Vigyan Prasar

VOL. V | ISSUE 2

MONTHLY EDITION | JANUARY 2022

COVID-19

Science & Technology Efforts in India

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

COVID REPOSITORY

SCIENCE &TECHNOLOGY EFFORTS IN INDIA

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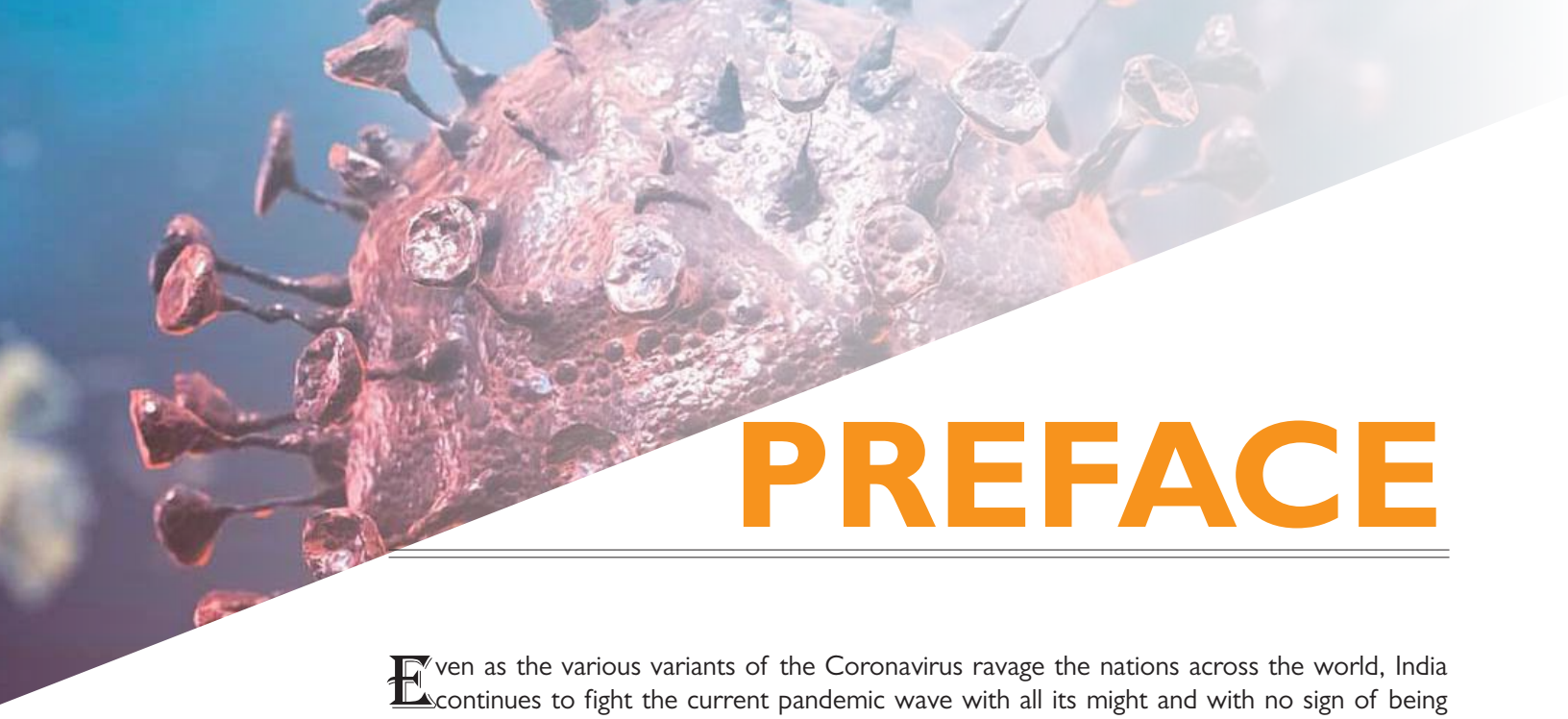
Reflecting Science, Technology & Innovation in India



PREFACE

Even as the various variants of the Coronavirus ravage the nations across the world, India continues to fight the current pandemic wave with all its might and with no sign of being fainted or exhausted by it. Though the new variant Omicron spreads faster than its predecessor variants of concern, the impact due to COVID-19 is lower, thanks to the 70% coverage of vaccination in the adult population.

Battling a spike in the positive cases, India has begun administering booster doses, termed as precautionary doses, of the COVID-19 vaccine to the priority groups – health and frontline workers along with the elderly people. India has followed a step-wise graded approach in offering vaccination to various age groups and is moving cautiously. Also, immunisation among adolescents continues to progress at a decent pace. Over 50% of youngsters in the age group of 15-18 years have been administered the first dose within the first fortnight.

As the pandemic has been superimposed on unresolved tensions between people and technology, the current edition focuses on various impactful initiatives to mitigate the pandemic and recent developments in S&T to apprise the scientific fraternity, like research outputs, industry collaborations, communications & resources, along with additional fact-check questionnaires. We continue compiling new information related to the pandemic to sensitise our readers about COVID-related latest developments, to inform the readers and strengthen the usefulness of the information.

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, eventually inculcating scientific temper among the general public. We look forward to suggestions and feedback from our readers at covidnewsletter@vigyanprasar.gov.in.

January 2022

Vigyan Prasar

New Delhi

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

INDEX

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TRENDING IN INDIA @COVID-19 PANDEMIC

The strategy for this section is to fill the gap area identified and as per the popular demand risen from the reader database. The communication stories compiled here are signature science stories related to the COVID-19 pandemic. The featured stories cover amongst ongoing research, recognised innovations, developed technologies/products/services, recent trends about variants-of-concern, the trend in diagnostics & prognostics, trend analysis of therapeutic regimens, communicating science & generating awareness, the contribution of a specific organisation in COVID warfare, the role of startups/private sectors in COVID mitigation, or any other relevant/significant related topic.

SECTION GUIDELINES

COVID-19: Fighting the invisible enemy with state-of-the-art technologies

Battling the COVID-19 pandemic: Roles and perspectives of Indian start-ups

COVID-19: Fighting the invisible enemy with state-of-the-art technologies

The global pandemic triggered by the novel coronavirus disease 2019 (COVID-19) has led to a surge in the application of genomic technologies for diagnostic purposes, development of novel vaccines, therapeutic protocols and mobile technologies for mitigation and containment of this pandemic. Also, there has been a surge in implementing group behaviour guidelines and biomedical and household waste management protocols. Technologies, developed and integrated real time, have been immensely helpful in the effective management of the pandemic.

1. Diagnostics: Molecular tests that have been widely used in detecting viral infection are: (i) rapid antigen-based testing that detects viral protein antigen, and (ii) RT-PCR-based test that detects viral RNA itself. During the pandemic, the Indian Government and private companies invested enormous resources in scaling up testing facilities.

Though PCR-based test has proved to be highly sensitive and more useful, both the tests are vulnerable to false negatives and errors during sample collection and processing. The highly sensitive PCR-based tests may detect the presence of viral shredding long after infection has subsided and may force quarantine even after the infection has subsided. As per ICMR data, till date, approximately 69.7 crore human samples have been tested for COVID-19 infection (https://www.icmr.gov.in), which is a phenomenal achievement.

2. Treatment: When an outbreak related to SARS-CoV-2 was first reported in Wuhan, China in December 2019 leading to global pandemic in 2020, a standard treatment protocol was missing. Mechanistic understanding of the molecular basis and evolution of the disease was missing. Based on the clinical presentation and spread of the disease within the body, protocols were developed both for COVID-19 treatment and post COVID-19 complications.

The government and private transport network was extensively used in delivering medicines, PPE kits, oxygen cylinders, plasma donation and so on. In addition, technology came in handy in the form of telemedicine (mobile health)/online video conferencing platforms that were extensively used to consult doctors without physically visiting the clinic.

3. Vaccination: The unpredictable physiological impact of the virus, the lack of appropriate experimental animal models, time constraints in running clinical trials, developing, producing, licensing, and globally distributing effective vaccine candidates were some of the major challenges to overcome in case of SARS-CoV-2. The ICMR data indicates that till today around 155 crore people have received single / double vaccination, which is also a phenomenal accomplishment. Three vaccines, i.e., Covishield (Serum Institute of India), Covaxin (Bharat Biotech) and Sputnik V (Dr. Reddy's Laboratories) are the main ones used in our country. India has also deployed indigenously developed drones to deliver COVID-19 vaccines to remote areas of the country. Recently, the Government also launched the Har Ghar Dastak initiative to ensure that everyone gets the benefit of technology in preventing and treating COVID-19.

4. Surveillance: One of the most powerful technological advancement in fighting COVID-19 was development of mobile technologies for surveillance, contact tracing, and quarantine. Aarogya Setu is a mobile application developed by the government to connect health services with the people in the fight against COVID-19. The Aarogya Setu app has been highly successful in alerting people about COVID-19 patients in the neighbourhood thereby helping people

minimise interaction and maintain safe physical distance. Aarogya Setu (total download till date - 21 crore) has been very beneficial in keeping track of the vaccination status.

