VIGYAN PRASAR

11TH JULY 2021

FORTNIGHTLY EDITION

COVID-19

Science & Technology Efforts in India

VOL. IV | ISSUE 6

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

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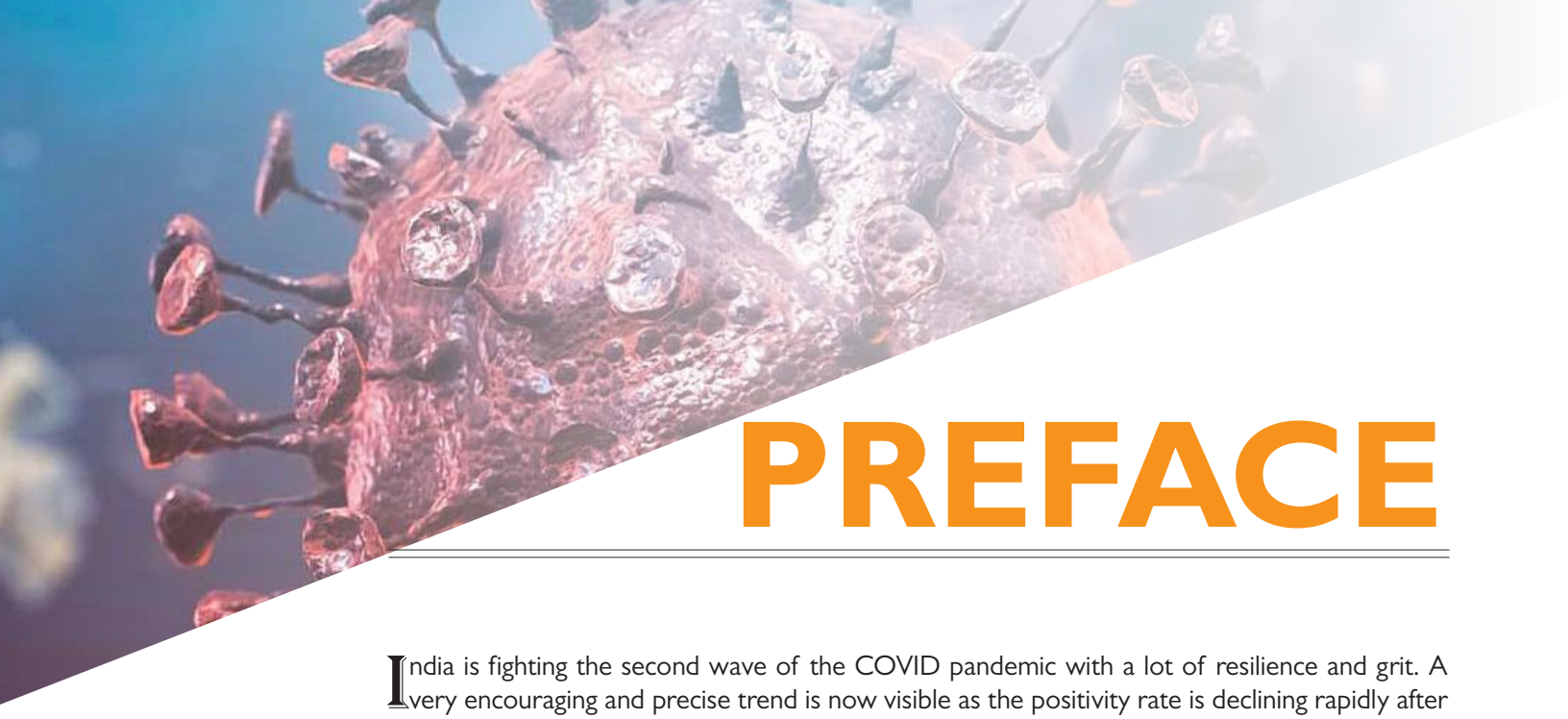
Although we have made the best effort to keep the information updated, the accuracy, completeness or adequacy of information will depend on what is made available by the third party or the same being up-to-date.

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

India is fighting the second wave of the COVID pandemic with a lot of resilience and grit. A very encouraging and precise trend is now visible as the positivity rate is declining rapidly after surging in the preceding months.

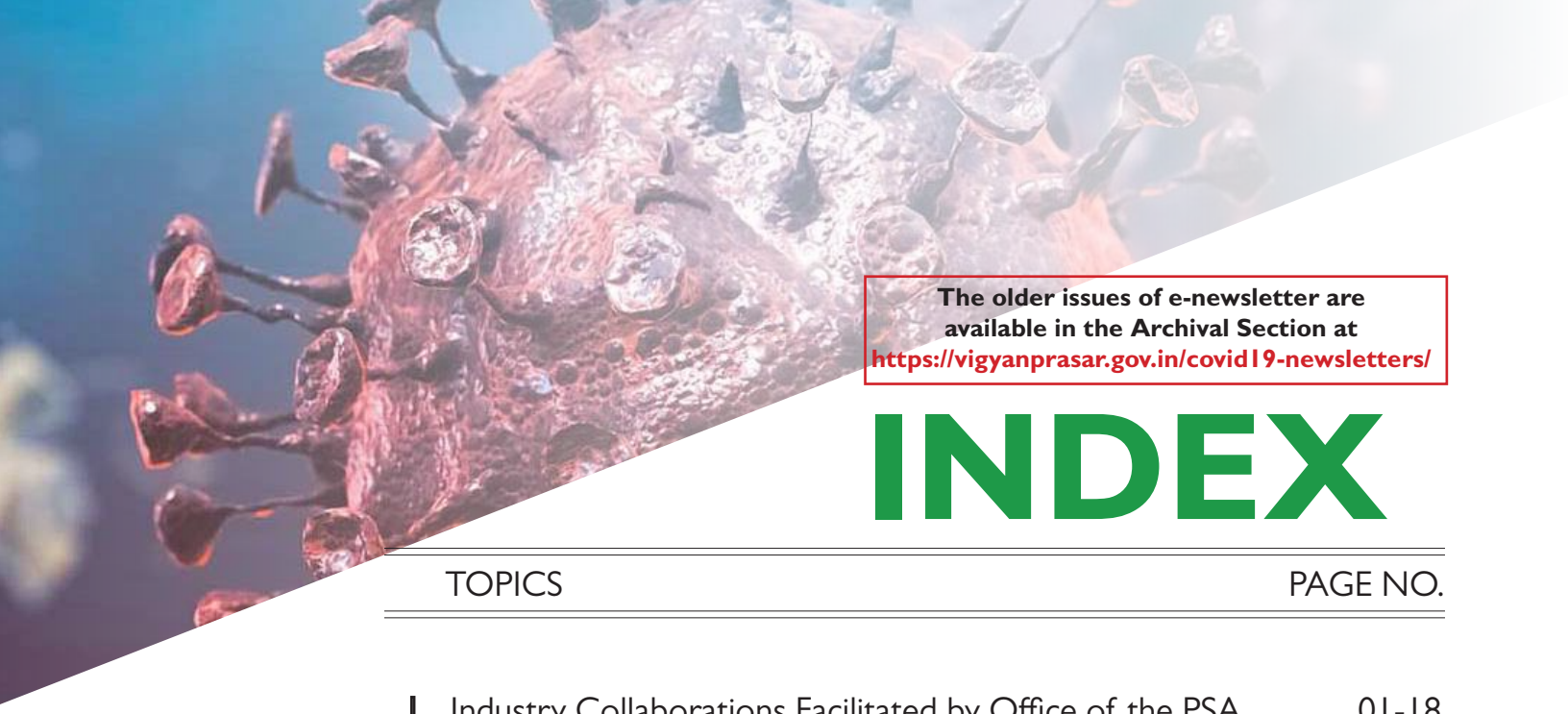
We continue compiling new information every fortnight on the pandemic to continue sensitising our readers about COVID-related latest developments. The aim is to inform the readers and strengthen the usefulness of the information. This edition contains compilation and coverage of information related to industry collaborations, COVID communication, resources and outreach, along with additional fact-check questionnaires. Special emphasis has been given to industry engagement initiatives which Office of the PSA is facilitating. Under these initiatives, innumerable deliverables have been achieved along with the addition of thousands of hospital beds, which in turn, continuously assist in boosting health infrastructure.

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

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

11 July 2021
World Population Day

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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INDUSTRY COLLABORATIONS FACILITATED BY OFFICE OF THE PSA

Strategic Alliances division of the Office of Principal Scientific Adviser (PSA) facilitates collaborations and partnerships among industries, foundations, academia, start-ups, MSMEs through coalitions and consortia at both national and international levels. The section contains information on contributions from industries, their timely pitching-in and joining the warfare against mitigating the COVID pandemic and boosting the health infrastructure at speed.

Additionally, Science & Technology (S&T) clusters are being established as formal umbrella structures for S&T organisations in various cities to have better synergy while retaining their autonomy and are supported by Office of the PSA to create an Atmanirbhar Bharat through S&T. These clusters are creating strong linkages among existing academic institutions, national and state research laboratories, and other stakeholders like relevant ministries, industry partners, start-ups, MSMEs, state governments, philanthropic foundations, and international organisations. To accomplish the objectives towards strengthening the S&T ecosystem of the country, several initiatives from Delhi, Jodhpur, Pune and Bhubaneswar clusters have been covered here for better dissemination of the information to the scientific fraternity.

For more information, write to: industry-engagement@psa.gov.in

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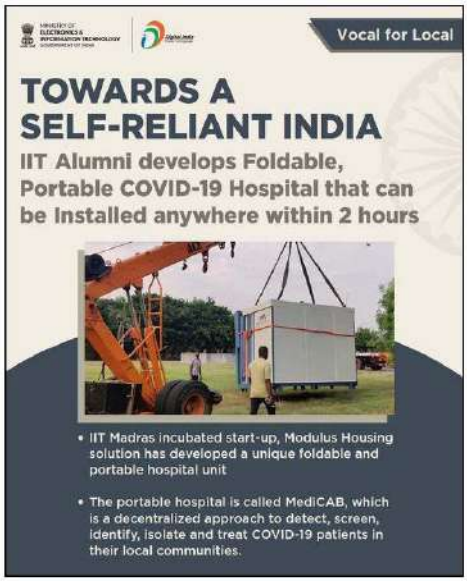
Office of the PSA is facilitating industry contributions to boost health infrastructure by bringing in innovation in hospital construction

With a contagious disease such as COVID-19, it is essential to have smart health infrastructure to screen, contain, and treat patients. Unlike urban areas, rural areas do not have plenty of existing infrastructure that can be converted to hospitals. There, it is difficult to construct buildings from scratch as the requirement is immediate. The office of the Principal Scientific Adviser (PSA) to the Government of India has identified two start-ups – Modulus Housing and Picture Time Digiplex – for revving up the hospital bed infrastructure within a short period of time, across the country. The start-ups are working on two different innovative technology deliverables.

An IIT Madras-incubated start-up called Modulus Housing has developed an innovative hospital construction module to tackle the problem of quick installation and functioning of a hospital with the required facilities. The start-up has developed a portable hospital unit that can be installed anywhere within two hours by four people. Called MediCAB, it is a decentralised approach to detect, screen, identify, isolate and treat COVID-19 patients in their local communities through these portable microstructures. It is foldable and is composed of four zones – a doctor's room, an isolation room, a medical room/ward and a twin-bed ICU, maintained at negative pressure. Modulus Housing, an early stage start-up incubated at IIT Madras partnered with a government institute, Sree Chitra Thirunal Institute Medical Sciences and Technology (SCTIMST), an autonomous institution of the Department of Science and Technology (DST) to develop a negative pressured four-zone medical strategy for the deployment of hospital extension to effectively arrest cross contamination.



External view of inflatable medical facility

Internal view of an inflatable medical facility

PT Medical (PT) Solutions offer a variety of portable shelters and mobile field hospitals to enable communities and defense forces to rapidly respond to healthcare requirements and disasters in any location or terrain. Using an integrated network of rapid deployment structure systems that are flexible, sustainable and robust, it creates modular solutions to cater to a wide range of field medical applications. These technological solutions are transportable by tactical, operational and strategic mobility systems. PT Medical Solutions provides innovative end-to-end fixed hospital solutions that can be rapidly deployed in any open area or increase the capacity of an existing hospital. Covid care facilities with all support services in rapid deployment modular inflatable structures may be scaled up as per needs.

