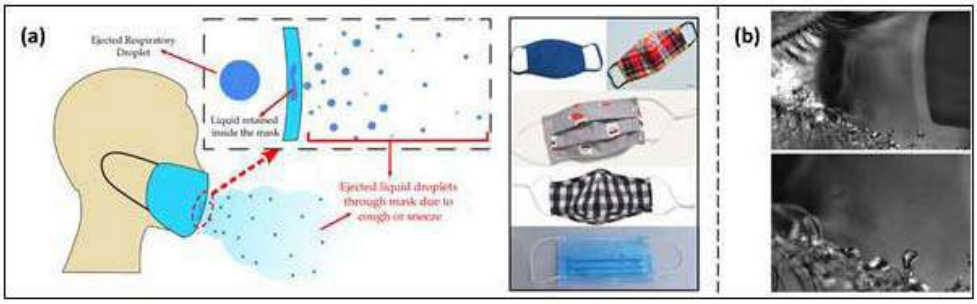
Homemade face masks – effectiveness varies depending on how they are made, says IISc study

Since the spread of virus causing COVID-19 continues, experts recommend wearing homemade facemasks when surgical or N95 masks are not available to prevent the spread of the pandemic. While such makeshift masks are more economical and accessible in low-capita countries, the effectiveness of cloth masks has not been studied in depth.

Researchers at Indian Institute of Science (IISc) have carried out a detailed study on the fate of a large-sized surrogate cough droplet impinging at different velocities (corresponding to mild to severe coughs) on various locally procured cloth fabric (stole, handkerchief, cotton towel, and surgical masks), specifically those which are convenient for people to use every day.

A single quantity has been formed by combining the individual effects of pore size and porosity, giving a better insight into the correlation between liquid penetration and fabric properties. Based on their findings, the researchers recommend using a cotton towel (with at least three layers) as a face covering if the person cannot use an N95 or a surgical mask. Masks with three or more layers are ideally recommended since they can suppress aerosolisation significantly. The team also analysed the effect of washing on mask effectiveness. Results show, up to 70 wash cycles, a negligible influence of washing on mask efficacy.

This study was carried out by Bal Krishan, Dipendra Gupta, Gautham Vadlamudi and Shubham Sharma under the guidance of Prof Saptarshi Basu and Prof Dipshikha Chakravortty.



(a) Cough droplet atomisation and various homemade facemasks
(b) Droplet generation from corneal tear film during the non-contact tonometry process

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https://aip.scitation.org/doi/10.1063/5.0061007

Modelling the impact of sensor performance on epidemic management: A study by IISc

The mathematical modelling of epidemic dynamics is a rich field with a large diversity of available models, accounting for various aspects of the problem. The study proposes to create a discrete, stochastic agent-based network model where each agent has a set of associated contacts, and a mobility pattern matching observed statistical distributions. The number of infected persons is estimated based on a testing technology with specified error rates. This simulation set-up will allow us to quantitatively evaluate the impact of various testing and sampling strategies on broader epidemic management.

The study attempts to add an essential additional layer into conventional epidemic models, namely, and disease testing technologies.

The model enables one to find an optimum allocation of tests to manage the epidemic spread. The simulation framework proposed will address several critical issues necessary for effective epidemic management.

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Network-based novel target identification and drug repositioning for novel coronavirus by IIIT Hyderabad and CSIR-IMTECH

A team of researchers from IIIT Hyderabad identifies relevant targets (both viral and host) by expansive analysis of the viral-host interactome at multiple levels and screening for possible drug molecules that effectively inhibit these targets using traditional molecular design methods and modern artificial intelligence/machine learning algorithms. The identified drug molecules will then be tested at CSIR-IMTECH using Vero E6 plaque assay for further development.

They have also developed a method based on reinforcement learning and docking methods for de novo molecular generation. Both these methods have been applied to identify novel molecules that strongly bind to the main proteinase of SARS-CoV-2.

The project has addressed three fundamental aspects related to COVID-19 – drug repurposing based on the analysis of host SARS-CoV-2 metabolic interactome; machine learning-based risk stratification and mortality prediction of COVID-19 positive patients; and molecular design for SARS-CoV-2 main proteinase using machine learning and physics-based methods. This would tremendously help reduce the computational effort in drug discovery and areas that require such high-throughput experiments.