Central to the introduction of Aarogya Setu has been a strong privacy and data protection shield using Bluetooth technology, rather than Global Positioning System data, to prevent location tracking.

5. Waste management: Disinfection technologies for hospital and domestic waste management comprises of incineration treatment, chemical treatment and alternative thermal treatment. The incineration-based disinfection is based on treating waste at combustion range of 800 deg C to 1200 deg C that completely kills the pathogen and burns organic matter.

The chemical disinfection method was used to pre-treat COVID-19 waste prior to shredding and incineration. Typically one uses sodium hypochlorite (NaOCl), hydrogen peroxide (H_2O_2), formaldehyde, isopropanol, ethanol and so on for inactivating SARS-CoV-2 virus. In addition, alternative thermal technologies like high temperature pyrolysis (540 deg-830 deg C) including pyrolysis oxidation, plasma pyrolysis and laser-based pyrolysis. Another method is the medium temperature microwave technology (177 deg-540 deg C) that uses high energy microwaves under inert atmosphere for breaking down organic content in the waste.

We are facing yet another COVID-19 winter after a massive second wave that saw epicentres of COVID-19 related infection and deaths across the country. Wearing of face mask and use of hand sanitizers has become a norm than exception. Though the government has done an outstanding work in the management of the pandemic, it is clear that vaccines alone won't end the pandemic.

Continuous use of public health measures will be needed alongside inoculations. Going by the lessons learnt from previous pandemics, the most effective solutions seem to be sanitization, physical distancing, wearing masks and increasing immunity against infections. The development and timely deployment of the state-of-the-art technologies have been incredibly beneficial in controlling the pandemic and saving precious lives. In future, we foresee use of wearable biosensors for real time surveillance of microbial infection. It is important that technologies are developed and diffused to assure safe and quality life for everyone.

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Battling the COVID-19 pandemic: Roles and perspectives of Indian start-ups

The recent COVID-19 pandemic has created a large-scale worldwide health threat, causing massive loss of lives, fear and detrimental impact on the economic foundation of countries worldwide. The pandemic has led to the death of over 50 lakh people worldwide and has been especially severe for the elderly and those suffering from pre-existing medical conditions. Over 30 crore people have been infected with the coronavirus, with severities

ranging from asymptomatic to mild symptoms to prolonged hospitalisations. This has placed a massive burden on the healthcare systems worldwide and has resulted in a shortage of ICU beds and delays in treatments for those suffering from other life-threatening medical conditions. The economic impact of the pandemic has also been severe, plunging several countries into a recession in 2020, reversing several years of sustained economic growth and pushing lakhs of people back into poverty. Constant movement restrictions and lockdowns have resulted in the shuttering of many companies, causing loss of livelihood, tight financial conditions and increasing debt for many people worldwide. Finally, the pandemic has also caused significant fear amongst the general populace. The lack of reliable information in the early stages of the pandemic, constant lockdowns, the fear of contracting the disease, and a lack of social interaction have negatively impacted several individuals' mental and physical well-being.

As the understanding of the disease grew, several companies developed and tested vaccines to fight against COVID-19, with the first vaccines being approved for use in early 2021. All publicly available COVID-19 vaccines have demonstrated the ability to reduce the severity of the disease in infected individuals and prevent the need for extensive hospitalisations. Up to date, nearly 60 per cent of the world's population has received at least a single dose of a COVID-19 vaccine, and the numbers are increasing every day. However, as the pandemic progressed, the virus SARS-CoV-2, which causes the coronavirus, has changed through mutations. As a result, several variants of the original coronavirus have emerged, some of which have shown the ability to evade vaccine protection better and necessitate the use of booster doses of the vaccines. The alpha, beta and gamma variants of the coronavirus disease were first documented during the earlier months of the pandemic and were constantly monitored; they are now spreading at much lower levels when compared with other variants in existence. First documented in October 2020, the delta variant is nearly twice as contagious as the earlier variants and might lead to more severe illness, particularly in unvaccinated people. Towards the end of 2021, the Omicron variant of the coronavirus was detected. It is believed to spread quicker than previous variants and has led to record-breaking case numbers in several Western countries. Several countries have reintroduced movement restrictions that were first seen in the early stages of the pandemic to control its spread. The emergence of these new variants has put further strain on the healthcare system and economies of countries the world over while also causing increased uncertainty and fear amongst the general population.

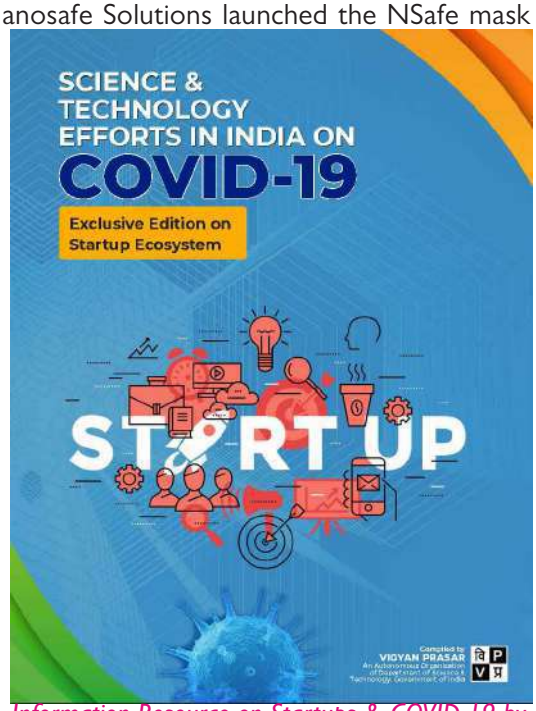
As we sailed through the most challenging times, developed countries like Italy and the UK crumbled under the pandemic crisis. In comparison, our nation faced the pandemic with an undampened spirit, ramping up manufacturing and instilling an example of genuine self-reliance

Information Resource on Startups & COVID-19 by Startup India

by reducing our dependence on imports. This was thanks to the role played by several start-ups in the Indian economy. Start-ups are making an ever-increasing contribution to India's GDP, and the numbers associated with them are expected to continue to proliferate. By early 2021, start-ups employed nearly 2 lakh people around the country.

Furthermore, India currently houses the world's third-largest start-up ecosystem, with the number of new start-ups growing at an exponential rate year on year. The Government of India, aware of the importance of start-ups to India's economy, has encouraged their growth and development in the past few years with initiatives such as Start-up India. However, the COVID-19 pandemic threatened to derail the growth of these companies and put their futures in doubt. Start-ups rely heavily on the cash economy, severely hit by the lockdown. The physical non-availability of workers, restrictions in the availability of raw materials and transport infrastructure further slowed them down. However, to counter the debilitating impact of the pandemic on India's start-ups and small industries, the government started the Aatmanirbhar Bharat Abhiyaan. As part of this initiative, the government slashed interest rates, increased limits on Non-Performing Assets (NPAs) to prevent triggering insolvency and offered payments from the government's share of Employee Provident Fund (EPF) to avoid layoffs. Other government initiatives like collateral-free loan debt provision of Rs 20,000 crore for stressed MSME's, Rs 50,000 crore equity infusion via Mother fund-Daughter fund and various additional funds propelled the start-up ecosystem and helped them weather the pandemic.

Successfully battling the COVID-19 pandemic required India's start-ups to rise to the challenge in the hardest of times. One of the start-ups at the forefront of India's war against COVID-19 was Nanosafe Solutions. Nanosafe Solutions is an IIT Delhi incubated start-up focusing on developing functional materials imbibed with antimicrobial properties for improved health and hygiene. With antimicrobial products and materials being the need of the hour and given that the vast majority of the country's antimicrobial technology is imported from other countries, it was imperative to develop rapid and effective indigenous solutions to tackle the pandemic. With this goal in mind, Nanosafe Solutions launched the NSafe mask in May 2020, just as the first lockdown was imposed. This made the company India's foremost developers of a copper treated antimicrobial mask, 50 times washable and capable of neutralising the SARS-CoV-2 virus in just one hour. This made-in-India product was successful in India and was also exported to over eight developed countries. The technology behind the NSafe mask was based on active nanotechnology, the likes of which are absent even in the international domain. Since then, the company has gone on to develop the RubSafe COVID-19 protection lotion, which is zero alcohol, has copper imbibed formulation that protects the skin from various bacteria, virus and fungi for up to 24 hours, and AqCure water bottle, which is a copper-plastic hybrid bottle, which ensures there is zero microbe formation starting from 30 minutes to over 10 days. The company's antimicrobial technology, based on patented



Information Resource on Startups & COVID-19 by Vigyan Prasar

active copper species, is a versatile technology with widespread applications in polymer, plastics, textiles, paper, coatings, paints and allied materials. The company is also a significant supplier of active copper nanomaterials, dispersions, textile formulations and polymeric master batches to leading international corporates. The company is also a recipient of the prestigious Biotechnology Ignition Grant (BIG) by BIRAC, DBT and DST NIDHI Seed Support Scheme by DST, Government of India.