Both these start-ups are either setting up new hospitals with beds or enhancing the existing capacity of a hospital to the tune of more than 3500 beds across the country in 54 projects, facilitated by Office of the PSA and supported by various industry CSR partners.

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Environment-friendly recycling technology and value addition of medical waste plastics obtained from PPE kit used during COVID-19 situation: A sustainable approach towards a healthy environment

Central Institute of Petrochemicals Engineering & Technology, SARP-LARPM, Bhubaneswar, in association with Kalinga Institute of Medical Sciences, Bhubaneswar is working on an environment-friendly recycling technology and value addition of medical waste plastics obtained from the personal protective equipment (PPE) kits used during the COVID-19 situation.

PPEs play an important role in safeguarding the health workers by minimising their exposure to the external pathogens. The components of PPE include goggles, face-shield, mask, gloves, coverall/gowns, head cover and shoe cover, etc. It is to be noted that biomedical waste is increasing drastically due to the current COVID-19 pandemic and is a big hazard to environmental health worldwide.

The objective of this project includes collection of plastics from COVID waste such as PPE kits and other biomedical items collected in red bins, their disinfection, cleaning and drying by using a selected process and their conversion into value added products for commercial application. The biomedical waste will be fully disinfected and mechanical, thermal, rheological and morphological properties of the recovered plastics will be analysed and compared with its virgin counterparts. Based on mechanical and thermal properties, a recycling blend will be developed and value addition will be performed using other additives, fillers and compatibilisers to improve mechanical and thermal properties. Finally, prototypes will be developed using value added polymers for various targeted applications.

The initiative has been supported under the Waste Management Technologies (WMT) programme of Technology Development and Transfer (TDT), Department of Science & Technology (DST).

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ETA Purification has designed advanced disinfection system for healthcare settings and institutions

Coimbatore based start-up ETA Purification Pvt Ltd has designed COSMO (Complete Sterilization by Micro-plasma Oxidation), an advanced disinfection system for healthcare settings and institutions. It has been designed as per the National Public Health standards supported by the Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH) programme of National Science & Technology Entrepreneurship Development Board (NSTEDB), DST, Government of India.

The product has the following features:

- Light-weight, mobile and easy-to-use
- No chemicals or consumables required
- Rapidly kills disease causing pathogens in the air, aerosol
- Sterilises surgical and dental tools at room temperature
- Patented technology sponsored by US-EPA
- Engineered as per WHO safety recommendations

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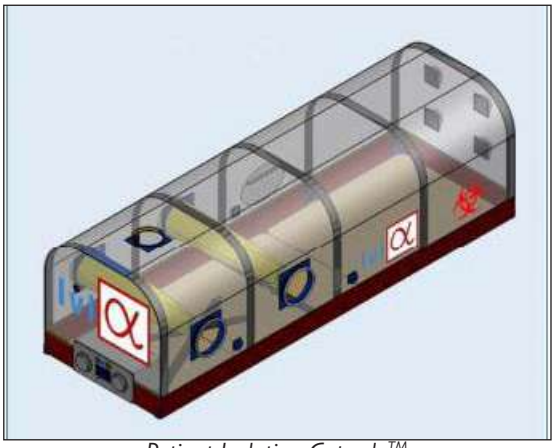
https://www.etapure.com/index.html

Pune based start-up develops a bio-safety level IV portable isolation device

lvl Alpha Pvt Ltd, a defence tech start-up building wearable health and communication devices for defence tri-forces has developed a patient isolation capsule, supported in grant by Scheme for Accelerating Start-ups around Post COVID Technology - Ministry of Electronics and Information Technology (MeitY).



Patient Isolation Capsule™

Patient Isolation Capsule, a bio-safety level IV portable isolation device is CBRN grade isolation infrastructure with remote patient monitoring and sterile patient access. It is a rapidly deployable and reusable all terrain, all weather portable device for all

transportation and hospitalisation needs. It has OSHA grade air circulation and up to 8 hours of battery life.

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Bio-Sure C+, an integrated sample storage device for safe transportation and biomedical waste disposal

Machphy Solutions Pvt Ltd, a start-up from Bhubaneswar, is developing an integrated sample storage device for safe transportation and disposal of biomedical waste – Bio-Sure C+. It is supported by National Initiative for Developing and Harnessing Innovations (NIDHI) – Seed Support System.

Bio-Sure C+ is a portable unit that can be carried by healthcare workers visiting suspected patients for sample collection. It has a refrigerated chamber for holding the infected UTM tubes with patient samples at temperatures of 2-8 degrees Celsius up to 100 hours; a disposal cabinet to dispose used PPEs like gloves, masks, body covers and other bio-waste generated during the process of sample collection like swab stems, cotton balls and involved accessories; a mini toolbox for carrying useful tools frequently required during the sample collection process; and an IoT interface for data transparency with which the test results can be proven to be more credible.

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NT mask developed by Comofi Medtech to protect healthcare workers during COVID-19 sample collection

For infection suspected and infected patient use, Bengaluru based start-up, Comofi Medtech Private Limited has developed NT masks. This mask shields healthcare practitioners from patient's cough and sneeze during nasal and throat swab during sample collection. It also safeguards hospital work environment from respiratory droplets during sample collection and reduces a patient's hand contact with mouth and nose during the procedure.

The common features of NT masks are: Minimalist design, reduced droplet exposure, optimised usability, guaranteed protection, excellent breathability and anti fog.

The initiative has been supported under the CAWACH programme by NSTEDB, DST, Government of India.

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Kerala based start-up develops protective eye goggles to fight COVID-19 pandemic

The CAWACH programme by NSTEDB, DST has supported a Kerala based start-up, RMmedi Innovations Private Limited to develop protective eye goggles, which comes as part of the PPE kits at an affordable rate.

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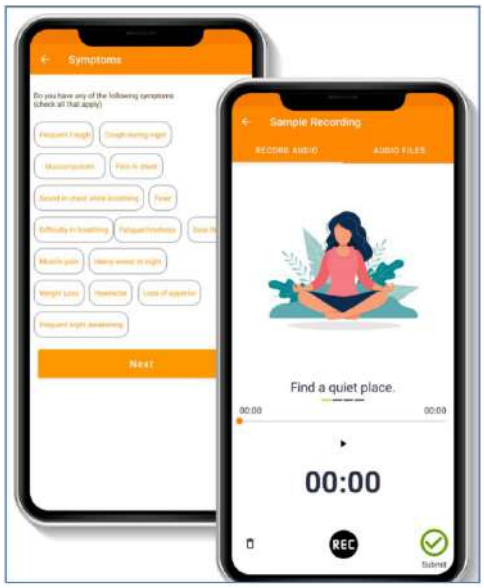
Hyderabad based start-up has developed Swaasa™ AI platform



Salcit Technologies Private Limited, a start-up based in Hyderabad has developed a patented Swaasa™ AI platform, which is a point-of-care technology to assess a user's respiratory condition. The platform analyses cough signals, and provide an assessment using proprietary ML and AI algorithms. The platform identifies the underlying respiratory condition (yes/no), the pattern (obstructive, restrictive, mixed or normal) and its severity. It uses the cough analysis as an additional factor in risk assessment. The platform receives inputs from the mobile or web client, processes the data and returns the prediction and detailed analytics as output.

The core technology has been enhanced to provide risk assessment for COVID-19. This can be used as an auxiliary to rapid test. The technology enables a direct read into lung assessment backed by clinical validation. This platform is sound enough to achieve this functionality without the constraints of cost, location, scheduling, special equipment, and trained personnel.

The project is supported by Scheme for Accelerating Start-ups around Post COVID Technology - Ministry of Electronics and Information TechnologY (MeitY).

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Website link:

https://swaasa.ai/solutions/

Udiyate Technologies has proposed respiratory assistive devices and smart sanitiser

Bhubaneswar based start-up, Udiyate Technologies Private Limited has proposed an Ambu Bag design that is well suited for ambulances, stable patients or for home based patients. To increase the reliability factor of this cheap ventilator, an innovative dual Ambu Bag based ventilator has been used that can work act both in asynchronous and synchronous manner, which means it can be independently set for two patients if patient traffic is high.

Santo is a smart sanitiser for easy misting of hands. Refill and drain sanitiser liquid with a touch of a button. The quantity of sanitiser falling on the palm can also be controlled. It has a one touch power-flush for nozzle cleaning and a smart display to show the sanitiser level to alert for a refill and also to inform the number of usages after the last refill. It is IoT and AI enabled to track and monitor usage.

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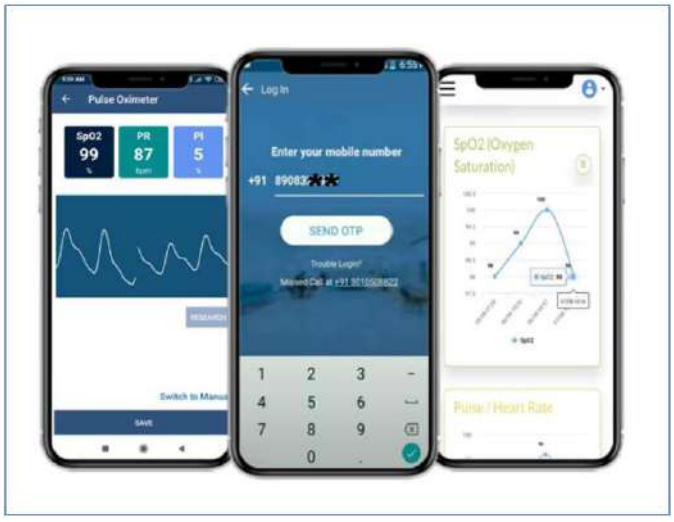
StopCov smartphone application developed by MedTel Healthcare Pvt Ltd

MedTel Healthcare is bridging the medical assistance gap in this Covid crisis through an app-based platform that enables screening and monitoring aid for frontline health workers.

MedTel's StopCov is a mobile app based COVID-19 screening and monitoring tool to enable frontline health workers to routinely report cases with COVID-19 symptoms, including general information such as the severity of the cases, age group, occupation, contact with someone with travel history to affected areas, history of chronic ailments (diabetes, hypertension, kidney diseases, weak immune systems, etc.). Presently the platform is being used in Uttar Pradesh and Karnataka for COVID-19 screening and monitoring.

Social distancing is one of the ways to counter COVID-19. Since most Out Patients Departments are not functioning, this missed call based telemedicine platform with a network of more than 200 Odia speaking doctors, serve patients from remote villages of Odisha. MedTel provides more than 200 tele-consultations daily for both Covid and non-Covid related queries.



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Swosth: A unified emergency response platform

Bhubaneswar based start-up, Teceads Solutions Pvt Ltd has developed a Swosth App, which is an unique and unified platform designed to handle and tackle any emergency response to any critical situation swiftly and efficiently.

SWOSTH APP facilitates emergency response, digitalised health monitoring, quarantine geo-fencing, crowd control, contact tracing, digital pass for essential personnel, etc. It has customised access terminals for different service personnel depending on the type of service and accessibility such as: State administration, healthcare personnel, district administration, and police personnel.

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Three-way ventilator splitter: Aerosol leakage prevention stopcock

Amid shortage of ventilators for COVID-19 patients due to rapid surge in demand, low manufacturing rate and global shutdown, researchers from Inofinity Research and Development Pvt Ltd, Bhubaneswar, have developed devices for ventilator splitting. KIMS being a major contributor for Odisha's COVID-19 hospitals is preparing to combat the third wave, if needed.

The KIIT-TBI have developed a 3D printed ventilator splitting device, which will allow an Intensivist to use a single ventilator on two or three patients in case of exigencies. This type of a device has been allowed by US FDA for the COVID-19 pandemic. The design may raise concerns among clinicians regarding the oxygenation status and cross infection but the use of bacterial and viral filters at the expiratory wings will eliminate the risk of cross infection. Clinical

parameters, arterial blood gas will help in monitoring the patients. With availability of ventilators splitting will be reversed to 1:1 ratio.

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IIT Jodhpur has developed a cold plasma detergent in the environment to fight COVID-19

To reduce the risk of infection from airborne pathogens in an indoor environment, IIT Jodhpur has developed a novel cold-plasma detergent in the environment (CODE) device using dielectric barrier discharge (DBD) plasma in combination with nanotechnology. It produces optimum concentrations of cold-plasma detergent in the environment (active negative ions) that lasts more than 25 seconds on an average, and is highly useful for better indoor air quality and also to fight the COVID-19 pandemic.