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AIIMS Delhi studies single-dose oral Ivermectin as a potential treatment for COVID-19 patients

Ivermectin has been suggested as a treatment for COVID-19. This randomised control trial was conducted to test the efficacy of Ivermectin in the treatment of mild and moderate COVID-19, at All India Institute of Medical Sciences (AIIMS) Delhi.

The study aimed to evaluate the efficacy of single-dose Ivermectin in reducing viral load in COVID-19 patients. Also, they considered the effectiveness of Ivermectin in time for clinical improvement, the percentage of patients progressing to severe disease, and the frequency of adverse events in both arms. The study hypothesises that single-dose Ivermectin will significantly reduce viral load (as estimated by RTPCR) and reduce the primary reproductive number (R0) for COVID-19.

They performed an open-label randomised controlled trial of single-dose Ivermectin (various doses, i.e., 12 mg, 24 mg, 48 mg, 96 mg and 120 mg) in admitted COVID-19 patients with non-severe illness and without contraindications to Ivermectin administration.

Significance of outcome of the research: Reduction in viral load, if achieved, can lead to early discharge of patients from the hospital. Also, as the persistent viral load correlates to progression

to severe disease and complications in the second week of illness, Ivermectin can lead to reduced incidence of progression to severe disease and respiratory failure. Another important aspect is that by reducing the duration for which a patient remains infected, Ivermectin can reduce the primary reproductive number (R0) for COVID-19. If found effective, it can be evaluated and considered for single-dose administration. This can become one important strategy in flattening the curve of this pandemic.

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RGCB develops anosmia checker, a rapid and low-cost alternative tool for mass screening of COVID-19

COVID-19 is an ongoing pandemic, with 80 per cent of patients showing only mild symptoms. Of this, 20 per cent are asymptomatic. These asymptomatic patients do not display any signs but are capable of shedding the virus and acting as carriers of COVID-19. Therefore, it is essential to identify these asymptomatic carriers and quarantine them to stop the spread of COVID-19. The only way to determine the asymptomatic carriers is to conduct mass screening, but current diagnostic kits have limitations. Considering the inability of different diagnostic platforms to independently screen and identify the asymptomatic carriers, researchers from Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, are working on multiple platforms together to identify the asymptomatic carriers among the masses and confirming infection using confirmatory media.

It is known that SARS-CoV-2 first infects the nasopharyngeal region leading to loss of smell. Hence, they hypothesised that this would be the first indicator of COVID-19 infection. Therefore, they are developing a low-cost initial screening tool using the initial loss of smell as an indicator that needs to be carried out and other confirmatory protocols.

The study proved to predict COVID-19 infection by calculating a loss of smell score with 100 per cent specificity.

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ILBS identifies COVID-19 associated extracellular vesicles as a prognostic tool and an alternative of SARS-CoV-2 infection and transmission

The COVID-19 illness has a broad range of clinical manifestations, from asymptomatic or mild infection to a severe respiratory disease progressing to respiratory and multi-organ failure.

Extracellular vesicles (EVs), including microvesicles (MVs), or exosomes have been shown to serve as vehicles for intercellular communication and transfer of genetic material in several viral infections. Therefore, it was reasonable to hypothesise that EVs may serve as reservoirs of SARS–CoV-2, transmit COVID-19 disease to naïve cells and the EV associated SARS-CoV-2 RNA might also contribute to reactivation after the viral clearance.

This study, conducted at Institute of Liver and Biliary Sciences, found that all confirmed COVID-19 patients, positive in nasal swab also had extracellular vesicles (EV) associated viral RNA. In the same patients, it was undetected in the plasma but positive in EV associated

SARS-CoV-2 RNA in one per cent of patients. Interestingly, the EV associated was of endothelial cells of origin as detected using flow cytometry.

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Modelling, analysis and prediction for SARS-CoV-2 infections by IISER Thiruvananthapuram

Prediction of the dynamics of new SARS-CoV-2 infections during the current COVID-19 pandemic is critical for public health planning of efficient health care allocation and monitoring the effects of policy interventions.

The susceptible-infected-recovered (SIR) model is the most classic and popular epidemic model to simulate the spreading of infectious diseases. By this model, one tries to understand how different situations may affect the outcome of the epidemic and to answer questions, like what is the most efficient technique for administering a limited number of vaccines in a given population.