The active role played by different start-ups in tackling the COVID-19 pandemic cannot be understated. Products and services such as antimicrobial materials, ventilators, virtual access to healthcare personnel and quick, easy to use COVID-19 tests were developed indigenously by various start-ups all over India, which played a pivotal role in allowing the country to fight the dangers posed by the pandemic successfully. Further development of Indian start-ups will provide the country with a greater degree of self-sustainability, reduce our reliance on external expertise and improve the nation's ability to fight future challenges.

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EFFORTS IMPACTING COVID MITIGATION

The efforts made by various agencies, apex bodies, domain institutions, and so on, which are working in the STI ecosystem towards meeting the requirements posed due to the pandemic are compiled here for the consumption and benefit of the general public. These efforts are presented here in terms of deliverables, outputs, technologies, products, services, etc., which are impactful and bring in STI elements in the activities and initiatives.

SECTION GUIDELINES

CSIR releases guidelines on disinfection technologies for mitigation of SARS-CoV-2 transmission

CDSCO approves emergency use authorization for Covovax to strengthen immunization efforts in India

ICMR approves RT-PCR kits to detect Omicron COVID-19 variant

CORBEVAX™ receives DCGI approval for emergency use authorisation

Ministry of AYUSH releases scientific resource of published research articles related to COVID-19

Flowchart of guidelines for international arrivals in the wake of Omicron variant transmission of COVID-19 pandemic

MoHFW released revised guidelines for international arrivals

Ministry of AYUSH releases clinical guidelines for holistic care during COVID-19

Government issues revised discharge policy for COVID-19

Omicron: Assam plans setting up genome sequencing lab in Guwahati

Revised advisory released for managing healthcare workers (HCWs) working in COVID-19 and non-COVID-19 areas of the healthcare facilities

Revised guidelines issued for home isolation of mild and asymptomatic COVID-19 cases

Ministry of AYUSH releases Ayurveda preventive measures for self-care during COVID-19 pandemic

CSIR releases guidelines on disinfection technologies for mitigation of SARS-CoV-2 transmission

The Ministry of Science & Technology through CSIR-CSIO (Central Scientific Instruments Organisation) has developed a totally effective technology for mitigation of airborne transmission of SARS-CoV-2. This will also remain relevant in post-COVID-19 era. The technology has been successfully tried in Railways, AC buses and even the Parliament House and is now open for general roll-out for use by the common masses.

The Union Minister of State (Independent Charge) for Science and Technology, Dr Jitendra Singh said the technology has been developed to deactivate SARS-CoV-2 virus. Contained in an aerosol with necessary ventilation measures, necessary safety and user guidelines and tested bio-safety standards, etc., UV-C deactivates viruses, bacteria, fungus and other bio-aerosols, etc. with appropriate dosages using 254nm UV light.

However, he cautioned that even after the installation of the technology, people are advised to strictly follow COVID-19 appropriate behaviour, including the use of face masks, maintaining social distancing, avoiding crowds, etc.

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1790527

CDSCO approves emergency use authorization for Covovax to strengthen immunization efforts in India

Strengthening India's fight against COVID-19, the Central Drugs Standard Control Organisation (CDSCO) has approved the COVOVAX vaccine. This takes the number of vaccines given restricted use in an emergency in India to eight.

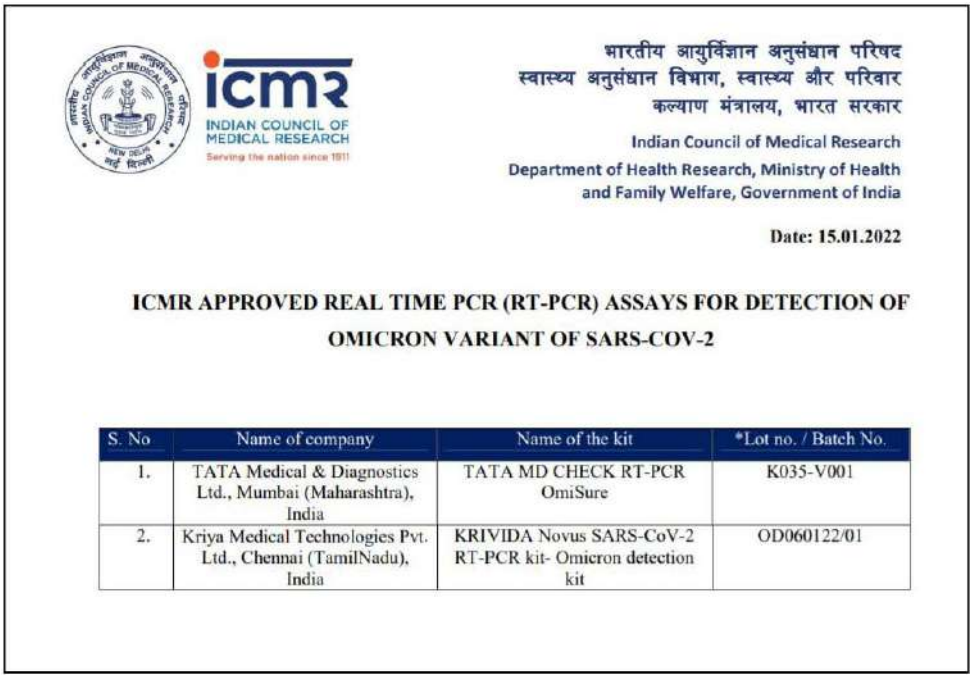
Drugs Controller General of India (DCGI) has granted Emergency Use Authorisation (EUA) for Novavax's recombinant nanoparticle protein-based Covid-19 vaccine with Matrix-M adjuvant. The vaccine will be manufactured and marketed in India by Serum Institute of India (SII) under the brand name Covovax for 18 years old and above.

Website link:

https://pib.gov.in/PressReleasePage.aspx?PRID=1786925

ICMR approves RT-PCR kits to detect Omicron COVID-19 variant

On 15 January 2022, the Indian Council of Medical Research (ICMR) approved two testing kits for detecting the Omicron variant of the SARS-CoV-2 virus. The kits are manufactured by



भारतीय आयुर्विज्ञान अनुसंधान परिषद
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य और परिवार
कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

Date: 15.01.2022

ICMR APPROVED REAL TIME PCR (RT-PCR) ASSAYS FOR DETECTION OF OMICRON VARIANT OF SARS-COV-2

S. No	Name of company	Name of the kit	*Lot no. / Batch No.
1.	TATA Medical & Diagnostics Ltd., Mumbai (Maharashtra), India	TATA MD CHECK RT-PCR OmiSure	K035-V001
2.	Kriya Medical Technologies Pvt. Ltd., Chennai (TamilNadu), India	KRIVIDA Novus SARS-CoV-2 RT-PCR kit- Omicron detection kit	OD060122/01

Tata Medical & Diagnostics and Kriya Medical Technologies and will be an enhancement for the detection of the Omicron variant.

Website link:

https://www.icmr.gov.in/pdf/covid/kits/RT_PCR_kits_for_OMICRON_VOC_15012022.pdf

CORBEVAX™ receives DCGI approval for emergency use authorisation

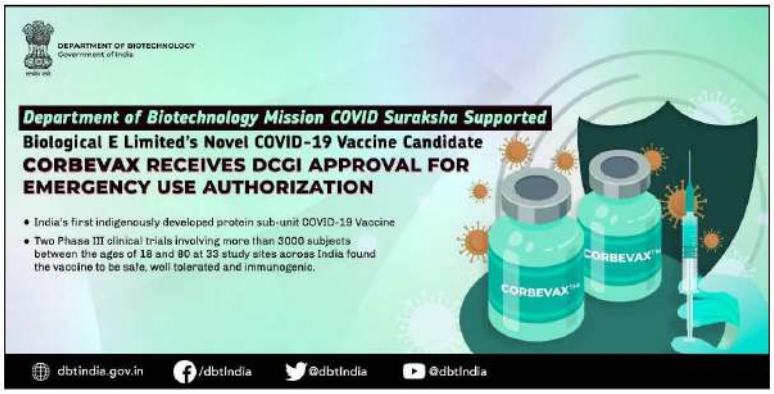
India's first indigenously developed Receptor Binding Domain (RBD) protein sub-unit vaccine for COVID-19, CORBEVAX™, developed by Biological E Limited, has received the Drug Controller General of India (DCGI) approval for Emergency Use Authorisation (EUA).

The Department of Biotechnology (DBT) and its public sector undertaking (PSU) - Biotechnology Industry Research Assistance Council (BIRAC), have supported Biological E's COVID-19 vaccine candidate from pre-clinical stage through Phase III clinical studies. The vaccine candidate was provided financial support under COVID-19 research consortium, through the National Biopharma Mission, for pre-clinical toxicology studies. Later, support was provided under Mission COVID Suraksha for clinical development. CORBEVAX™ is a two-dose vaccine administered intramuscularly and can be stored at 2°C to 8°C.

The recombinant protein sub-unit vaccine developed from the RBD of the spike protein on the viral surface is adjuvanted with Dynavax's CpG 1018 and alum. Comprehensive Phase III clinical trials involving more than 3000 subjects between the ages of 18 and 80 at 33 study sites across India, demonstrated the vaccine to be safe, well tolerated and highly immunogenic. The Translational Health Science and Technology Institute (THSTI), an autonomous institute of DBT, provided key immunogenicity data for the Phase II & III studies.