It is able to produce plasma detergent ions with concentration varying from 300 ions/cm3 to 2,00,000 ions/cm3 and above, from an 8" inch device easily controlled by electric circuitry. The average power consumption in the discharge process of the device is also very low (< 2W). The working performance of the device has been tested for disinfection of total microbial counts, reduction of total fungal counts, dust and pollens in indoor environment of sizes more than 1,72,80,000 cm3. The obtained results show that pristine natural environment is quite realisable from the CODE device in the indoor environments. It is a low-cost, easily scalable device, and will require less maintenance.

The developed technology is attractive for individuals in offices and houses. Systems based on this technology can eventually be deployed at all public and healthcare facilities as standalone systems or can be integrated with the ducts, ACs, coolers, etc. The proposed device can also be easily tailored in the form of CODE jets to clean the environment, PPEs, dresses, face masks, etc. for safe handling of patients by doctors.

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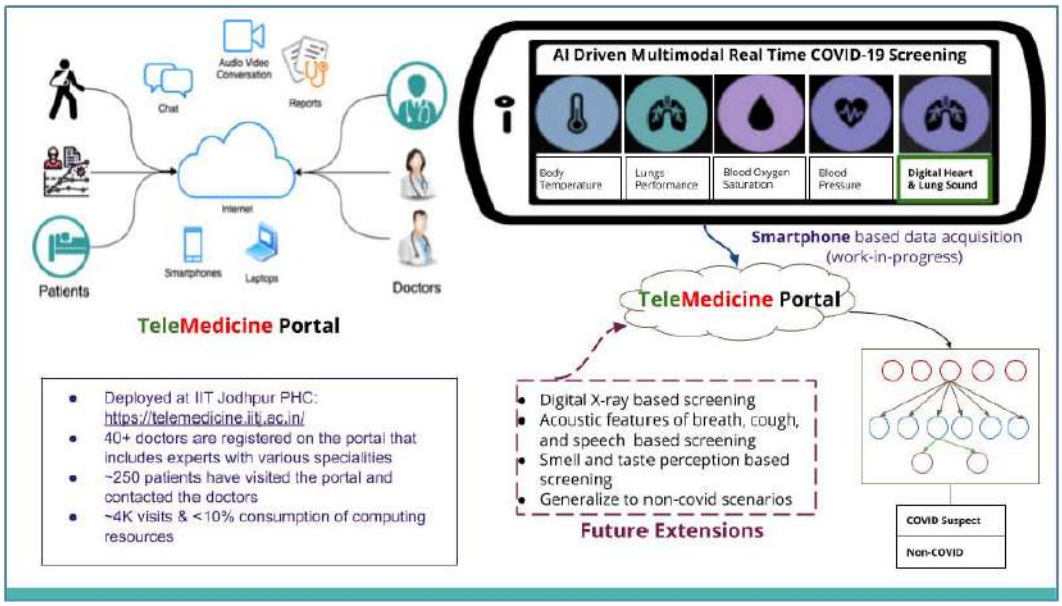
Smart health solutions for rapid mass diagnosis for COVID-19, funded by DST-RAKSHAK

DST-Remedial Action, Knowledge Skimming and Holistic Analysis of COVID-19 (RAKSHAK) funded IIT Jodhpur to develop a telemedicine system that allows clinicians to remotely interact with patients and other doctors. A specialist can provide consultancy via video conferencing services integrated with electronic healthcare records management. It handles non-emergency cases immediately.

An AI-powered telemedicine system can bring a paradigm shift in the currently known methods and benefits of telemedicine. Continuously evolving ML algorithms and increasing computational power have made real-time data analysis possible. Big data is an important attribute of the proposed telemedicine system. It includes radiological data such as CT and X-ray images,

digitised pathological, clinical, and occupational data, etc. AI algorithms are used to extract relevant information from these datasets to build diagnosis and prognosis models to assist the doctors remotely interacting with patients.

This project aims towards (i) a tailored made solution for providing tele-health solutions based on the existing solutions for screening of COVID-19 suspects, (ii) deployment of multiple kiosks at COVID-19 hotspot areas, and (iii) AI-based model development and enhancement for sensor data analytics for COVID-19 screening.



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Non-invasive estimation of care – body temperature, heart rate, SPO_2 for classification of subject as healthy or non-healthy

This project is to find non-invasive estimation of vital physiological-parameters such as core body temperature (despite ambient temperature), heart rate, respiration rate, blood-oxygen saturation levels (SpO_2) from thermal and RGB videos, towards classification of individuals as 'healthy' or otherwise.

Given the crisis triggered by the COVID-19 pandemic, this technology is envisioned to be of use in the preliminary screening/monitoring of individuals at entrance points, critical habitation zones, in-patient wards, homes for the elderly and other such areas. While the core body temperature would indicate the presence of fever-like symptoms, irrespective of the environmental temperature, the other parameters would help identify (apparently asymptomatic) individuals suffering from silent hypoxia (abnormally low levels of oxygen in the blood with no external manifestation) – one of the primary symptoms of COVID-19.The initiative has been supported by DST-RAKSHAK.

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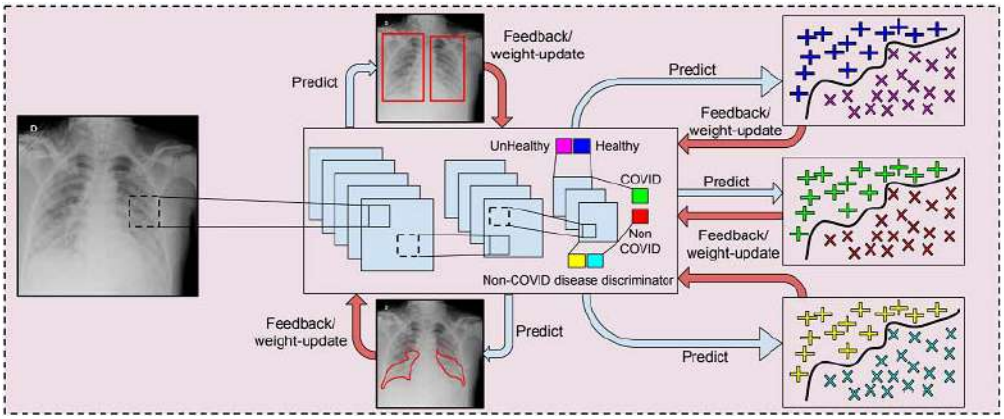
Richa Singh and team received the RAKSHAK grant for project on 'AI-driven diagnosis of COVID-19 using X-ray images'

In the face of the SARS-CoV2 pandemic, it has become essential to perform mass screening and testing of patients. Richa Singh and her team have developed an AI-driven diagnosis of COVID-19 using X-ray images. The project has been supported by DST-RAKSHAK.

X-rays are amongst the most popular, cheap and widely available imaging technology across the world, and can be used to detect COVID-19 pneumonia in patients through chest radiographs. Experiments conducted on different chest radiograph datasets with multi-task deep network algorithm, learns the abnormalities present in the chest X-ray images to differentiate between a COVID-19 affected lung and a non-COVID-19 affected lung.



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DST-RAKSHAK has funded IIT Jodhpur for campus RAKSHAK project

The COVID-19 pandemic has placed a massive burden on the public health system. Restrictions to contain the COVID-19 spread have come with significant cost to livelihoods and have created massive disruptions in education. In view of this, and to recover from the impact, colleges and university campuses partially reopened just before the March 2021 surge with safe operating procedures put in place. In this context, it is important to have dashboard frameworks for situational awareness and frameworks of testing, contact tracing, computational epidemiology that can enable bio-surveillance and swift remedial actions in case of outbreaks. The population in large campuses is in thousands. The student community may be predominantly residential, some staff may reside on campus, but staff, students, contractors, and vendors move in and out of large campuses with the potential risk of spreading the infection. There is, thus, a need for a decision support framework that can assist campus administrators to decide on the safe levels of operation.

The campus RAKSHAK solution framework, as a contact-tracing, bio-surveillance, scenario exploration, and decision support platform, can provide situational awareness to campus administrators, generate connectivity, mobility, hotspot insights, save testing costs, explore scenarios for safe operation and assist campus administrators with their decisions. It is important that all these components work together as a harmonious whole for maximum effectiveness.

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Social distance alert and monitoring system using a smartphone, IoT and AI

The increased number of COVID-19 patients in various parts of the country poses challenges for medical professionals, related to focused health monitoring and care for critical cases. IIT Jodhpur has indigenously designed a prototype wristband that will create a sound alarm if two such bands come close to each other. The band works on 2.4 GHz radio frequency and contains a RFID trans-receiver, a microcontroller and lithium battery. It also includes a BLE chip, which helps in transferring the contact graph to any connected mobile phone. It weighs about 30gms. The work has been supported by RAKSHAK scheme of DST.

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Long-term outcome of infants born to COVID-19 positive mothers: A prospective cohort study jointly conducted by IIT Jodhpur and AIIMS, Jodhpur

Abundant research has been carried out to define the epidemiology, prevention and treatment of SARS-COV-2 infection among adult population. However, very little is known about the perinatal aspects of COVID-19 especially during the second wave, which has crippled the entire world and more so our own country. Moreover, no one knows the long-term outcome of the infants born to COVID-19 positive mothers. Therefore, they planned to assess the incidence and long-term outcome of infants born to COVID-19 mothers.

The project is supported by DST-RAKSHAK.

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AIOT based bed occupancy detection in a hospital set-up developed by IIT Jodhpur

Automated detection of bed occupancy has been useful to many applications including remote healthcare, elderly monitoring, fall detection, home automation, assisted and ambient living and so on. The existing IoT based solutions for bed occupancy detection vary with respect to cost, accuracy and scalability. This is an engineering problem having specific focus on the choice of instruments, deployment strategy and approaches used for data collection and occupancy detection. In a typical hospital set-up, the problem adds a few additional dimensions in terms of safety, scalability and administrative functionality.

Jodhpur City Knowledge and Innovation Cluster support the project. In this project, the team has designed a low-cost AIOT based solution for bed occupancy detection problems in a hospital set-up and plan to demonstrate the solution's effectiveness by deploying a small prototype in the local hospitals.

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IIT Jodhpur develops face mask detection for COVID-19

Due to the COVID-19 pandemic, wearing face masks has become mandatory in public places worldwide. Face masks occlude a significant portion of the facial region. Additionally, people wear different types of masks, from simple ones to ones with graphics and prints. In countries like India, with attire diversity, people are not limited to wearing traditional masks but also clothing like a '*gamcha*' (a thin cotton printed towel), 'stoles', and 'handkerchiefs' to cover their faces. IIT Jodhpur has designed a machine learning algorithm for mask detection, which efficiently detects different kinds of masks in an unconstrained environment. They are currently working towards recognising the person in the presence of a mask. They have also prepared a novel Indian Masked Faces in the Wild (IMFW) dataset, which will be released to the community to promote further research in this area – http://iab-rubric.org/.

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Food packets/ products sterilisation using UV light to fight COVID-19

IIT Jodhpur has developed an advanced photocatalytic oxidation conveyor system (APCOC) for sterilisation of surfaces, such as food packets, books, mobile phones, laptops, carry bags, courier bundles, etc. This technology can also be used on some of the thick peel food items, leather items, during the packaging of herbs and seeds, etc. and may reduce the number of complete wash downs required during processing, thereby saving resources, such as water, chemicals, and energy costs. The developed sterilisation method is a substitute for traditional chemicals and scrubbing agents, which will be highly useful for the general public during the pandemic particularly at public places, such as airports, railways, healthcare facilities, college and university libraries, shopping malls, commercial buildings, public buildings, etc. This APCOC system mitigates cross-contamination concerns and is able to sterilise items via a dry process even in the shadow regions.

The technology is based on a hybrid process where UV-C light and its photons interaction with nanoparticles catalyst provides an opportunity to generate hydroxyl radicals, hydro peroxides and super oxide ions that eventually lead to enhance the inactivation process of bacteria and viruses. In the general UV-C light-based sterilisation process, shadow effects are more critical to be dealt with because light always travels in a straight path. However, in this developed advanced process, the lipid peroxidation can produce transient pores (through abstraction of H-atoms from hydroxyl radicals) for wall rupture of viruses. Therefore, the proposed methodology can be more effective for the disinfection process.