With the basic SIR model, the importance of primary reproductive number (R0) has been studied by the team led by Dr Utpal Manna, Indian Institute of Science Education and Research (IISER) Thiruvananthapuram. The SIR model tries to compute the theoretical number of people infected with a contagious illness in a closed population over time, and the total number of infected persons or the duration of an epidemic. As COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a newly emergent virus, there is much to be understood about its transmission.

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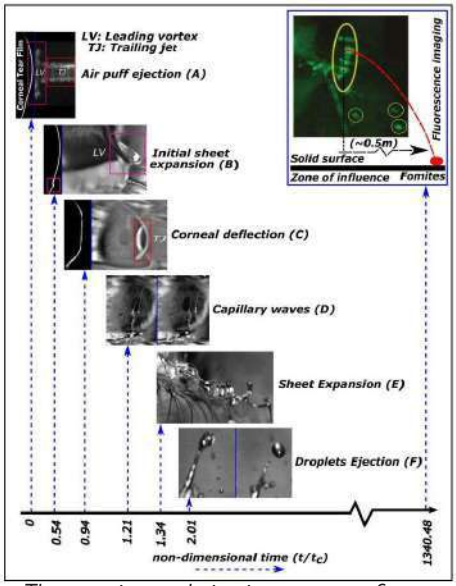
IISc studies droplet generation from eyes for pathogen transmission

A common eye test could expel tear droplets up to a meter away from the patient, potentially spreading virus that causes COVID-19 and other pathogens. In physics of fluids, scientists from IISc and the Narayana Nethralaya Foundation explain how tears ejected from the eye during a glaucoma test can theoretically transmit disease.

The researchers modelled the eye's response and took high speed images of eyes undergoing the procedure. They were specifically looking at the liquid in the eye and how it responded. As the eye was hit with the air puff, the film of tears on the surface expanded into a sheet that spilled out over the eyelids. The cornea also deflected away from the incoming air. The waves move within the eye and tear liquid eventually becomes unstable, and the tears break up into droplets. The team tracked the speed of those droplets as they left



The creation and ejection process of tear droplets in the eye from a non-invasive eye procedure

the eye and predicted they could travel up to a meter away from the patient. The distance depends on the air flow within the room.

This work can help eye care practitioners to develop and follow health and safety protocols, like improved room ventilation and cleaning nearby instruments and surfaces, that may not have been considered necessary in the past.

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Website link:

https://aip.scitation.org/doi/10.1063/5.0061956

IIT Palakkad develops an automated lung ultrasound workflow for diagnostic assistance in COVID-19

In the case of SARS-CoV-2 infection, it has been reported that lung abnormalities may develop before clinical manifestations and nucleic acid detection. Hence, early chest computerised tomography (CT) has been recommended for screening suspected patients. However, the high contagiousness of SARS-CoV-2 and the risk of transporting unstable patients with hypoxemia and hemodynamic failure make chest CT a limited option for a patient with suspected or established COVID-19. It has been reported that lung ultrasonography (LUS) gives similar results to chest CT and is superior to standard chest radiography for evaluating pneumonia and acute respiratory distress syndrome (ARDS). LUS has the added advantage of ease of use at the point of care, repeatability, absence of radiation exposure, and low cost.

An IIT team led by Professor Mahesh R Panicker has developed a lightweight algorithm based on 'you look only once version 5' (YOLO5) and single-shot detection (SSD) that has the capability of providing the quality of images based on the identification of various LUS landmarks, prediction of severity of lung infection and the possibility of active learning, based on the feedback from clinicians.

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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

HUL ties up with Office of PSA for study on COVID-19 vulnerability and vaccine efficacy

Active copper as a leading antimicrobial: A post-COVID, sustainable solution in the polymer and textile industry

UVGI air sanitizer by Magneto CleanTech prevents the spread of viruses

HUL ties up with Office of PSA for study on COVID-19 vulnerability and vaccine efficacy

India's top packaged consumer goods company – HUL (Hindustan Unilever Ltd) and UIPL (Unilever Industries Private Limited) R&D will provide CSR funding for a research project towards building a holistic multi-dimensional understanding of immune responses in SARS-CoV-2 in vaccinated people. This is a first-of-its-kind national level multi-centre study on the long-term protection and immunogenicity of vaccines, in combination with an understanding of nutritional and 'skin immunity' status in the Indian population. It will help build the required knowledge base, as well as an enduring clinical and research platform to fight the next waves of COVID-19 as well as future pandemics.