Dr Rajesh Gokhale, Secretary, Department of Biotechnology, Government of India said, "The EUA to CORBEVAX™ is yet another example of successful academia-industry collaboration. This vaccine will sharpen the country's efforts in ending the pandemic. The development of indigenous vaccines to fight the pandemic will also inspire the country's scientists and manufacturers to resolve the problems of the country."

Ms. Mahima Datla, Managing Director, Biological E. Limited, said, "We would like to take the opportunity to specially thank our Prime Minister Shri Narendra Modi for making vaccination a national mission. His vision and the advance commitments we received towards CORBEVAX™ were instrumental in our ability to scale-up and manufacture at such huge capacities. While COVID Suraksha Program's endeavour to accelerate vaccine development played a crucial role



in the initial development, the mechanism that was setup with the support of Department of Biotechnology and DBT-Biotechnology Industry Research Assistance Council (BIRAC) allowed us to scale up to a capacity of about 1.2 billion doses per annum making the dream of accessibility – affordability and supply – a reality."

Website link:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1786152

Ministry of AYUSH releases scientific resource of published research articles related to COVID-19

COVID-19 cases are still increasing day-by-day worldwide. The spreading of SARS-CoV-2 infection is very fast and different from other SARS-CoV infections possibly due to structural differences. In the current scenario of the ongoing pandemic, when there seems to be less immediate solution to the existing crisis, the only remedy available to the humankind is prevention. The most precise prevention is boosting of immunity. India is famous worldwide for its traditional medical wisdom and in treating diseases through medicinal plants.

Ministry of AYUSH is responsible for ensuring a time-bound research programme on identified diseases for which these systems have an effective treatment and to evolve pharmacopoeia standards for Indian systems of medicine and homoeopathy drugs.

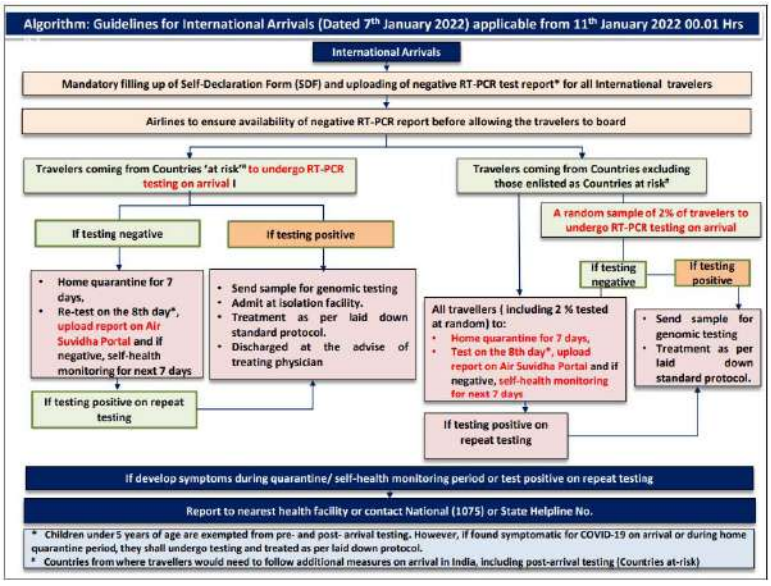
Ministry of AYUSH has published 20 peer-reviewed original articles, three case reports, three study protocols, and two editorials so far to address challenges arising out of COVID-19 pandemic. The full and free-to-download articles can be accessed at the below provided website link.

Website link:

https://www.ayush.gov.in/docs/Published%20Articles%20and%20Preprints.pdf

Flowchart of guidelines for international arrivals in the wake of Omicron variant transmission of COVID-19 pandemic

Ministry of Health and Family Welfare has released guidelines for international arrivals in supersession of all guidelines issued on the subject on and after 30 November 2021. The



guidelines are for COVID-19 symptomatic and asymptomatic cases. The flowchart has been prepared for easy comprehension.

Website link:

https://www.mohfw.gov.in/pdf/Algorithmforrevisedguidelinesforinternationalarrivals7thJanuary2022.pdf

MoHFW released revised guidelines for international arrivals

Ministry of Health and Family Welfare (MoHFW) has released guidelines for international arrivals in supersession of all guidelines issued on the subject on and after 30 November 2021. This document provides protocols to be complied by international travellers as well as those to be followed by airlines and all points of entry (airports, seaports and land border). This Standard Operating Procedure (SOP) is valid with effect from 11 January 2022 till further orders. Based on the risk assessment, this document will be reviewed from time to time.

Website link:

https://www.mohfw.gov.in/pdf/RevisedGuidelinesforInternationalArrivalsdated7thJanuary2022.pdf

Ministry of AYUSH releases clinical guidelines for holistic care during COVID-19

The Ministry of AYUSH, Government of India, recently issued an 'AYUSH-based holistic care during COVID-19' in India to fight against the coronavirus pandemic.

While antiviral drugs and vaccines are being developed, the traditional systems focus more on developing the body's immunity and providing a holistic solution for the well-being of an individual as a coordinated strategy.

AYUSH-based holistic care has the advantage of lesser side effects and of being cost effective. Along with modern medicine, these systems can also be explored as potential treatment/prevention for COVID-19.

Self-care immunity boosting measures for COVID-19 by the Ministry of AYUSH are:

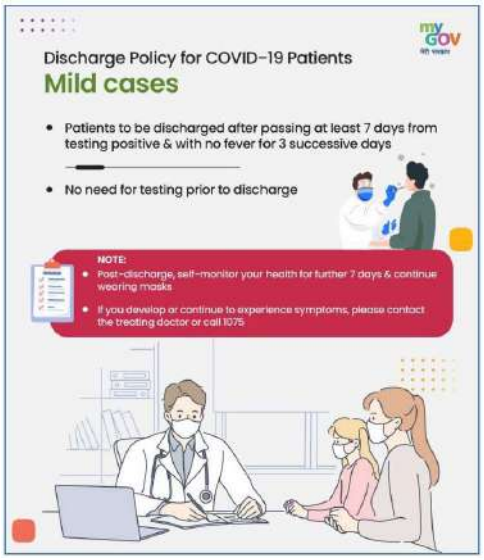
- Drink warm water throughout the day
- Once a day inhale steam infused with mint leaves or caraway seeds (ajwain)
- Practice yoga, pranayam and meditation
- Include spices like turmeric, coriander, cumin and garlic in daily diet
- Once or twice a day drink herbal tea/kadha made using basil (tulsi), cinnamon (dalchini), black pepper, dry ginger, munakka (raisin), and jaggery, or lemon juice
- Drink milk with turmeric powder (half teaspoon in 150 ml hot milk) once or twice a day
- Take one table spoon of sesame seed or coconut oil and swish in the mouth for two to three minutes, spit it out and rinse the mouth with warm water

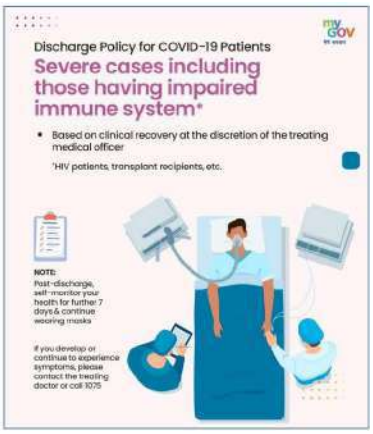
Website link:

https://www.ayush.gov.in/docs/Ayush-general-guidelines-for-COVID-19.pdf

Government issues revised discharge policy for COVID-19

Ministry of Health and Family Welfare (MoHFW) has come out with a revised discharge policy for COVID-19 cases.





According to the guidelines, mild cases admitted to a COVID-19 care facility or under home isolation will undergo regular health monitoring. The patient will be discharged after at least seven days from testing positive and with no fever for three successive days. There is no need for testing prior to discharge.

Moderate cases admitted to dedicated COVID-19 health centre: Patients, whose signs and symptoms resolve and maintain saturation above 93 per cent for three successive days (without oxygen support), and stable comorbidities, if any, will be discharged as per the advice of the treating medical officer. There is no need for testing prior to discharge. Patients on oxygen whose signs and symptoms do not resolve, and demand of oxygen therapy continues, such patients will be discharged as per the advice of the treating medical office.

Discharge criteria for severe cases will be based on clinical recovery at the discretion of the treating medical officer.

The revised discharge policy is aligned with the COVID-19 clinical management protocol.

Website link:

https://www.mohfw.gov.in/pdf/RevisedDischargePolicyforCOVID19updatedon9thJanuary2022.pdf

Omicron: Assam plans setting up genome sequencing lab in Guwahati

Amid the threat posed by the variant of concern, Omicron, the Assam government is contemplating setting up a genomic sequencing laboratory at the Guwahati Medical College and Hospital (GMCH) in a bid to boost the testing and tracking infrastructure in the state.

In mid-2020, a COVID-19 testing laboratory was established in the Jorhat campus of the North East Institute of Science and Technology (NEIST). It may be mentioned that the institute's Biotechnology Division has been playing a pivotal role in carrying out RT-PCR based COVID-19 tests.