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IIIT-Delhi in collaboration with CSIR-IGIB and IIT-Delhi has developed an AI/ML model for genomic surveillance of COVID-19

AI/ML in healthcare, an NDHM compliant platform for interoperable data exchange, diagnostics, and infodemic management solutions, has successfully created deployable solutions for COVID-19 including AI/ML models for genomic surveillance of the pandemic.

The overarching goal of this theme is to enable a transformative change in healthcare through artificial intelligence and machine learning collaborations for (i) targeted public health challenges and epidemiological surveillance, (ii) data, modelling, and predictive models, (iii) digital tools,

apps, and platforms including conversational AI, and (iv) diagnostic and prognostic solutions using computational and biotechnological solutions. The key projects being implemented under this theme include: (i) artificial intelligence models to enable genomic surveillance for pandemics, (ii) a platform for clinical data exchange, and collaboration, (iii) DNA sequencing for genomic surveillance for COVID-19, and (iv) development of large scale and rapid diagnostics for COVID-19. The activities of this theme are being carried out in two phases. Over a period of one year, phase I operationalises the cluster with thematic solutions for the ongoing COVID-19 challenge. Phase II will target the deployment of a suite of COVID-19 solutions in partnership with industry and development solutions for health challenges beyond the pandemic. These would include AI/ML based solutions for tackling tuberculosis, antimicrobial resistance (AMR), cancer, cardiovascular diseases, and rare neurological diseases. The theme is embedded into the health ecosystem with key partnerships with health institutions, industry, and think tank organisations including AIIMS New Delhi, Maulana Azad Medical College, Max Hospitals, Google Research India, and the World Economic Forum.

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Studies on immunological, nutritional and comorbidity factors impacting response to infection and vaccination

Since the beginning of the COVID-19 pandemic, Pune has been one of the worst hit cities in the world. The total number of coronavirus positive patients to date (as on 9 May 2021) has reached 4,46,564 of which 4,05,474 have been cured while 7358 have died. There are still 33,732 active patients undergoing treatment in various hospitals. Pune has, thus, been hit incredibly hard by the pandemic. During the beginning of the pandemic, Pune city, managed by Pune Municipal Corporation (PMC), successfully initiated and maintained a Government mandated data compilation from clinic and hospital-level data at the city level. The PMC and Pune Knowledge Cluster (PKC) entered into a collaborative agreement in April 2020 to develop and implement local policies based on the analysis of COVID-19 patient level data. The major activities of this collaboration included curation of the data, analysis of the data at sub-region level called Prabhags, modelling of the data to project the pandemic curve, constitution of a project to assess the prevalence of positive serology among the population and coordination for resource procurements and allocation.

The PKC (www.pkc.org.in) is funded by the cluster initiative of the office of the Principal Scientific Adviser (PSA) to the Government of India. The studies outlined here, however, can easily be scaled up across various regions of the country, which will generate public health data of enormous value for immediate policy decisions to address the current pandemic and also for the future.

Differences in the scale of the infection spread and severity of the clinical outcomes of infection highlight the importance of framing policies and strategies to fight the pandemic, both in the short-term and the long-term, based on ground level data and scientific investigations of the infectivity of the virus and immune response of infected people. Detailed studies on both the viral pathogen and host factors are key to understand and control the pandemic, prevent loss of lives, and reduce long-term health impact. Viral genome sequencing (as the infection spreads across diverse human populations and as they are vaccinated) and immunotyping of populations based on immune response to infection and vaccination need to be taken up immediately on a war footing. In addition, factors such as nutritional diversity among the populations and other co-morbidities that impact the risks of severe disease need to be studied in more detail. Such

studies have minimal epidemiological and public health value unless they are designed based on ground level granular data on the pandemic since its beginning.

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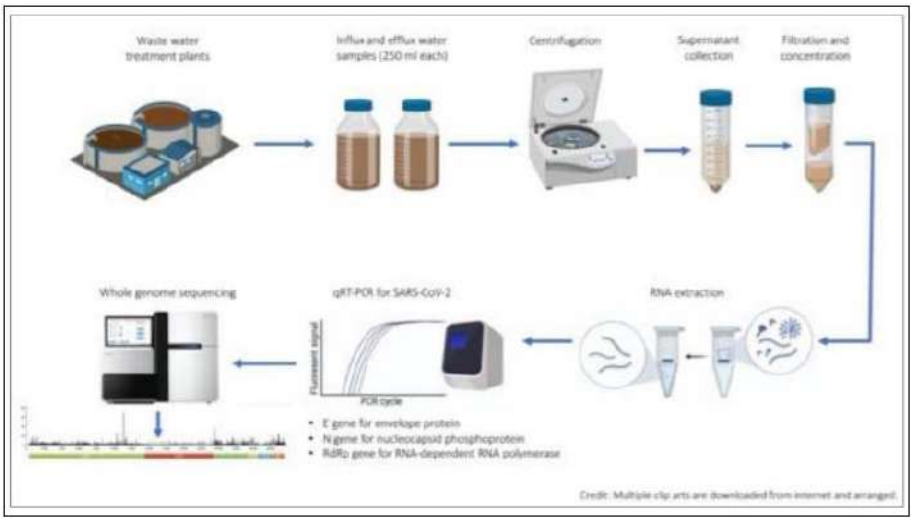
Genomic surveillance of SARS-CoV-2 using wastewater in Bengaluru city

Bangalore Water Supply and Sewerage Board (BWSSB) manages wastewater systems through more than 25 Sewage Treatment Plants (STPs) and supplies treated water for irrigation, industrial use, and recharging of urban lakes (https://www.bwssb.gov.in). National Centre for Biological Sciences (NCBS) is currently engaging with BWSSB for regular sampling of non-treated, treated, and sludge samples from different STPs. These samples are to be tested for SARS-CoV-2 RNAs using standard qRT-PCR and also to be used for standardising and optimising other novel methods. A formal memorandum of understanding is in place between NCBS and BWSSB to perform the above mentioned activities.

Wastewater epidemiology is a powerful tool to understand the dynamics of not just SARS CoV-2 but many other emerging pathogens. In addition to detecting the SARS CoV-2 genome, this study would identify variants circulating in the populations. Repeated sampling at regular intervals would help track emerging variants and their dynamics over time. This information can be correlated with the clinical data from the catchment area. Besides, prevalence information would actively be used as an indicator of infection load and the health status of the catchment area population. By actively engaging with BWSSB, NCBS hopes to build capacity at BWSSB to implement wastewater epidemiology for public health purposes. This collaborative effort would strengthen knowledge on the impact of COVID-19 in the city and build the capabilities of both institutions – BWSSB and NCBS – to understand and manage wastewater in Bengaluru city better.



Envisaged workflow of wastewater sample collection, processing, and whole genome sequencing

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Rapid response in a pandemic through genomic surveillance of SARS-CoV-2 genomes

SARS-CoV-2 is the coronavirus that causes COVID-19, a pandemic that has gripped the entire world since November 2019. Several countries throughout the world have been through waves and troughs of infection. Through these difficult times, science-based response remains at the forefront of what we can do. The aim is to work at this science-based pandemic response interface. Genomic surveillance of the virus as it evolves and changes are critical for vaccine calibration due to the generation of variants. Such surveillance remains poor in India, despite interest and some level of national investment in such an endeavour. This is particularly true in the context of vaccination. While vaccine breakthrough is now recognised as most significant, the genomic characteristics of the virus that allows it to breakthrough depend on adequate genomic surveillance. The proposal addresses the genomics and immunology of vaccine breakthrough, correlated with disease severity in multiple geographies in India – Vellore in Tamil Nadu and Bengaluru in Karnataka – by creating and building on existing infrastructure and cohorts set-up during this on-going pandemic. This will be coordinated and executed by some of the best hospitals (CMC, Vellore, Baptist Hospital and St Johns Research Institute) and most accomplished institutes like DBT's inStem and TIFR-NCBS in the country.

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A pan-national effort on enhanced viral surveillance to better track COVID-19 and vaccinations in India: The second wave and beyond

Pathogens like viruses have short generation times and high reproductive rates. This allows them to evolve or change very rapidly. SARS-CoV-2, the virus responsible for the on-going pandemic of COVID-19, mutates and changes continuously as it transmits from person to person. While most new mutations or changes are of little to no consequence, others are able to transmit better, escape existing immunity, dodge detection by diagnostic kits, or have serious clinical impacts. Continuous and on-going genome sequencing of the virus and genomic surveillance help better understand how SARS-CoV-2 is evolving. Such sequencing will eventually allow us to mitigate the risks posed by the ever-changing genomic landscape of the virus, particularly making course correction to vaccination strategies. Furthermore, genomics coupled with host serum analyses can help to explain why people respond to COVID-19 in different ways, therefore helping to identify and better protect those at greater risk of the severe disease.

Genomic surveillance for both **retrospective and prospective** (future infections), when coupled with clinical data, allow us to infer correlations between viral mutations and patient outcomes. All centres will work with their respective states and clinical partners, who have access to epidemiological clinical data on disease outcomes. Such analyses will allow understanding the role of virus evolution in disease burden. Patient genomics can help identify individual-specific responses and correlations.

From a practical perspective, the only way forward is vaccination. Vaccine breakthrough, when vaccinated people get infected, is now recognised as significant. The genomic characteristics of the virus that allow it to breakthrough also require adequate genomic surveillance.

Objectives

1. Retrospective genomic surveillance: Genome sequencing of archived samples representing dynamics of the pandemic (high vs. low incidence zones; asymptomatic/mild vs. severe symptoms/mortality; paediatric/young age vs. old age infections, etc.).

2. Prospective genomic surveillance: Genome sequencing to i) track variant emergence and transmission using sampling strategies defined by sociodemographics; ii) reconstruct epidemiologic history using both phylogenetic analysis and gene genealogy; iii) characterise and draw inferences from clinical phenotypes including vaccine breakthroughs, re-infections, and others; and iv) conduct environmental surveillance (*of sewage and wastewater*), potential to complement human surveillance and support of early interventions (considering large proportion of infected people are asymptomatic).

3. Build human resource: Bioinformatics and genomic epidemiology training for pathogen genomics across institutions and platforms. Adopt evolving technology for sequencing, analyses and rapid identification of viral variants, build workflows, use of pipelines, quality checks, data validation and approaches to rapid/real-time data sharing.

4. Applied science: Use of sequencing data to inform and support evaluations relevant to public health, vaccines, drug development and clinical prediction.

Partners, such as Pune Knowledge Cluster (coordinator representing CSIR-NCL, IISER Pune, SPPU, NCCS, BJMC, AFMC, KEM and Symbiosis Hospitals), CCMB, NCBS, InStem, St. Johns Hospital, Baptist Hospital, NIMHANS, Bangalore Water Supply and Sewage Board, and CMC Vellore are among those whose objectives of success include the well-being and health of the greater populace.

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2

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

OxyJani, developed by JNCASR, aims to cater to acute and chronic oxygen needs at the grass roots level

IIT Delhi develops rapid antigen test kit for COVID-19

Government readies two more central drug laboratories in Pune and Hyderabad for COVID-19 vaccine testing

IIT Delhi develops novel antifungal strategy for fungal eye infection

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

OxyJani, developed by JNCASR, aims to cater to acute and chronic oxygen needs at the grass roots level

Indian researchers have designed a robust, mobile group oxygen concentrator that can be used in rural settings and also be rapidly deployed in emergencies in any location. The second wave of COVID-19 led to an acute shortage of medical oxygen. While the crisis in the bigger cities was more about rapidly responding by overcoming supply chain limitations, in smaller cities and villages, the crisis exposed the chronic lack of medical oxygen infrastructure in the country.

Overcoming the crisis required two solutions – 5 to 10 lpm personalised O_2 concentrators for home use and 500 lpm pressure swing adsorption (PSA) plants for large hospitals. While the 500 lpm plants for hospitals were robust, they lacked the portability required for deployment on resource-poor settings. The personal concentrators were too fragile to be used on a sustained basis in a hospital setting. This created a need for a robust technology with necessary portability.

A team from Jawaharlal Nehru Centre for Advanced Scientific Research, an autonomous institute under the Department of Science & Technology, Government of India, developed a new solution called 'OxyJani' to address these novel challenges in adsorption science and engineering. It was developed during the second wave of COVID-19, addressing the several novel design challenges posed for the sourcing of materials and the need in hospitals of different capacities.