This research is being enabled by the Office of PSA's Division of Strategic Alliances to stimulate collaborations between industry and academia. It is being carried out by the platform, VISION (Vaccine Immunology Studies – Indian Outbreak-response Network), which includes top public and private research institutes: National Centre for Biological Science (NCBS-TIFR), Bengaluru, which is a centre of Tata Institute for Fundamental Research, Institute for Stem Cell Science and Regenerative Medicine (a DBT Institute), Bangalore, Indian Institute for Science Education and Research, Pune (IISER-Pune), CSIR-National Chemical Laboratory, Pune; clinical research centres Baptist Hospital and St John's Research Institute, Bangalore, Christian Medical College, Vellore and KEM Hospital and Research Centre and Symbiosis Hospital and Research Centre, Pune. HUL will also support additional analytical and data analyses through its R&D scientists to the consortium partners, as needed.

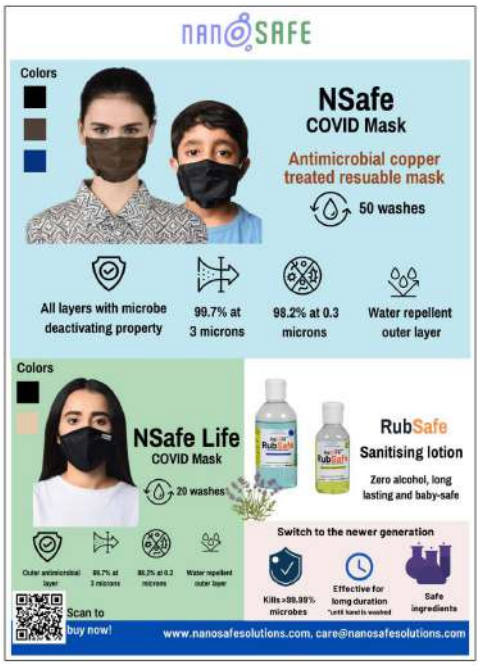
Website link:

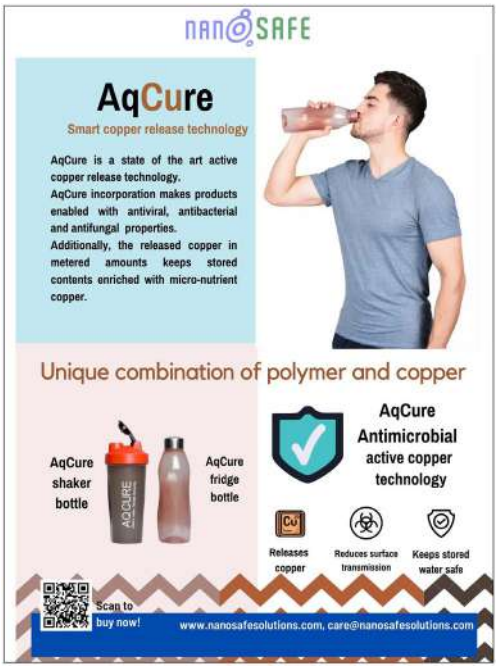
https://www.psa.gov.in/article/hul-funds-study-delineate-factors-impacting-covid-19-vulnerability-and-vaccine/3255

Active copper as a leading antimicrobial: A post-COVID, sustainable solution in the polymer and textile industry

The COVID-19 pandemic has created a massive worldwide health threat, causing huge loss of lives, fear and detrimental impact to economic foundations of countries worldwide. Community mitigation control has been touted as a critical factor for deciding containment of the disease in times of public health emergency. The hazard has pushed manufacturers to introduce antimicrobial range in practically all material applications, both in commodity as well as engineering applications. The most pertinent of them are applications in which multiple human contact within a short time span is a necessity, such as public transport contact points, office doors and handles, elevator buttons, food/edible contact packaging films just to name a few. Metal based chemistry in achieving antimicrobial effect has been quite popular. Several studies advocated toxicity related issues pertaining to silver-based ions and nanoparticles. Copper is an age-old remedy for antimicrobial applications and has the advantage of excellent bioactivity and non-resistance to pathogenic microbes at low concentrations. Usage of copper made jugs and vessels for food and water purification is common in India as it is considered as a minor trace nutrient element required for growth and immunity in humans. Copper presents fortifying properties with increased antifungal activity.