The Health Minister of Assam met CSIR-NEIST Director, Dr G Narahari Shastry, in the presence of the Managing Director of the National Health Mission Assam and deliberated on enhancing the state's medical infrastructure, including setting up a COVID-19 testing laboratory in Guwahati, and other facilities for better diagnosis.

The deliberations have been prompted by the growing need and importance of SARS-CoV-2 genome sequencing in the Northeast, keeping the Omicron scare in context. The minister and virologists also visited the advanced molecular laboratory of NEIST. Genome sequencing helps researchers identify variants that spread to new regions. Scientists have been using genome sequencing to track SARS-CoV-2 almost in real-time since the onset of the pandemic.

Website link:

https://www.csir.res.in/sites/default/files/26%20To%2031%20December%20%202021_0.pdf

Revised advisory released for managing healthcare workers (HCWs) working in COVID-19 and non-COVID-19 areas of the healthcare facilities

The health workforce is a valuable resource for the country. The healthcare personnel working in hospitals are at increased risk of contracting the COVID-19 disease if there is a breach of personal protection while managing patients. It is important to ensure proper advisory to protect healthcare workers (HCWs) particularly in the context of safety from healthcare associated infections (HAIs) while managing COVID-19.

In view of this, the Ministry of Health and Family Welfare (MoHFW) issued a revised advisory for managing HCWs working in COVID-19 and non-COVID-19 areas of healthcare facilities. The purpose of the document is to provide guidance on the following: a) Prevention measures to be observed at the institution/facility level, b) testing and isolation measures for healthcare functionaries.

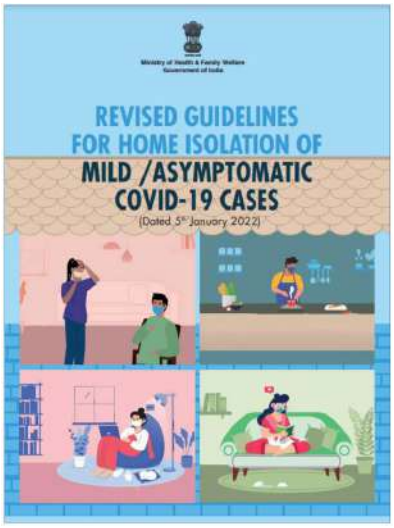
Website link:

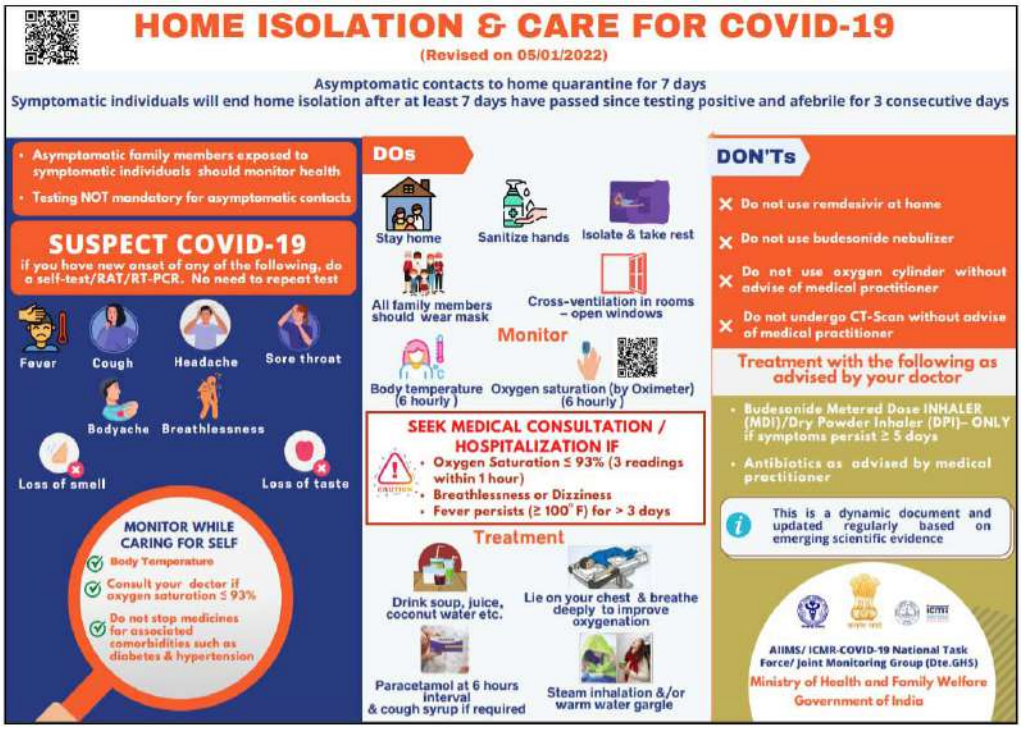
https://bit.ly/reviseadvisoryHCWs

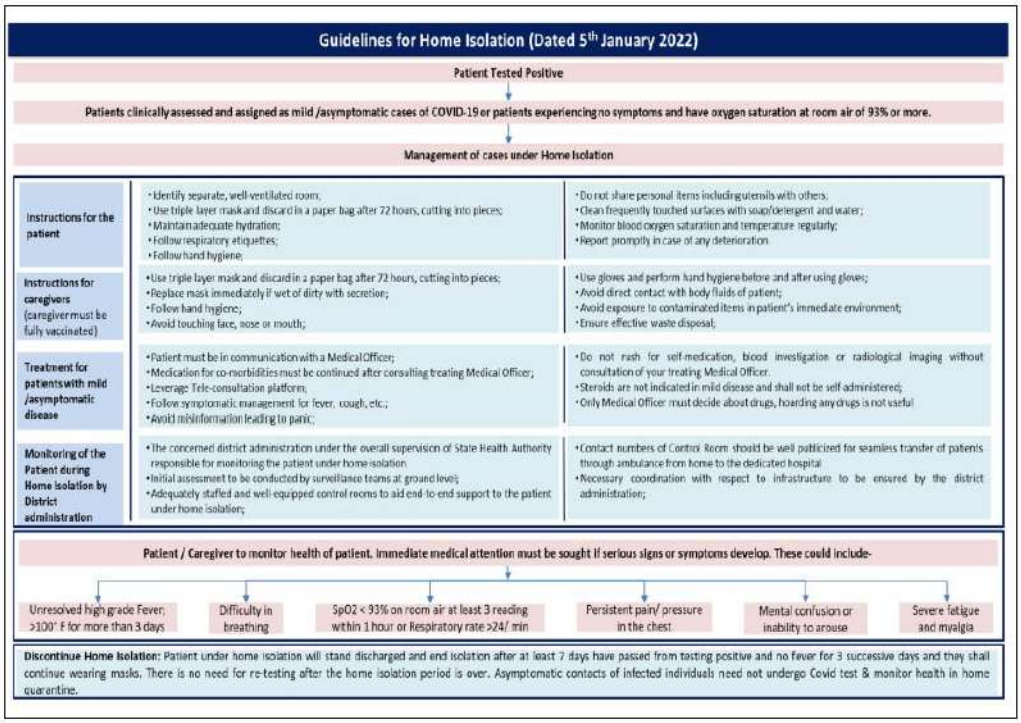
Revised guidelines issued for home isolation of mild and asymptomatic COVID-19 cases

Over the past two years, it has been seen globally as well as in India that majority of cases of COVID-19 are either asymptomatic or have very mild symptoms. Such cases usually recover with minimal interventions and accordingly may be managed at home under proper medical guidance and monitoring.

Ministry of Health & Family Welfare (MoHFW) has thus issued and updated guidelines for home isolation from time to time to clarify selection criteria, precautions that need to be followed by such patients and their families, signs that require monitoring and prompt reporting to health facilities.





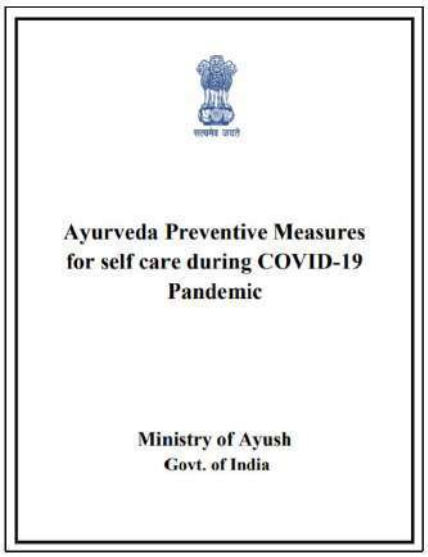


The present guidelines are applicable to COVID-19 patients who have been clinically assessed and assigned as mild /asymptomatic cases of COVID-19.

Website link:

https://www.mohfw.gov.in/pdf/RevisedIllustratedGuidelinesforHomeIsolationofMildAsymptomaticCOVID19Cases.pdf

Ministry of AYUSH releases Ayurveda preventive measures for self-care during COVID-19 pandemic



The world is currently going through a health crisis due to COVID-19 with emergence of newer variants. Enhancing the body's natural defense is the most important tool for maintenance of an optimal state of health.