OxyJani is based on the principles of PSA technology. The team replaced lithium zeolites (LiX), which is usually used in oxygen concentrators, with sodium zeolites, which does not generate toxic solid waste and can be manufactured in India. Although the science behind it is well understood, yet developing an engineering solution that can work with sodium in a portable device and fill this specific market gap when there are severe sourcing problems, posed engineering challenges. Obstacles had to be overcome at each stage of the cycle, from working with the available zeolites to effective ways of dehumidifying and designing the right adsorption-pressure cycle.

The concentrator is modular and capable of delivering a range of solutions, conversion of medical air to medical oxygen, and is an entirely off-grid solution including all modules that can facilitate deployment in rural areas. Moreover, the waste from the 13X zeolite plant can potentially be a good agricultural input material.

A modular design of the three different units so that solutions can be offered to different hospitals based on their needs.

In this multi-group initiative, Dr SV Diwakar, Dr Meher Prakash, Prof Santosh Ansumali from JNCASR, and collaborators, Prof Arvind Rajendran from the University of Alberta and Mr Arun Kumar (Eiwave Digitech) executed the OxyJani developmental efforts with the help of Mr Ritwik Das (MS student). Technical advice was provided by Prof M Eswaramoorthy, Prof Tapas Maji, and Prof Sridhar Rajaraman. Prof GU Kulkarni, President, JNCASR and Prof Amitabha Bandyophyay of IIT Kanpur mentored the developmental efforts. The financial assistance for the prototype was provided through JNCASR and the Nidhi Prayaas scheme of IIT Kanpur. The zeolite material was obtained through a generous donation from Honeywell UOP, Italy.

This new class of technology called 'group concentrators' has the robustness of large PSA plants, portability similar to the personal concentrators, and is affordable too. The device is in the range of 30-40 lpm, which is useful in ICU too.

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https://pib.gov.in/PressReleseDetailm.aspx?PRID=1731966

IIT Delhi develops rapid antigen test kit for COVID-19

Indian Institute of Technology (IIT) Delhi has developed a rapid antigen test kit for COVID-19, in the research leadership of Dr Harpal Singh, Prof, at the Institute's Centre for Biomedical Engineering.

The salient features of the technology, as certified by the ICMR are as follows:

- This kit is used for in vitro qualitative detection of SARS-CoV-2 antigen.
- The SARS-CoV-2 Ag rapid test is a colloidal gold enhanced double antibody sandwich immunoassay for the qualitative determination of SARS-CoV-2 antigen in human nasal swabs, throat swabs and deep sputum samples. It is suitable for general population screening and diagnosis of COVID-19.
- The invention is directed towards an in vitro diagnostic kit for qualitative detection of SARS-CoV-2 coronavirus antigens in nasopharyngeal swab, using the rapid immune chromatographic method.
- The identification is based on the monoclonal antibodies specific for the coronavirus antigen.
- The results obtained are qualitative based and can be inferred visually with naked eye.
- A SARS-CoV-2 positive specimen produces a distinct colour band in the test region, formed by the specific antibody antigen coloured conjugate complex '(Au-SARS-CoV-2-Ab)-(SARS-CoV-2-Ag)-(SARS-CoV-2-Ab)'. The absence of this coloured band in the test region suggests a negative result.
- A coloured band always appears in the control region serving as procedural control regardless whether the specimen contains SARS-CoV-2 or not.
- The test is found to be suitable for early Ct values (Ct values ranging 14-32) with sensitivity – 90 per cent, specificity – 100 per cent and accuracy – 98.99 per cent. It is certified by ICMR. These are one of the best available validation values for any such test kits.
- The technology and its manufacturing are 100 per cent indigenous.

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https://home.iitd.ac.in/show.php?id=22&in_sections=Press

Government readies two more central drug laboratories in Pune and Hyderabad for COVID-19 vaccine testing

In the wake of the COVID-19 pandemic, and considering the enhanced production of COVID-19 vaccines, the Government proactively took the decision to set up additional laboratories to facilitate expedited testing / pre-release certification of the vaccines. Currently, the nation has a Central Drugs Laboratory (CDL) at Kasauli, which is the National Control Laboratory for testing and pre-release certification of immunobiologicals (vaccines and antisera) meant for human use in India.

The Department of Biotechnology, Ministry of Science & Technology, Government of India has set up two vaccine testing facilities in its autonomous research institutes, National Centre for Cell Science (NCCS), Pune and National Institute of Animal Biotechnology (NIAB), Hyderabad as Central Drug Laboratory (CDL), for batch testing and quality control of vaccines. Accordingly with funding support provided by the PM-CARES Funds trust, two new vaccine testing facilities have been set up as central drug laboratories at DBT-NCCS and DBT-NIAB.

Since the COVID-19 pandemic, Department of Biotechnology has been in the forefront contributing to various COVID-19 related activities including vaccine development, diagnostics and testing, bio-banking and genomic surveillance, in addition to fundamental research and also building a strong ecosystem for translational research. DBT-NCCS and DBT-NIAB have been the pillars for many aspects of infectious disease related work in India and have contributed to the advancement of cutting-edge research output in frontier areas of biotechnology relevant to human health and disease.

Newly built DBT-NCCS Central Drugs Laboratory for COVID-19 vaccine testing constructed with support from PM CARES Fund trust

The facility at NCCS, Pune, has now been notified as a central drugs laboratory for testing and lot release of COVID-19 vaccines vide Gazette notification issued by the Ministry of Health & Family Welfare on 28 June 2021.The facility at NIAB, Hyderabad is likely to receive necessary notification shortly.

With generous support from PM CARES Fund trust, in a very short span of time, both the institutions through relentless efforts have set up state-of-the-art modern facilities for this purpose. The facilities are expected to test approximately 60 batches of vaccines per month. The facilities are geared up to test the existing COVID-19 vaccines and other newer COVID-19 vaccines as per the demand of the nation. This will not only expedite the vaccine manufacture and supply but also be logistically convenient considering that both Pune and Hyderabad are the two vaccine manufacturing hubs.

DBT-NIAB Central Drugs Laboratory for COVID-19 vaccine testing being constructed with support from PM CARES Fund trust

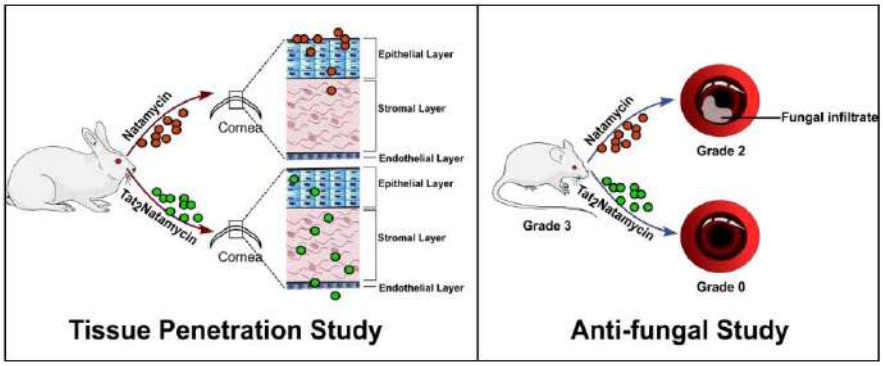
Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1732660

IIT Delhi develops novel antifungal strategy for fungal eye infection

An IIT Delhi scientist led research team has developed a novel antifungal strategy for fungal eye infection (fungal keratitis). The team has successfully developed a novel peptide-based antifungal strategy for enhanced Natamycin penetration. The developed peptide-drug conjugate showed an appreciable antifungal effect in the lab. These peptides are known to have the ability to carry molecules with them in the cells. Therefore, when poorly permeable Natamycin was attached to the peptide, the formed complex showed better antifungal effect.

In their research, the scientists found that conjugate drug penetration was five-fold higher than Natamycin in rabbits, thus enabling lowering of the dosage frequency. Further, 44 per cent of the mice showed complete resolution of fungal infection with the novel conjugate as compared to 13 percent that were treated with Natamycin suspension only.



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

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

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

Deadline: Open till next announcement

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Website link:

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

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3

COVID COMMUNICATIONS

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

SECTION GUIDELINES

PM addresses CoWin Global Conclave as India offers CoWIN platform as a digital public good to the world to combat COVID-19

NITI Aayog releases report on not-for-profit hospital model in India

Both pregnant woman and child can be saved by COVID-19 vaccine: COVID-19 Working Group Chairman

States to take up immediate containment measures, enhanced testing, tracking and vaccination in districts and clusters where the Delta Plus variant is found

Quick vaccination is key to open the economy and go back to normal: NITI Aayog

NITI Aayog answers why new waves of any endemic happen?

Indian Chest Society describes CSIR-CMERI's oxygen enrichment technology as 'Made in India, Made for India'

PM addresses CoWin Global Conclave as India offers CoWIN platform as a digital public good to the world to combat COVID-19

The Prime Minister, Shri Narendra Modi addressed the CoWin Global Conclave as India offered the CoWIN platform as a digital public good to the world to combat COVID-19.

The Prime Minister began by conveying his condolences for all the lives lost to the pandemic, in all the countries. The Prime Minister remarked that there is no parallel to such a pandemic in hundred years and no nation, however powerful, can solve a challenge like this in isolation. "The biggest lesson from the COVID-19 pandemic is that for humanity and the human cause, we have to work together and move ahead together. We have to learn from each other and guide each other about our best practices," said the Prime Minister.

Underlining India's commitment towards sharing experiences, expertise and resources with the global community, the Prime Minister also expressed India's eagerness to learn from global practices. Emphasising the importance of technology in the fight against the pandemic, Shri Modi said that software is one area in which there are no resource constraints. That's why India made its Covid tracking and tracing app an open source as soon as it was technically feasible. He pointed out that with nearly 200 million users the Aarogya Setu app is a readily available package for developers. Having been used in India, the Prime Minister told the global audience that they can be sure that it has been tested in the real world for speed and scale.

The Prime Minister said that given the importance of vaccination, India decided to adopt a completely digital approach while planning its vaccination strategy. This helps people in proving that they have been vaccinated, expediting the normalcy in the post pandemic globalised world. A safe, secure and trustworthy proof helps people to establish when, where and by whom they have been vaccinated. Digital approach also helps in tracking the usage of vaccination and minimises wastage.

In line with India's philosophy of considering the whole world as one family, the Prime Minister said, Covid vaccination platform CoWin is being prepared to be made open source. Soon, it will be available to any and all countries.

The Prime Minister informed that through CoWin, India has administered 350 million doses of Covid vaccines, including nine million people in one day, a few days ago. Furthermore, the vaccinated people do not need to carry around fragile pieces of paper to prove anything. It is all available in digital format. The Prime Minister also highlighted the customisability to the software as per the local requirements of the interested countries. The Prime Minister concluded with the hope that guided by the 'One Earth, One Health' approach, humanity will certainly overcome this pandemic.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1732812

NITI Aayog releases report on not-for-profit hospital model in India

NITI Aayog today released a comprehensive study on a not-for-profit hospital model in the country. It is a step towards closing the information gap on such institutions and facilitating robust policymaking in this area.

"There has been relatively low investment in the expansion of the health sector in the private domain. The stimulus announced yesterday provides us an opportunity to change this situation. The report on the not-for-profit sector is a small step in that direction," said Dr V.K. Paul, Member (Health), NITI Aayog.

The report was released by Dr Paul, in the presence of CEO Mr Amitabh Kant, Additional Secretary, Dr Rakesh Sarwal, and representatives of hospitals across the country who participated in the study.

The study provides insights into the operation model of not-for-profit hospitals. It presents research-based findings on such hospitals – categorised under ownership and premise of service – and makes subsequent comparisons with private hospitals and health schemes of the Union Government.

NITI Aayog has been extensively studying the private sector healthcare delivery landscape in the country. While there exists adequate information on for-profit healthcare providers and institutions there is a dearth of reliable and structured information on their not-for-profit counterparts, known for their tireless service in making quality healthcare accessible and affordable to everyone.

The not-for-profit hospital sector provides not only curative but also preventive healthcare. It links healthcare with social reform, community engagement, and education. It uses government resources and grants to provide cost-effective healthcare to people without being concerned about profits. However, over the years, this sector has remained understudied.

The study discusses in detail the cost containment strategies implemented by not-for-profit hospitals. It seeks to understand the challenges that burden the operations of these institutions and hinder their growth.