Nanosafe Solutions, being an academic spin-off from IIT Delhi, focuses on lab-to-market strategies of innovations and technologies that demonstrate substantial promise at lab-scale. Keeping in view the self-reliant India goals and the inherent micro-nutrient chemistry of copper, active copper-based antimicrobial solutions have been the focus area for the past few years. Its manufacturing facility synthesises ACTIPART CU™ (active copper powder) in house, which demonstrates excellent antibacterial, antiviral, antifungal and antialgal properties. ACTIPART CU can be incorporated in melt-processable and solvent-processable polymer systems with excellent augmented





antimicrobial properties. It is also compatible with foam, plywood, coatings and laminates. Active copper immobilised bentonite-nanoclay system (CLAYCURE CU) is another powder formulation which synergises paint and cosmetic formulations with antimicrobial functionality.

Masterbatches are an inherent part of the plastic industry and serves as a quick addition of colour/functionality in the final product making step. AQCURE MASTERBATCHES compatible with commodity and engineering plastics can impart antimicrobial property to the final product at very low doses. These masterbatches can be simply mixed at the stage of injection molding, blow molding, rotomolding, extrusion, film forming (cast and blown), thermoforming, etc. It also offers textile finishing formulation for padding application reusable up to 50 home launderings. The chemical can be applied to any natural and man-made fabric through simple padding procedure. AqCure drinking water bottles is another interesting innovation in its portfolio. AQCURE drinking water bottle imbibed with active copper technology was created to counter unwanted growth of microbes in water bottles over time. These copper-plastic hybrid water bottles ensure there is zero microbe formation starting from 30 minutes to over a period of 10 days. These unique bottles also reduce surface transmission of microbes as their outer surface also keeps microbes at bay.

With the advent of COVID-19 pandemic, as masks were fast emerging as an important mitigation medium to contain SARS-CoV-2 virus, NSafe mask was launched. NSafe mask is a premium mask which is antimicrobial and reusable upto 50 washes and is engineered to protect against virus, bacteria, dust and allergens. A patent pending active copper-based antiviral coating is applied on its layers which deactivates SARS-CoV-2 within two hours. The mask has been designed with special woven man-made fabrics in middle and outer layer to maximise the durability and dimensional stability, so that the mask can be reused 50 times keeping the bacterial filtration efficiency and other attributes intact. It has 99.7 per cent bacterial filtration efficiency at three microns (SITRA certified), 98.2 per cent at 0.3 microns and complies with ASTM standards of breathability and splash resistance. A smaller version of NSafe mask, Nkids masks is also available for children. RubSafe COVID-19 sanitising lotion with zero alcohol formula is also in the portfolio which remains active on the skin for prolonged duration (>12 hours). In the present pandemic times, it is advised to exercise utmost precaution and safety while choosing material systems around us. Sustainable antimicrobial chemistry and boosting immunity remains the best possible ways to combat existent and emerging infectious diseases.

Nanosafe Solutions, a budding startup in S&T space, received support through Biotechnology Ignition Grant (BIG), by Biotechnology Industry Research Assistance Council (BIRAC), and Special COVID-19 call by DST NIDHI Seed Support Scheme.

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UVGI air sanitizer by Magneto CleanTech prevents the spread of viruses

A path-breaking air sanitization product that can be integrated with any kind and capacity of air conditioning systems, from split AC, cassette AC to AHUs and FHUs, and inactivate 99.9 per cent of coronavirus in an affordable manner has been launched with the approval of CSIR.

It's a unique UVGI-based solution for COVID-19 protection, which has been certified and validated by CSIR-CSIO. Given the airborne nature of the virus and the increasing recognition of the threat from it in indoor spaces, the product is yet another testimony to Magneto's proficiency in innovative product design, ability to speedily commercialise new technologies, and translate R&D insights into valuable consumer products.

Although UVGI technology has been traditionally considered harmful to human skin thereby remaining limited in use for many years, the company has sought to mitigate those safety concerns by developing a thoroughly non-contact, non-chemical product. Injecting periodical dosages of UV-C light of wavelength 254 nm, this solution involves the creation of an irradiation field within the HVAC-ducts and thereby disinfecting the inner chamber, a process which rules out any direct human contact whatsoever.