The Ministry of AYUSH has collaborated with premier research and medical institutions to generate considerable evidence on Ayush interventions for improving immunity and prophylaxis against COVID-19. The self-care guidelines recommended by the Ministry of AYUSH have been modified as per the evidence emerged out of research studies undertaken by the ministry for COVID-19 prophylaxis.

Website link:

https://www.ayush.gov.in/docs/Ayurveda-Preventive-Measures-for-self-care-during%20-Covid-19-Pandemic.pdf

Ministry of AYUSH issues Unani medicine-based COVID-19 guidelines for self- care during COVID-19 pandemic

In the wake of the current spike in COVID-19 cases, enhancing the body's natural defense system (immunity) is important in maintaining optimum health. The CCRUM, Ministry of AYUSH recommends the following self-care guidelines modified as per the available evidence for improving immunity.

The main focus of the guidelines is on self-care and home management of COVID-19, as the vast majority of COVID-19-affected families in the country are forced to negotiate the pandemic out of hospitals.

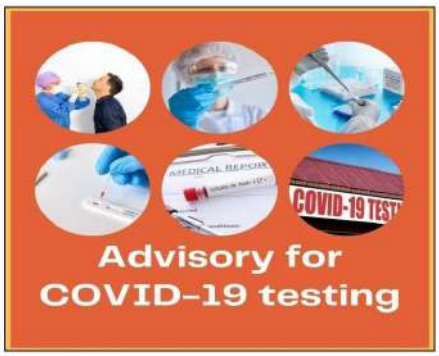
Website link:

https://www.ayush.gov.in/docs/Unani%20Medicine%20Advocacies%20for%20Self%20Care%20during%20Covid%20-%2019%20Pandemic.pdf

ICMR issued advisory on purposive testing strategy for COVID-19 in India

Indian Council of Medical Research (ICMR) issued an advisory on purposive testing strategy for COVID-19 in India. This advisory is for:

1. Early detection of symptomatic cases for quick isolation and care.
2. Early detection of infections in elderly (>60 year-old) and individuals with co-morbidities (diabetes, hypertension, chronic lung or kidney disease, malignancy, obesity, etc.) for quick care.



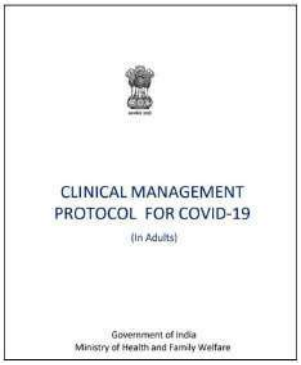
In this advisory, PCR algorithm for COVID-19 test interpretation using home test and rapid antigen point-of-care test is also provided in the annexure form.

Website link:

https://www.icmr.gov.in/pdf/covid/strategy/Advisory_COVID_Testing_10012022.pdf

COVID-19 management guidance for adults issued by MoHFW

Ministry of Health and Family Welfare (MoHFW), Government of India has recently re-published COVID-19 management guidance for adults. These guidelines are given in a algorithmn form so that it is easy for the public to understand. The guidelines gives the information about the symptoms to the patients after getting COVID-19. This can be in three levels viz, mild, moderate and severe disease. It talks about what to do and what not to do in these three levels of the disease. It also informs about the medicine that should be taken at the time of COVID-19.



Website link:

https://www.icmr.gov.in/pdf/covid/techdoc/COVID_Management_Algorithm_23092021.pdf

Strategy for COVID-19 vaccination of children between 15-18 years and precaution dose to HCWs, FLWs and 60+ year-old population with co-morbidities

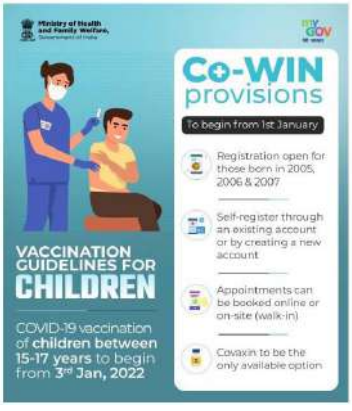
The CoWIN platform provides every citizen the facility of conveniently and safely prebooking vaccination appointments. All government and private vaccination centres also provide onsite registration facility, available both for individuals as well as groups of individuals, for which a detailed procedure has been finalised and published by States/UTs, to minimise any inconvenience to citizens.

Keeping in view the recent global surge of COVID-19 cases and detection of Omicron variant, which has been categorised as a variant of concern (VOC), MoHFW issued guidelines for COVID-19 vaccination for different category persons. They are as follows :

1. COVID-19 vaccination is given to the children in the age group of 15-18 years. For such beneficiaries, vaccination option would be 'Covaxin' only.

2. As a matter of abundant precaution, for those HCWs and front line workers (FLWs) who have received two doses, another dose of COVID-19 vaccine will be provided. The prioritisation and sequencing of this precaution dose will be based on the completion of nine months, that is, 39 weeks from the date of administration of the second dose.

3. All persons aged 60 years and above with comorbidities who have received two doses of COVID-19 vaccine, will on Doctor's advice, be provided with a precaution dose. The prioritisation and sequencing of this precaution dose will be



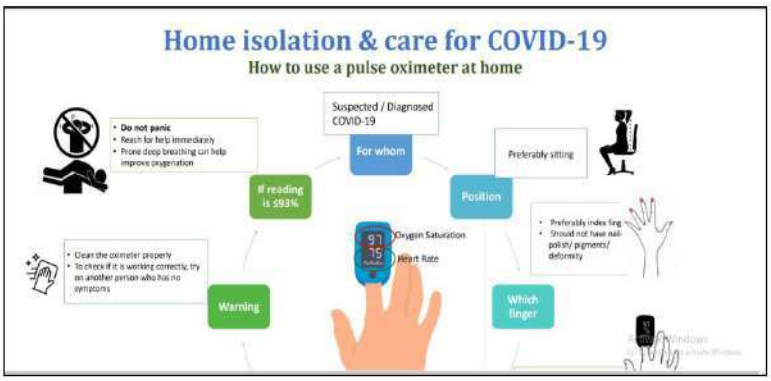
based on the completion of nine months, that is, 39 weeks from the date of administration of the second dose.

Website link:

https://bit.ly/vaccination15to18yearsand60above

ICMR releases guidelines on how to use a pulse oximeter at home

ICMR has pictorially depicted basic but essential information about 'How to use a pulse oximeter at home' and explained them step by step. In this picture, who should use this oximeter, how to position it and, the correct way of using it has been shown. It has also explained on which finger it should be used and how to clean the oximeter perfectly after using it. It is very helpful for COVID-19 patients.



Website link:

https://www.icmr.gov.in/pdf/covid/techdoc/oximeter.pdf

Ministry of AYUSH releases yoga advisory for COVID-19 patients in home isolation

Yoga, as we know it, is a tried and tested method of promoting good health and building resistance against diseases. Generations after generations have practiced this form of physical activity

and received tremendous benefits. In today's situation, this time-tested tradition has proved to be supremely beneficial. Daily practice of yoga promotes good health, builds immunity against diseases and ailments, promotes sound mental health, and helps maintain a fit physique, and energy level.

Yoga and pranayam greatly add on to one's immunity. Ministry of AYUSH in collaboration with yoga experts of Morarji Desai National Institute of Yoga (MDNIY) has released a yoga advisory for home isolated COVID-19 patients.

Website link:

https://www.ayush.gov.in/docs/Yoga-Advisory-for-Home-Isolated-COVID-19-patients.pdf

Sports Authority of India issues fresh SOPs to combat rising COVID-19 cases

The Sports Authority of India (SAI) has come up with fresh Standard Operating Procedures (SOPs) to deal with the drastic rise in COVID-19 cases, mostly owing to the Omicron variant. These measures will be strictly implemented at the various National Centres of Excellence (NCOEs) as well as the ongoing national coaching camps.

Upon arrival to the training centres, all athletes will undergo mandatory Rapid Antigen Test (RAT). If the test comes negative, they will train and dine separately until the sixth day of joining. A repeat of the RAT will take place on the fifth day. The ones who get a positive result will undergo a RTPCR test and be treated in isolation, while the athletes testing negative will continue normal training.

Proper isolation facilities are being earmarked for COVID-19 positive or symptomatic athletes across the camps and the facilities will be sanitized twice a day. There will also be a micro bio-bubble, where the athletes will be divided into small groups for training and dining. The athletes have also been strictly asked to avoid interacting with other groups.

There will also be random testing of athletes, coaches, support staff and non-residential staff in the NCOE, once every 15 days. It has also been recommended that athletes would be participating in only those competitions recommended by the respective National Sports Federations (NSFs) and the SAI HQ officials. For invitational tournaments and non-Olympic qualifying events, recommendations will be made by the respective Regional Directors (RDs) of the NCOEs.