The report proposes short- and long-term policy interventions, such as developing criteria to identify these hospitals, ranking them through a performance index, and promoting top hospitals for practicing philanthropy, among others. It also highlights the need to use the expertise of these hospitals in managing human resources with limited finance in remote areas.

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https://niti.gov.in/sites/default/files/2021-06/Not-for-profitHospitalReport.pdf

Both pregnant woman and child can be saved by COVID-19 vaccine: COVID-19 Working Group Chairman

Dr NK Arora, Chairperson of the COVID-19 Working Group of NTAGI spoke during the press conference regarding the vaccination guidelines for pregnant women, issued by the Health Ministry. Dr Arora informed that the increased mortality of pregnant women during the second wave of COVID-19 led to this decision. "During the second wave, it was seen that mortality rates of pregnant women infected by COVID-19 had increased by two to three times, in comparison to the first wave. In such a situation, it was felt that pregnant women should also become beneficiaries of the COVID-19 vaccine. In case of pregnant women, it involves the safety of two lives – the mother and the child in her womb. Hence, the country has decided to vaccinate pregnant women."

He stated that mothers will be benefitted more by this vaccine; they will remain free from fear and anxiety about coronavirus. "The child growing in the mother's womb can also be saved by this vaccination. If the mother develops immunity, it will be passed on to the foetus. The effect of the vaccine and immunity developed in the mother's body will remain in the child at least till the time of birth."

Safety of vaccines for pregnant women

In reply to a query on how safe vaccines will be for pregnant women, Dr Arora pointed out that "By and large, our vaccines have been found to be safe. Even in western countries like in Europe and North America where mRNA vaccines are being given, pregnant women are being vaccinated. Looking at these facts and figures, a decision has been taken to vaccinate pregnant women in our country."

Some doubts and fear were expressed about vaccinating a pregnant mother in the first trimester as the child's organs begin forming in that period. Addressing these doubts, Dr Arora assured the safety of the vaccine for the mother as well as for the child. "I would like to dispel these fears and assure people that our vaccines do not contain any live virus which can cause infection. Thus, it does not seem that the vaccine will have any ill-effect on the child growing in the mother's womb."

He added that pregnant women receiving vaccines will be tracked, to ensure their safety. "All pregnant women who will be vaccinated around the country will be tracked by means of a network to monitor signs of discomfort. Foetal outcomes, that is, growth of the child in the mother's womb, will also be monitored. This will assure us that our mothers, sisters and daughters are fully safe post-vaccination."

Speaking about post-vaccination side-effects faced by pregnant women, Dr Arora said: "One in 10 lakh women have experienced bleeding or formation of clots. The symptoms that manifest are severe headache, vomiting along with headache, stomach ache along with vomiting tendency or also breathing problems. By and large, three or four symptoms may happen and they generally happen within a period of three to four weeks after vaccination. In such cases, family members should quickly take the pregnant woman to a Covid vaccine hospital. The reason for the illness can be investigated at the hospital and the required treatment provided."

When can pregnant women take the vaccine?

Pregnant women can take the vaccine at any time, informs the Chairperson. "As per the decision taken, COVID-19 vaccine can be given to pregnant women at any point of time during the pregnancy. It does not matter whether the vaccine is being given in the first, second or third trimester."

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1732327

States to take up immediate containment measures, enhanced testing, tracking and vaccination in districts and clusters where the Delta Plus variant is found

The Government of India, in active collaboration with the states has been proactively working towards effective COVID-19 management by sustained strengthening of multi-level health and testing infrastructure, and through focussed public health measures. The Union Health Ministry has from time to time alerted the state governments on critical points in the trajectory of COVID-19 for implementing an effective public health response under a 'whole of government' approach.

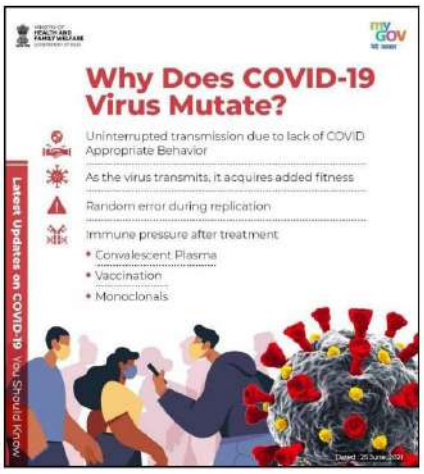
Based on the recent findings of Indian SARS-CoV-2 Consortium on Genomics (INSACOG), the Union Health Ministry has alerted and advised Maharashtra, Kerala and Madhya Pradesh about finding the Delta Plus variant of COVID-19 in some districts in these states.

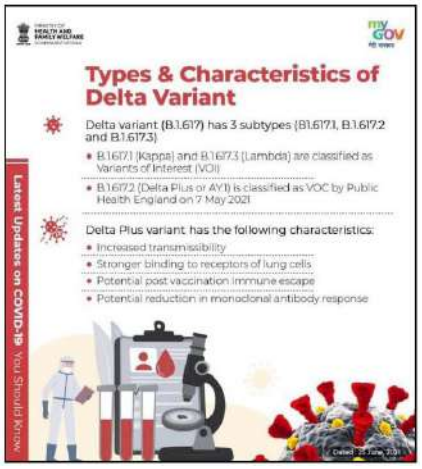
The Union Health Secretary has communicated to these three states that this variant has been found in genome sequenced samples from Ratnagiri and Jalgaon districts of Maharashtra; Palakkad and Pathanamthitta districts of Kerala; and Bhopal and Shivpuri Districts of Madhya Pradesh.

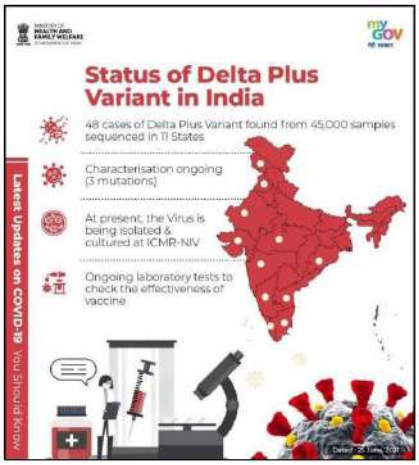
INSACOG is a consortium of 28 laboratories of the MoHFW, Department of Biotechnology, Indian Council of Medical Research (ICMR) and Council of Scientific and Industrial Research (CSIR) for whole genome sequencing vis-a-vis the COVID-19 pandemic. INSACOG is tasked with not just the whole genome sequencing but also to give timely inputs on appropriate public health response measures to be adopted by states and UTs. INSACOG has informed that the Delta Plus variant, currently a variant of concern (VOC), has the following characteristics:

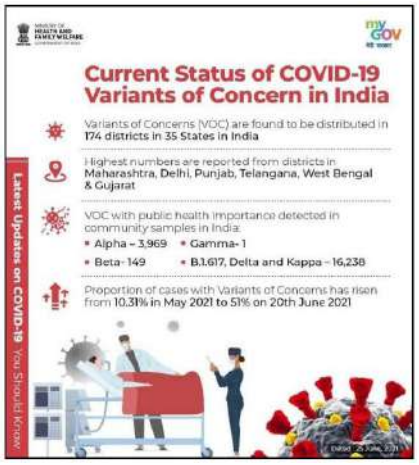
- Increased transmissibility
- Stronger binding to receptors of lung cells
- Potential reduction in monoclonal antibody response

The Union Health Ministry has advised Maharashtra, Kerala and Madhya Pradesh that the public health response measures, while broadly remaining the same as have been implemented by them earlier, have to become more focussed and effective. The chief secretaries of the states have been advised to take up immediate containment measures in the districts and clusters (as









identified by INSACOG) including preventing crowds and intermingling of people, widespread testing, prompt tracing as well as vaccine coverage on a priority basis.

They were also advised to ensure that adequate samples of positive persons are promptly sent to the designated laboratories of INSACOG so that clinical epidemiological correlations can be made for further guidance to be provided to states.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1729467

Quick vaccination is key to open the economy and go back to normal: NITI Aayog

Member (Health), NITI Aayog, Dr V Paul, while speaking to DD News informed that India administered nearly 81 lakh vaccine doses, on the first day when the revised guidelines for Covid vaccination came into force.

A sign of India's ability to vaccinate at scale: He said that the day one vaccination figures demonstrate India's ability to carry out vaccination on a large scale for days and weeks together. "All this was possible because of planning and coordination between the Central and state governments and taking up the task work in mission mode," added Dr Paul.

"Whether or not the third wave occurs is in our hands": Dr Paul reminded that a third wave can be stopped if Covid appropriate behaviour is followed and majority of the people get vaccinated. "Why will there be a third wave if we follow Covid appropriate behaviour and get ourselves vaccinated? There are many countries where even the second wave has not arrived; if we follow Covid appropriate behaviour, this period will pass."

Fast vaccination is key to going back to normal: The NITI Aayog Member underscored the importance of fast vaccination to enable India to open its economy and resume normal work. "We need to do our daily work, maintain our social life, open schools, businesses, take care of our economy; we will be able to do all this only when we are able to vaccinate at a fast pace."

"Vaccines are saving lives, now is the best time to take the vaccine": Dr Paul said that it is a big mistake to think that our vaccines are unsafe. "All vaccines of the world have been approved under emergency use authorisation, just like our vaccines. People from various sections of society have taken these. The second wave has now receded and it is the best time to take the Covid vaccine," he added.

Dr Paul also pointed out how the decision to vaccinate the health workers on priority protected them during the second wave. "Very few healthcare workers got infected, otherwise, our hospitals themselves would have collapsed during the second wave, so please be assured that people are being saved from infection due to the vaccine."

Public participation and awareness essential to remove vaccine hesitancy

The NTAGI Chairperson, Dr N Arora emphasised the significance of people's participation and public awareness to avoid rumours and misconceptions against vaccination. "*Jan bhagidari* and *jan jagran* are very essential to eradicate the fear of vaccination. Ultimately it is in the hands of the public to come forward and get vaccinated."

He also mentioned that preparations have been made for spreading awareness about the vaccination and ASHA workers and frontline workers have already started working from grass roots levels to fight vaccine hesitancy.

"There will not be any issue regarding vaccine supply": The Chairperson assured that there won't be any issue regarding the availability of vaccine. "We will have around 20-22 crore doses next month." Dr Arora also assured that the health infrastructure is well spread out to ensure that the vaccination drive reaches every corner of the country including hilly, tribal and very sparsely populated areas.

No need to change the current dosage interval of Covishield vaccine: Responding to a query on the dosage interval of Covishield vaccines, the Chairperson said that no need is felt at the moment to change the interval. "We are collecting data under the national vaccine tracking system and doing real-time evaluation regarding the effectiveness of vaccines, dose interval, region-wise impact, variants, etc.; at present, no need is felt for changing the dose interval of Covishield. The basic principle is that our people should get maximum benefit from every dose of the vaccine. We find that the current dosages are proving to be beneficial." He added that at the same time, nothing is written in stone.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1729282

NITI Aayog answers why new waves of any endemic happen?

"There are countries where even the second wave has not occurred. If we do what is required and do not indulge in irresponsible behaviour, then outbreak should not occur. This is a simple epidemiological principle." So said Dr V Paul while explaining the reasons for the emergence of new pandemic waves and how it can be controlled or even avoided by following Covid appropriate behaviour and taking measures such as vaccination. He was addressing the Union Health Ministry's media briefing on COVID-19, held at the National Media Centre, PIB Delhi.

Why do new waves happen?

Dr Paul said there are four elements leading to the formation of a new wave.

1. **Behaviour of the virus:** The virus has the capacity and ability to spread.
2. **Susceptible host:** Virus keeps looking for susceptible hosts for it to survive. So, if we are not protected either via vaccination or by previous infection, then we are a susceptible host.
3. **Transmissibility:** The virus can become smart enough where it mutates and becomes more transmissible. The same virus that used to infect three hosts becomes capable of infecting 13! This factor is unpredictable. No one can pre-plan to fight such mutations. The change of the very nature of the virus and its transmissibility is an X factor and no one can predict when and where it may happen.
4. **Opportunity:** Which we give the virus to infect. If we sit and eat together, crowd, sit in closed areas without masks, then the virus gets more opportunities to spread.