The product not only allows protection from coronavirus and other microscopic pathogens indoors in stationary buildings and living spaces, but also from their threats on various modes of mobility including public transport featuring metros, buses, taxis, and so on.

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https://www.magneto.in/uvgi.php#

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4

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

DBT releases a resource book on COVID-19 DNA vaccine

Ministry of Health releases a resource book on the world's largest vaccination drive

Outreach initiatives by India Science Channel

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

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

CSIR releases bulletin on recent scientific developments including COVID-19 news and updates

Press Information Bureau releases daily bulletin on COVID-19

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

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

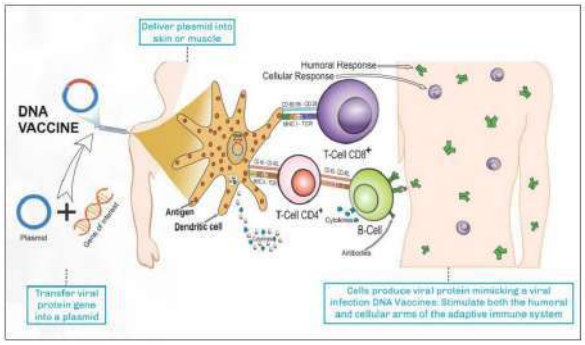
Initiative by myGOV to engage the general public in thanking the health care workers

DBT releases a resource book on COVID-19 DNA vaccine

The world's first COVID-19 DNA vaccine has been developed in partnership with the Department of Biotechnology (DBT), Government of India under the 'Mission COVID Suraksha' and implemented by BIRAC, a PSU of DBT. DBT has released a resource book on COVID-19 DNA vaccine.

The ZyCoV-D is the world's first and India's indigenously developed DNA-based vaccine for COVID-19 to be administered in humans including children and adults 12 years and above. Vaccine Technology Centre (VTC), a vaccine research centre of the Zydus group, Translational Health Science and Technology Institute (THSTI), an autonomous institute of the DBT and Interactive Research School for Health Affairs (IRSHA), Pune, GCLP Lab set up under the DBT-National Biopharma Mission (NBM) also played a vital role in this success story.

Currently no DNA vaccines have been approved for use in humans, but many DNA vaccines are undergoing human clinical trials. Some DNA vaccines have been approved by US regulatory agencies.



Website link:

https://dbtindia.gov.in/sites/default/files/World%27s%20First%20DNA%20Vaccine_The%20Scientific%20Journey.pdf

Ministry of Health releases a resource book on the world's largest vaccination drive

A booklet on the world's largest vaccination drive was released by the Ministry of Health and Family Welfare (MoHFW), GOI. This booklet gives information about the scientific guidance about the programme, COVID-19 vaccination in India, use of Co-WIN portal, operationalisation of COVID-19 vaccine, progress of vaccination drive and surveillance of adverse events, etc. This book will be helpful for the public.

Website link:

https://www.mohfw.gov.in/vaccinationbooklet/

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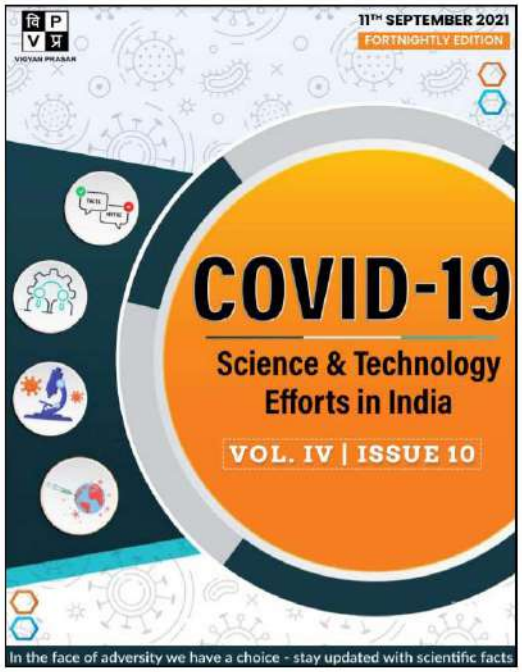
COVID-19: Science & Technology Efforts in India – an information resource on the pandemic

Effective communication is in its own right a non-pharmaceutical intervention for any epidemic that can increase adherence to protective behaviour 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 -19 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 11 September 2021.