Website link:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1787995

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3

RESEARCH SUPPORTS

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

SECTION GUIDELINES

National Institute of Virology collaborates to study persistence of immunity and impact of a third (booster) dose of an inactivated SARS-CoV-2 vaccine

RGCB delineates molecular rearrangements in the binding interface of SARS-CoV-2, revealing key molecular determinants for virus-host interaction

Sub-optimal neutralisation of Omicron variant by antibodies induced by vaccine alone or SARS-CoV-2 infection plus vaccine post six-months: THSTI

CCMB and IICT collaborating on indigenous mRNA vaccine for COVID-19

Aesthetically acceptable, breath friendly triboelectric face masks designed by CeNS

ARCI develops self-disinfecting copper-coated face mask (COP-Mask) to combat COVID-19

IIT Delhi comes up with N9 blue nano silver and its nano composites as antiviral nano coatings for protection against COVID-19 virus

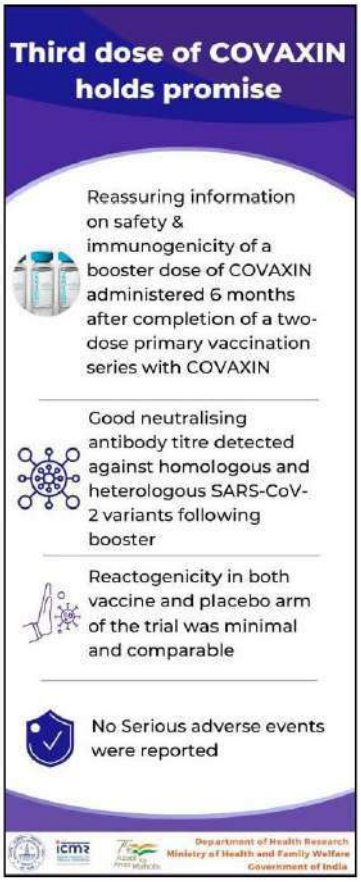
Organic-inorganic hybrid nanocoatings for disposable masks: A formidable arsenal against pathogenic COVID-19

IIT Kanpur develops scalable and reusable N95 and N99 mask with enhanced antiviral/antibacterial properties

IIT Guwahati develops antiviral and compostable facemask, moisturiser and gloves

National Institute of Virology collaborates to study persistence of immunity and impact of a third (booster) dose of an inactivated SARS-CoV-2 vaccine

Neutralising antibody responses to SARS-CoV-2 vaccines have been reported to decline within six months of vaccination, particularly against variants of concern (VOC). Scientists have assessed the immunogenicity and safety of a booster dose of BBV152 administered six months after the second of a two-dose primary vaccination series.



In an ongoing Phase II trial, the protocol was amended after six months to re-consent and randomise 184 previously vaccinated participants to receive a third dose of vaccine or placebo on Day 215. The primary outcome was to measure neutralising antibody titres by plaque-reduction neutralisation test (PRNT50) four weeks after the booster; safety as serious adverse events (SAE) was the key secondary outcome.

Six months after a two-dose BBV152 vaccination series cell mediated immunity and neutralising antibodies to both homologous (D614G) and heterologous strains (Alpha, Beta, Delta and Delta plus) persisted above baseline, although the magnitude of the responses had declined. Neutralising antibodies against homologous and heterologous SARS-CoV-2 variants increased 19- to 97-fold after a third vaccination. Booster BBV152 vaccination is safe and may be necessary to ensure persistent immunity to prevent breakthrough infections.

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Website link:

https://www.medrxiv.org/content/10.1101/2022.01.05.22268777v1

RGCB delineates molecular rearrangements in the binding interface of SARS-CoV-2, revealing key molecular determinants for virus-host interaction

Researchers from Rajiv Gandhi Centre for Biotechnology (RGCB), an autonomous organisation of Department of Biotechnology (DBT), delineate molecular rearrangements in the binding interface of SARS-CoV-2 RBD mutants.

SARS-CoV-2, the causative agent of COVID-19 pandemic is a RNA virus prone to mutations. Formation of a stable binding interface between the RBD of SARS-CoV-2 Spike (S) protein and Angiotensin-Converting Enzyme 2 (ACE2) of host is pivotal for viral entry. RBD has been shown to mutate frequently during the pandemic. Although, a few mutations in RBD exhibit enhanced transmission rates leading to rise of new variants of concern, most RBD mutations show sustained ACE2 binding and virus infectivity. Yet, how all these mutations make the binding interface constantly favourable for virus remain enigmatic.

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Website link:

https://bmcmolcellbiol.biomedcentral.com/articles/10.1186/s12860-021-00403-4
https://www.rgcb.res.in/spotlight101.php

Sub-optimal neutralisation of Omicron variant by antibodies induced by vaccine alone or SARS-CoV-2 infection plus vaccine post six-months: THSTI

Rapid expansion of the Omicron SARS-CoV-2 variant of concern despite extensive vaccine coverage might be related to decreased neutralising ability of vaccine induced antibodies. The neutralising ability of different vaccines with or without natural SARS-CoV-2 infection against Omicron is, however, not well known.

Researchers from Translational Health Science and Technology Institute (THSTI) have tested the ability of vaccine and natural infection induced antibodies to neutralise Omicron variant in a live virus neutralisation assay. The primary outcome was fold-change in the virus neutralisation ability of plasma against the Omicron variant compared with ancestral and Delta variant.

The study interpreted that the Omicron variant shows significant reduction in neutralising ability of both vaccine induced and hybrid immunity induced antibodies, which might explain immune escape and high transmission even in the presence of widespread vaccine coverage.

Website link:

https://www.medrxiv.org/content/10.1101/2022.01.04.22268747v1

CCMB and IICT collaborating on indigenous mRNA vaccine for COVID-19

CSIR-Centre for Cellular & Molecular Biology (CCMB) is working in collaboration with CSIR-Indian Institute of Chemical Technology (IICT) and others on developing an indigenous mRNA vaccine. "It is going to take a while with rigorous development and testing before it can be brought out in the form of an injectable vaccine," said its director Vinay Kumar Nandicoori.

The premier scientific institute has been in the forefront right from the time the pandemic broke out in March 2020 working in validation of diagnostic kits, developing new technologies, testing for new drugs, training personnel and in genome sequencing.

With generous funding from Indian SARS-CoV-2 Genomics Consortium (INSACOG), and others like Rockefeller and SBI Foundations, it has been able to utilise next generation sequencing platform Novaseq where 700-800 sequences can be done at a single shot and through another method of Nanopore, where 50 sequences can be done in one go.

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Website link:

https://www.csir.res.in/sites/default/files/26%20To%2031%20December%20%202021_0.pdf

Aesthetically acceptable, breath friendly triboelectric face masks designed by CeNS

With the increase of active COVID-19 cases in India and other countries, it is advised that the general public wear a fabric face mask whereas healthcare professionals use special and high technical quality medical masks. For the general public, a mask with moderate filtering efficiency should suffice, provided one need not compromise comfort, particularly when wearing the same for long hours.

In this respect, a team of scientists, Prof GU Kulkarni, Dr Ashutosh Singh, and Dr Pralay Santra from Centre for Nano and Soft Matter Sciences, Bangalore, an autonomous institute of Department of Science and Technology (DST), came up with a recipe for making unique face masks, which they called Tribo E Mask. The mask holds electric charges and is expected to restrict the entry of infections but without any external power. The innovation relies on the well-known phenomenon of electrostatics. When two non-conducting materials are rubbed against each other, they develop positive and negative charges instantly and continue to hold the charges for some time. This electric field is quite strong at proximity.

The design helps to create enough space in front of the mouth while speaking. The snug fit mask causes no speech distortion, no fogging on glasses due to exhaled breath, and indeed, packs well around the nose and mouth, drastically reducing the risk of infection. Another important advantage is its high breathability allowing one to wear it without any discomfort. This work is supported by the Nano Mission, DST, Government of India.

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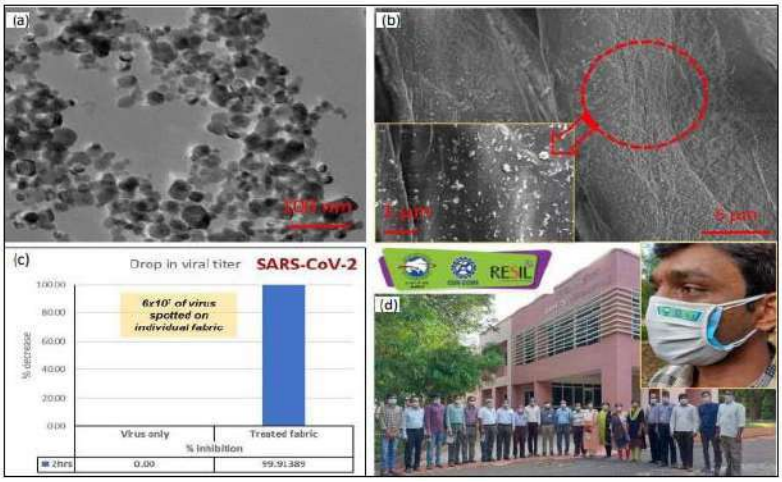
ARCI develops self-disinfecting copper-coated face mask (COP-Mask) to combat COVID-19

It is known that COVID-19 is caused by SARS-CoV-2, an enveloped positive-sense single-stranded RNA virus, where the mode of transmission is via respiratory particles that are mainly airborne. The virus spread could be minimised by using a face mask and physical distancing in the community. Public mask-wearing is most effective in reducing the spread of the virus when compliance is high. With the science around the use of masks to impede transmission advancing rapidly, the market is selling expensive masks that neither exhibit antiviral nor antibacterial properties. Hence, it is very difficult to control the transmission by wearing the conventional mask particularly in densely populated places like hospitals, airports, stations, shopping malls, etc., where the virus load is very high. In the present scenario, where mutations in coronavirus causing the COVID-19 pandemic are fast emerging, it is an urgent necessity to develop a low-cost antiviral mask.