A call to do what is in our hands

The NITI Aayog Member reminds us what is in our hands. "Of the above four, two elements – susceptibility and opportunities – are totally under our control whereas the other two – behaviour and transmissibility – cannot be predicted or controlled. So, if we are protected and ensure we are not susceptible, then the virus will not be able to survive. We can control the susceptibility by wearing a mask or getting vaccinated. Hence if we decrease opportunities by following Covid appropriate behaviour and decrease susceptibility to infection, then a third wave will not occur."

Dr Paul also called for collective efforts of the citizens as well as the system to stop another wave. "Some of these require individual efforts, while some others such as isolation of clusters, contact tracing, ensuring testing capacity and building awareness require the system to act."

"Decision to open schools has to be taken very cautiously"

Speaking about easing restrictions and reopening of schools, Dr Paul said that the decision has to be taken cautiously and that we should take risks only when we are protected. "A school is a crowd, a medium or large gathering, which gives an opportunity for the virus to infect. So, we should take that risk only when we are better protected, the virus is suppressed and we are able to sit at a distance. It is not easy to take the decision to open schools when an unpredictable situation is prevalent." He also mentioned that the virus is suppressed at present due to discipline and restrictions prevalent in many states, if we ease restrictions and open schools, then the virus gets opportunities to infect.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1729477

Indian Chest Society describes CSIR-CMERI's oxygen enrichment technology as 'Made in India, Made for India'

A webinar on 'The Element of Hope in the COVID Era: Oxygen' was organised by the Indian Chest Society in association with CSIR-CMERI on 27 June 2021. Prof Harish Hirani, Director, CSIR-CMERI, was the chief speaker at the virtual event. The webinar was attended by expert panellists comprising Dr Deepak Talwar, Dr Neeraj Gupta, Dr Subhakar Kandi and Dr Dhrubajyoti Roy. They are all eminent Pulmonologists and senior members of the Indian Chest Society. Dr D Behera moderated the entire virtual panel discussion, on behalf of the Indian Chest Society.

Prof Hirani, in his address shared that the human body rejects a substantial portion of oxygen during the process of exhaling. During high flow oxygen therapy, the exhaled oxygen can be trapped, which in turn will decrease the oxygen load to a great extent. The CSIR-CMERI Oxygen Enrichment Unit (OEU) encompasses the functionality and goes beyond that of an oxygen concentrator. Since, the MSMEs are the pillar of the Indian economy, CSIR-CMERI has organised a series of virtual awareness exercises to bring them into the fold. As part of this initiative the technology has already been handed over to a number of MSMEs across India, who in turn will help in the diffusion of the technology. The licensees have also very innovatively upgraded the aesthetics and ergonomics of the technology.

CSIR-CMERI is working upon an advanced oxygen mask technology, which will provide protection against this transmission of viral load. It has a separate supply and exhaled air passage. The exhaled air passage/channel is equipped with CO_2 scrubber and BV filter. These innovative applications are a step towards the possibility of recycling oxygen from the exhaled air. Such technologies are also ideal for isolation wards/quarantine zones, where there is an air recirculation environment.

An advanced OEU for oxygenated hospital beds in rural areas is also being worked upon which will have independent flow rate and FiO_2 controls. CSIR-CMERI is also working towards the development of 50 LPM and 100 LPM hospital model oxygen enrichment technologies. Another hybrid system configuration for existing hospitals will be able to function along with oxygen cylinders and oxygen lines of the hospitals through an in-built intelligent controller system to complement cylinder stocked oxygen with enriched oxygen. These advancements will facilitate the decentralised usage of the technology for 5-20 patients. The cost of the CSIR-CMERI

oxygen technology is lesser than 50 per cent when compared with centralised oxygen generation technologies available in the market.

Dr Deepak Talwar, Specialist Pulmonologist and Member of the Governing Body of the Chest Society presented his discussion over various indication of oxygen therapy and shared that Prof. Hirani's idea of 'Make in India, Make for India' is brilliant. He also discussed pneumonia related hypoxia and the existing and chronic respiratory issues. He also shared that the studies show that in 85 per cent of the cases the patients do not require oxygen and in moderate to severe cases only oxygen therapy is needed to maintain a saturation level of 90. He also shared that the proper saturation level is 92-96 per cent and above 96 per cent level may be also harmful.

Dr Neeraj Gupta, Senior Chest Specialist Physician and Member, Governing Body of the Chest Society found Prof Hirani's lecture to be very encouraging. He also asked for comparison between pressure swing adsorption (PSA) plants and CSIR-CMERI developed OEU and the possible number of patients to be catered to with this institute developed device. He later shared his ideas on different delivery methods of oxygen at low flow and high flow rates. Talking about the advantages and disadvantages of the different methods, Dr Gupta said that the nasal cannula though is a comfortable method, yet it may cause dryness of nose and throat to the patient too.

Dr Subhakar Kandi, Senior Chest Specialist Physician and Member, Governing Body of the Chest Society said the CSIR-CMERI developed indigenous device is the need of the hour. He lauded Prof Hirani for the innovative device, which may be customised depending upon the requirement and needs of the patients. Dr Kandi later spoke on the mechanism of hypoxia and various types of masks used for oxygen therapy. He also pointed out that liquid oxygen, which has a purity of 99.5 per cent may be utilised for patients in ICUs whereas devices such as that developed by CSIR-CMERI may be utilised for patients under non-critical conditions as well as during the post-hospitalisation care at home.

Dr. D Roy, Senior Chest Specialist Physician and Member, Governing Body of the Chest Society discussed the sources of medical oxygen. He welcomed the idea and Prof Hirani's presentation on the oxygen enrichment system and said that he described the topic and the technology very correctly. Dr Roy talked about the different sources of oxygen in hospitals like pressurised oxygen cylinders, liquid oxygen, concentrators, etc. He also mentioned some of the disadvantages of oxygen concentrators.

Dr D Behera, Specialist Pulmonologist and President, Indian Chest Society while moderating the discussion talked about the history and discovery of oxygen by Joseph Priestley and said that its importance has been recognised by everybody in the pandemic. He also applauded Prof Hirani and CSIR-CMERI for dissemination of awareness about the oxygen enrichment technology and enquired about the cost aspects of the different oxygen enrichment technologies developed by CSIR-CMERI. Dr Behera said that they are the end users and stressed upon the need for educating the society particularly the nursing staff about the innovations and technology diffusions. For this, he wished to arrange similar awareness programmes for the benefits of the nursing staffs and the MSME sectors.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1730720

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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

Outreach initiatives by India Science Channel

MoHFW releases resource materials to promote youth campaign on COVID appropriate behaviour, vaccination drive and psychosocial well-being

PGIMER, in collaboration with Panjab University, releases infographic booklet on COVID-19-associated mucormycosis

MoHFW releases operational guidance for COVID-19 vaccination of pregnant women

PGIMER-Chandigarh and Panjab University bring out sixth educative comic series to spread COVID-19 awareness amongst children

COVID 2021: Nation's S&T Efforts Against COVID-19 – An e-Newsletter on COVID-19

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

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

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

Press Information Bureau releases daily bulletin on COVID-19

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

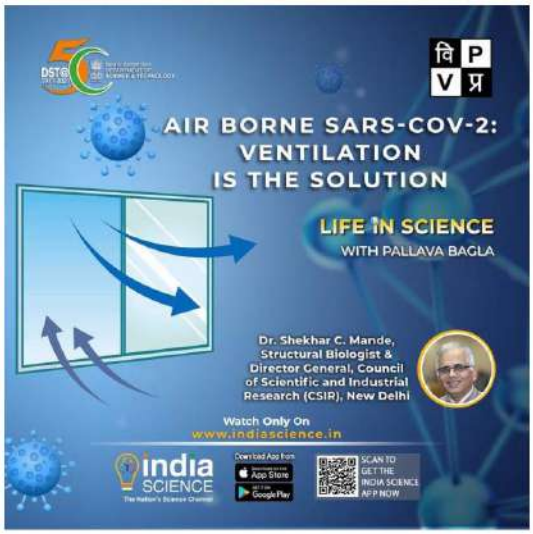
Outreach initiatives by India Science Channel

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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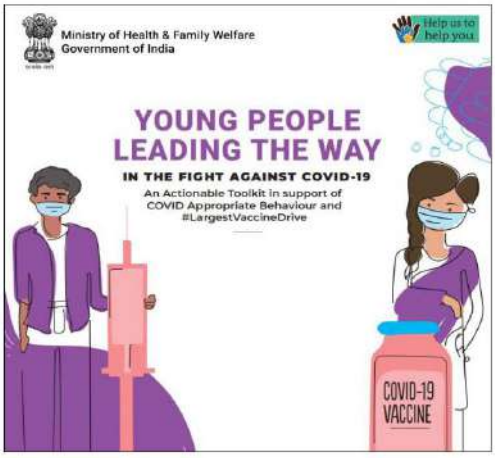
MoHFW releases resource materials to promote youth campaign on COVID appropriate behaviour, vaccination drive and psychosocial well-being

Young people are central to tackling the COVID-19 crisis and finding new ways to transform their lives and communities. To respond to the challenges of the new post-crisis reality and help shape a better future, they are once again leading the way with their innovative and disruptive ideas.

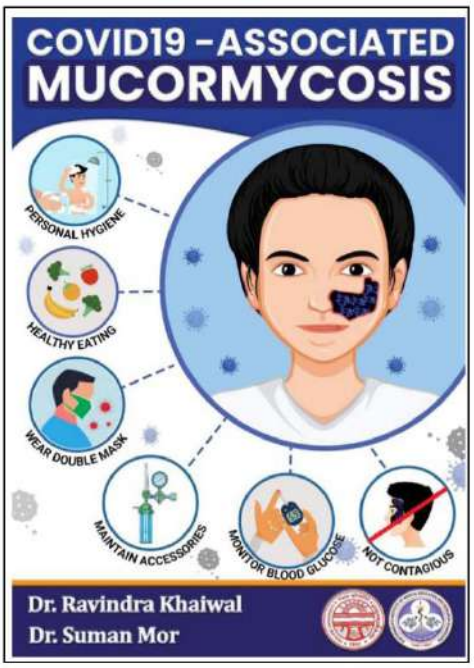
Ministry of Health and Family Welfare (MoHFW) issued an actionable toolkit in support of COVID appropriate behaviour and the largest vaccine drive. This toolkit is designed to encourage eligible citizens, who are above 18 years of age, to become youth champions in the fight against COVID-19 supporting the #LargestVaccineDrive and COVID appropriate behaviour.



Website link:

https://www.mohfw.gov.in/pdf/YouthGuidebookonCAB&VaccinationEnglish.pdf

PGIMER, in collaboration with Panjab University, releases infographic booklet on COVID-19-associated mucormycosis



Mucormycosis is a critical condition caused by a group of molds known as mucormycetes. These fungi can be found in the environment, but they thrive in soil and decaying organic materials like leaves, compost piles, and rotten wood. It affects people who have health issues that impair and reduce their ability to combat pathogens in the environment. They include immune-compromised individuals with uncontrolled diabetes mellitus, neutropenia and in people who have taken immunosuppressant for the treatment of blood cancer, hematopoietic stem cell transplantation, etc. The infection is not contagious and cannot be passed from one person to another, but if left uncared, it could be fatal.

Mucormycosis can also complicate the case of severe COVID-19 infection. The COVID-19 pandemic is still a major public health issue around the world and now its wide range of symptoms and complications have also emerged. One of these complications is fungal infection such as mucormycosis. Patients who have been treated for COVID-19, who have taken excessive steroids and who are diabetic are more susceptibile to mucormycosis. Clinical manifestations of mucormycosis can vary based on anatomical sites such as nasal blockage, discharge from the nose, pain or swelling on one side of the face, chest pain, cutaneous involvement, abdominal pain with nausea and vomiting, etc.

This pictorial booklet aims to create awareness by providing education and knowledge on COVID-19 and its complications such as mucormycosis in simple, easy to understand language. Its purpose is to enhance the self-care measures in persons who are suspected or confirmed COVID-19 to protect themselves against mucormycosis.