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Website link:

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

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

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

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

COVID-19. These resources are generated by efforts made by numerous initiatives and schemes taken up by several departments and ministries of the Government of India and numerous institutions spread across the country. The content presented here relies on the best available scientific understanding of the disease and its transmission.

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

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Website link:

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

CSIR releases bulletin on recent scientific developments including COVID-19 news and updates

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

Website link:

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

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19, starting from the early days of the COVID-19 outbreak. The bulletin contains press releases concerning COVID-19, issued in the last 24 hours, inputs from PIB field offices, and fact checks undertaken by PIB. These bulletins are published in 14 languages: Hindi, English, Urdu, Marathi, Telugu, Tamil, Punjabi, Bangla, Kannada, Oriya, Gujarati, Assamese, Malayalam and Manipuri. The following data points were released on 23 September 2021.

83.39 Cr. vaccine doses have been administered so far under Nationwide Vaccination Drive
Active cases account for less than 1% of total cases, currently at 0.90%; lowest since March 2020
India's Active caseload stands at 3,01,640; lowest in 187 days
31,923 new cases in the last 24 hours
Recovery Rate currently at 97.77%; Highest since March 2020
31,990 recoveries in the last 24 hours increases Total Recoveries to 3,28,15,731
Weekly Positivity Rate (2.11%) less than 3% for last 90 days
Daily positivity rate (2.09%) less than 3% for last 24 days
55.83 crore Total Tests conducted so far

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1757283

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 84 crore vaccine doses (84,15,18,026) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 24 September 2021, 08:00 AM, it stands at 3,35,94,803 cases, of which 3,28,48,273 have recovered. The recovery rate stands at 97.78 per cent while the case fatality rate stands at 1.33 per cent.

Website link:

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

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-19 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 health care 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 health care workers, for which you have to first join the Thank You Health care 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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5

COVID FACT-CHECKS

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

SECTION GUIDELINES

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

1. SARS-CoV-2 surveillance in India

Q. What is INSACOG?

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

Q. What is the objective of INSACOG?

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

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

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

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

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

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

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

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

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

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

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

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

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

Source:

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

2. Delta and Delta Plus variants

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

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

- Random error during replication of virus

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

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

3. COVID-19 vaccination for pregnant women

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

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

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

A. Higher risk of infection involves with:

- A health care 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A. Most affected children get a mild disease with fever and need supervised home care with monitoring. We have learned a lot about COVID-19 illness from our shared experiences in adult medicine in the last 15 months. IAP guidelines on the management of COVID-19 in children are in place, and paediatricians have been sensitised and trained on its management. We need to be ready for a more significant number of patients seeking consultations; educating the parents on different platforms regarding illness and warning signs; and arranging more COVID-19 wards for children with more special wards such as high-dependency units (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

5. COVID-19 and White Fungus infection

Q. What is White Fungus?

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

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

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

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

Q. Who can get infected by white fungus?

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

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

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

Q. Is White Fungus contagious?

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

Q. What are the symptoms of White Fungus?

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

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

Q. How can White Fungus be treated?

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

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

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

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

Q. Are 8 breaths per minute normal?

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

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

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

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

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

7. Related to drugs and medications to fight the disease

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

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

Q. What is Remdesivir? How does Remdesivir work?

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

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

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

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

Q. Can Remdesivir be taken at home?

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

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

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

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

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

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

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

Q. Is Favipiravir effective in treating COVID-19?

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

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

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

8. Related to Black Fungus and COVID-19 disease

Q. What is Black Fungus?

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

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

A. Risk Factors are:

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

Q. Why the sudden increase in Black Fungus cases?

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

Q. How serious is Black Fungus?

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

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

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

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

A. One can take the following precautions:

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

Q. What are the early signs of Black Fungus?

A. Some of the early signs are:

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

Q. Is Black Fungus treatable?

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

Q. Which specialist should I visit for Black Fungus?

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

Source:

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

9. Related to indoor air and COVID-19 disease

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

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

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

A. When cleaning and disinfecting for COVID-19, ventilation is essential – in general, increasing ventilation during and after cleaning 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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