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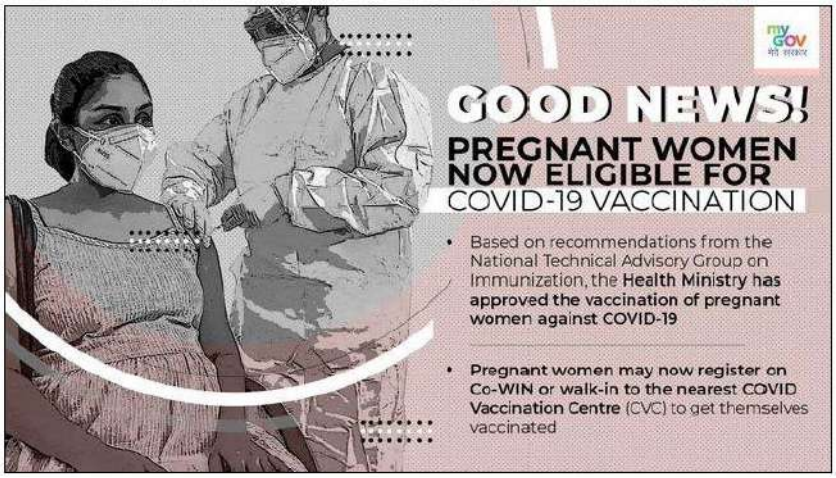
Website link:

https://6c7e24ae-fb40-4331-a67d-c876b179abc8.filesusr.com/ugd/bce95d_8e2ee155d34d4be99825e997c80f03bb.pdf

MoHFW releases operational guidance for COVID-19 vaccination of pregnant women

COVID-19 infection during pregnancy may result in rapid deterioration of the health of pregnant women and could also affect the foetus. According to experts, the benefits of vaccination to pregnant women outweigh its potential risks. Based on the recommendations from National Technical Advisory Group on Immunization (NTAGI), MoHFW has approved the vaccination of pregnant women against COVID-19 with the condition that they are informed about the risks of exposure to COVID-19 infection along with the risks and benefits associated with the vaccines. Based on this information, a pregnant woman will have the choice to take the vaccination.



Contact info:

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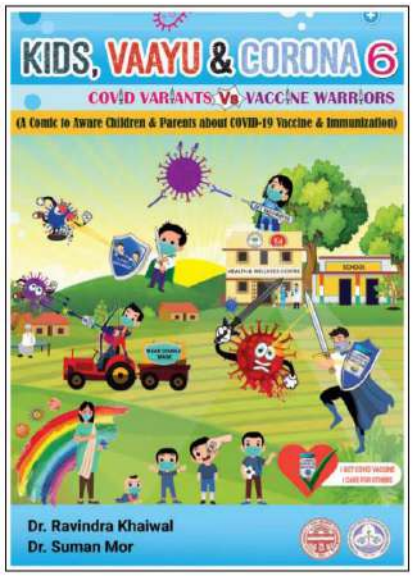
Website link:

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

PGIMER-Chandigarh and Panjab University bring out sixth educative comic series to spread COVID-19 awareness amongst children



COVID-19 has become a nightmare for most of the people around the world. While adults can gather data from common platforms like a newspaper, for children it really becomes incomprehensible to understand the talks, advisories and other scientific information. To overcome the challenge, Postgraduate Institute of Medical Education and Research (PGIMER, Chandigarh) and Panjab University (PU) have created an educative comic series titled *Kids, Vaayu & Corona,* for children. Here is the sixth edition sensitising the young kids on various COVID variants and vaccine warriors. This is aimed at helping them become aware about the threats of coronavirus and of ways to remain safe by taking simple precautionary steps for prevention and control of the spread of the infection.

The series is based on conversations between three children and the superhero of the series, Vaayu, who is a global citizen, who works for better public health and environment. The sixth part of the series in simple words explains terms like COVID vaccine, yoga, COVID appropriate behaviour, double mask, and other common dos and don'ts.

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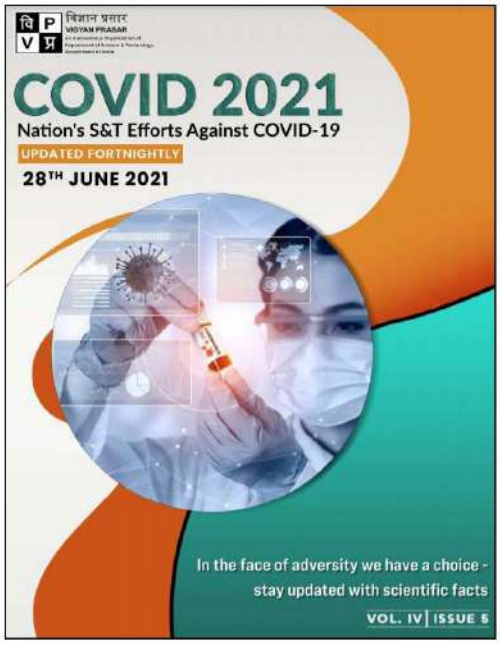
Website link:

https://6c7e24ae-fb40-4331-a67d-c876b179abc8.filesusr.com/ugd/bce95d_cb2b7297c8c049f58ca5b1d5c3f8f6f8.pdf

COVID 2021: Nation's S&T Efforts Against COVID-19 – An e-Newsletter on COVID-19



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 2021: Nation's S&T Efforts Against COVID-19, is being compiled to inform our readers and strengthen the usefulness of any published information.

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

The latest edition was digitally published on 28 June 2021.

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Website link:

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

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

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

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

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

Last date: 31 December 2021

Website link:

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

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

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

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

Last date: 31 December 2021

Website link:

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

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

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19, starting from the early days of the COVID-19 outbreak. The bulletin contains press releases concerning COVID-19, issued in the last 24 hours, inputs from PIB field offices, and fact checks undertaken by PIB. These bulletins are published in 14 languages: Hindi, English, Urdu, Marathi, Telugu, Tamil, Punjabi, Bangla, Kannada, Oriya, Gujarati, Assamese, Malayalam and Manipuri. The following data points were released on 6 July 2021.

35.75 Cr. Vaccine Doses administered so far under Nationwide Vaccination Drive
India reports 34,703 new cases in last 24 hours; lowest in 111 days
India's Active Caseload declines to 4,64,357; lowest in 101 days
Active cases constitute 1.52% of total cases
2,97,52,294 Total Recoveries across the country so far
51,864 patients recovered during last 24 hours
Daily recoveries continue to outnumber the Daily New Cases for the 54th consecutive day
Recovery Rate increases to 97.17%
Weekly Positivity Rate remains below 5%, currently at 2.40%
Daily positivity rate at 2.11%, less than 3% for 15 consecutive days

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1733171

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 36 crore vaccine doses (36,13,23,548) to States/ UTs.

India's coronavirus cases have crossed three crores, and as of 7 July 2021, 08:00 AM it stands at 3,06,63,665 cases, of which 2,97,99,534 have recovered. The recovery rate stands at 97.18 per cent while the case fatality rate stands at 1.32 per cent.

Website link:

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

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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

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1. Delta and Delta Plus variants

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

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

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

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

Q. What are variants of interest (VoIs) and variants of concern (VoCs)?

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

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

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

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

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

Q. What are Delta and Delta Plus variants?

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

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

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

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

Compared to the Delta variant, the Delta Plus variant has an additional mutation. This mutation is called the K417N mutation. 'Plus' means an additional mutation has happened to the Delta variant. It does not mean that the Delta Plus variant is more severe or highly transmissible than the Delta variant.

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

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

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

Q. How often are these mutations studied in India?

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

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

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

A. Sample selection is done under three broad categories:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. Why is continuous monitoring of mutations important?

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

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

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

Source:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1730875

2. COVID-19 vaccination for pregnant women

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

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

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

A. Higher risk of infection involves with:

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

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

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

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

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

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

A. Pregnant women who are:

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

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

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

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

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

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

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

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

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

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

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

Source:

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

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

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

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

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

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

A. In the first wave, primarily the elderly and individuals with co-morbidities were affected with severe disease. In the current (second) wave, a large number of younger population (30-45 years) have developed severe disease as also those without co-morbidities. After the second wave is over, if we do not continue following COVID appropriate behaviour, the third wave, if it occurs, is likely to infect the remaining non-immune individuals and that may include children

also. The latest sero survey (December 2020 to January 2021) showed that the percentage of infected children in the age group of 10-17 years was around 25 per cent, the same as adults. This indicates that while children are being infected like adults, they are not getting the severe disease.

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. What is the plan for vaccinating children?

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

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

Source

https://iapindia.org/pdf/hA5Gnpt_IQv63Bk_IAP%20view%20point%20for%203rd%20wave%20Covid%2022%20May%202021.pdf

4. COVID-19 and White Fungus infection

Q. What is White Fungus?

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

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

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

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

Q. Who can get infected by white fungus?

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

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

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

Q. Is White Fungus contagious?

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

Q. What are the symptoms of White Fungus?

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

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

Q. How can White Fungus be treated?

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

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

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

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

Q. Are 8 breaths per minute normal?

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

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

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

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

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

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

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

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

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

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

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

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

Q. Is pure oxygen used in hospitals?

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

Q. What is the use of medical oxygen?

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

Q. What is the need for medical oxygen?

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

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

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

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

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

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

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

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

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

Q. What is moderate COVID-19 cases?

A. In moderate COVID-19 cases a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than or equal to 24/minute and SpO_2 90 per cent to 93 per cent with ambient air.

Q. What is severe COVID-19 cases?

A. In severe Covid-19 case, a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than 30/minute and SpO_2 less than 90 per cent in room air.

Q. When does a patient require mechanical ventilator support?

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

Q. Can mechanical ventilation be given at home?

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

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

A. The six minute walk test (6MWT) is an exercise test that measures functional status in chronic obstructive pulmonary disease (COPD) patients and provides information on oxygen desaturation. This test is also being used for COVID-19. In case of COVID-19 symptoms, SpO_2 level must be checked before taking a walk. Now, walk for six minutes without a break on an even surface and measure the SpO_2 level. It may fall 1-2 per cent, but consult a medical professional if it falls below 93 per cent.

Source:

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

6. Related to drugs and medications to fight the disease

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

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

Q. What is Remdesivir? How does Remdesivir work?

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

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

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

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

Q. Can Remdesivir be taken at home?

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

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

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

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

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

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

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

Q. Is Favipiravir effective in treating COVID-19?

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

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

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

7. Related to Black Fungus and COVID-19 disease

Q. What is Black Fungus?

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

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

A. Risk Factors are:

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

Q. Why the sudden increase in Black Fungus cases?

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

Q. How serious is Black Fungus?

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

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

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

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

A. One can take the following precautions:

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

Q. What are the early signs of Black Fungus?

A. Some of the early signs are:

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

Q. Is Black Fungus treatable?

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

Q. Which specialist should I visit for Black Fungus?

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

Source:

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

8. Related to indoor air and COVID-19 disease

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

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

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

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

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

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

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

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

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

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

Source:

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

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FEEDBACK FORM

COVID-19

Science & Technology Efforts in India

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

I. How do you rate the following aspects of COVID 2021 e-Newsletter, focused on the second wave of the pandemic?

1. The overall appearance

😄Very Good 😊Good 😐Average ☹️Poor 😞Very Poor 😶No Opinion

2. Ease to read and flow of information

😄Very easy 😊Fairly easy 😐Not very easy ☹️Not at all easy

For suggestions and feedback, click on:
https://www.indiascienceandtechnology.gov.in/covid-newsletter/feedback-form

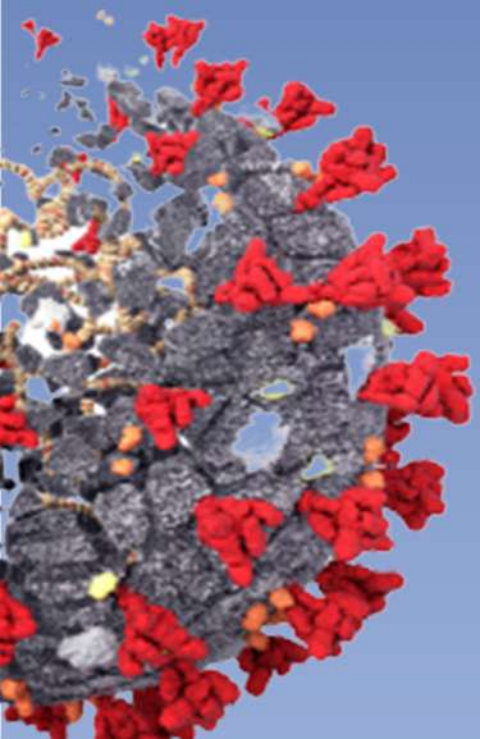
COVID-19

Science & Technology Efforts in India

VOL. IV | ISSUE 6 | 11 JULY 2021

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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