In view of this, ARCI, in collaboration with the Centre for Cellular & Molecular Biology (CSIR-CCMB) and M/s. Resil Chemicals Pvt. Ltd., Bengaluru developed a Nanoparticle Copper-coated

Antiviral Face Mask (COP-Mask), that is self-disinfecting, under the Department of Science and Technology's nano-mission project to fight against the COVID-19 pandemic.

In an attempt to further make the mask more economical for the common man, incorporation of CuO-Ag nanoparticles onto the disposable mask fabrics during fibre production itself is being explored. Industrial partner M/s. Resil Chemicals Pvt. Ltd., Bengaluru is now in the process of production of such masks. Simple cloth masks present a pragmatic solution for use by the public in reducing COVID-19 transmission in the community and wearing COP-Mask as a secondary mask (outer layer) is definitely one of them.



(a) TEM image of CuO-Ag nanopowders
(b) FE-SEM image of nanoparticle coated fabric
(c) COP-Mask fabric exhibiting an efficacy >99.9 per cent against SARS-CoV-2
(d) demonstration of COP-masks at ARCI

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IIT Delhi comes up with N9 blue nano silver and its nano composites as antiviral nano coatings for protection against COVID-19 virus

Prof Ashwini Agrawal and Prof Manjeet Jassal from IIT-Delhi have come up with an N9 blue nano silver and its nano composites as antiviral nano coatings for protection against the COVID-19 virus. The aim of the project was to develop an antiviral coating for PPEs and other surfaces. The project has been successful in developing a highly efficient antiviral coating, which is India's first and possibly the world's most efficacious antiviral coating. The product has been developed in the form of a sprayable liquid that can create high quality durable, transparent coating on all kinds of porous and non-porous surfaces, such as masks, coveralls, metal knobs and railings, plastic buttons, bags and sheets, wood products, glass surfaces, etc. Some of the characteristics are as follows:

1. Highly stable antiviral formulation based on aqua silver technology
2. Antibacterial testing (ISO 21702:2019) showed 99.9 per cent reduction in less than 30 minutes of contact

3. Antiviral testing (ISO 18184:2019) carried out at national and international labs showed excellent activity (98-99%) against viruses like Felina Coronavirus, H1N1, H1N2 and MS2 in two hours of contact time
4. Long lasting protection for over 45-60 days

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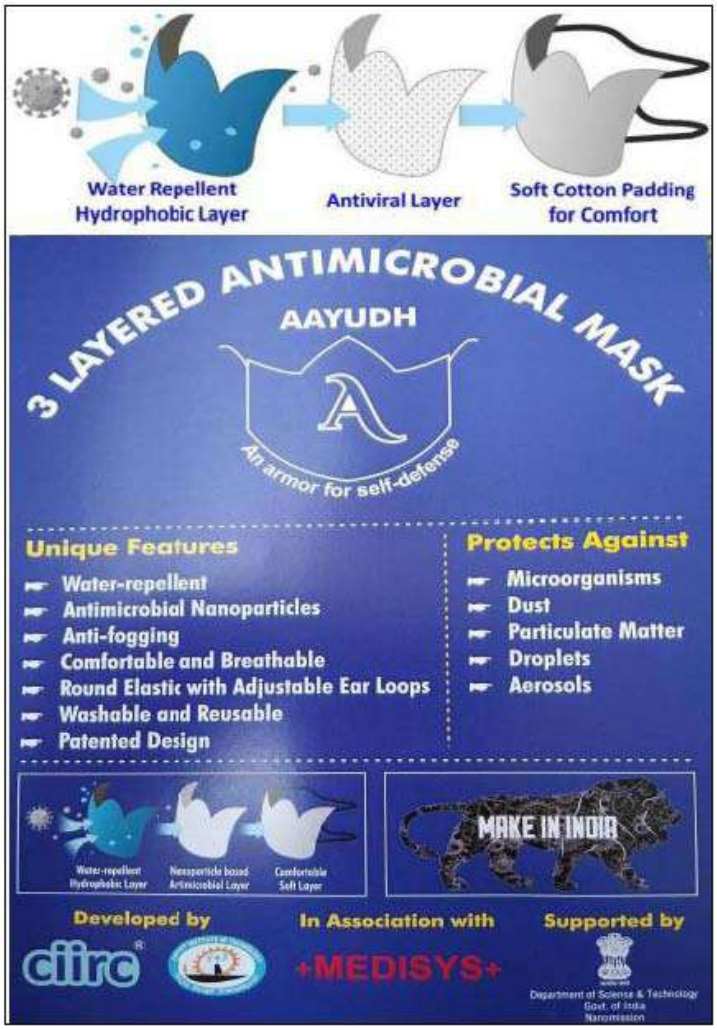
Organic-inorganic hybrid nanocoatings for disposable masks: A formidable arsenal against pathogenic COVID-19

Prof R Vishwanatha from Jyothy Institute of Technology, Bengaluru has developed a disposable mask to protect against pathogenic COVID-19. This three-layered antimicrobial mask is branded as 'Aayudh' which means a weapon to counter the COVID-19 infections. The mask is custom



designed in the shape of a lotus leaf which makes the mask inherently antifogging. The mask with the antiviral nanocoating remains effective up to 50 washes and exhibits excellent protection and comfort to the wearer.

The developed product was characterised for various parameters ranging from material properties to durability, in vitro to in vivo and inhalation toxicity to permeation. With the support of the industry partner, the nanocoated antiviral masks were sold to more than 7000 customers which included individuals, religious organisations, corporates, government offices, advocates, teachers, and many more.

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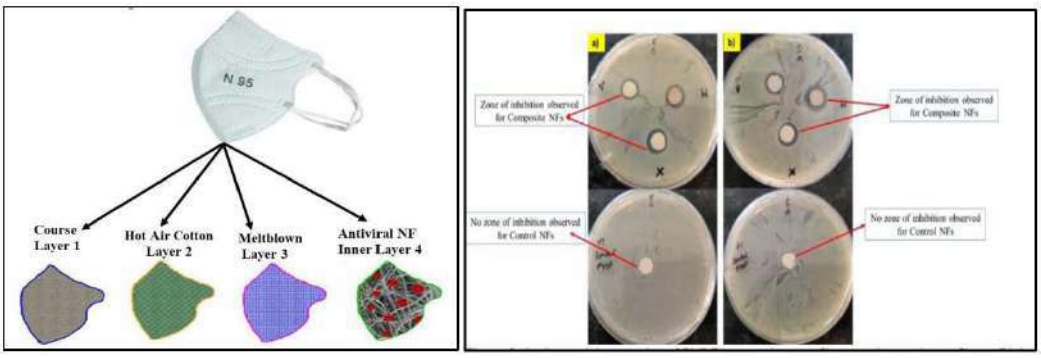
IIT Kanpur develops scalable and reusable N95 and N99 mask with enhanced antiviral/antibacterial properties

Researchers from the Indian Institute of Technology (IIT) Kanpur has made N95 and N99 masks with enhanced antiviral/antibacterial property. These N95 face masks are based on nanofibres made from polymers (Polyacrylonitrile PAN), Nylon 6 (PA6), and Polyethylene Terephthalate (PET) and Polyvinyl Fluoride (PVF) possessing antiviral/bacterial agents (e.g. inorganic antiviral/bacterial nanoparticles and organic antiviral/bacterial molecules). This mask is made with electrospun PAN nanofibres and ZnO nanoparticles and it shows good antiviral and antibacterial properties. The mask is reusable after washing with water and has good breathing compatibility. This project is done in collaboration with E Spin Nanotech Pvt. Ltd, Kanpur, which is a start-up company incubated from Nanoscience Center, IIT Kanpur.



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IIT Guwahati develops antiviral and compostable facemask, moisturiser and gloves

Researchers from Chemical Engineering Department, IIT-Guwahati have developed 3D printed bio-degradable polymer-based face masks and nano-fabric respirators have been made via electrospinning technique. Additionally, to incorporate functionalities into the nano-fabric respirators, antiviral biopolymer molecules have been electro sprayed converting them into antiviral masks. The proposed strategy of preparation of compostable/biodegradable antiviral face masks will promote environmental sustainability and will tackle the problem of face mask disposability by alleviating the problem of a one-time use of masks.

Similarly, antiviral biopolymer molecule has been added into conventional cream manufacturing process, which has been effectively converted into an antiviral cream. This will not only act as a moisturiser for the skin but is also expected to give protection from viruses to reduce inter-personal transmission. It is non-toxic and compostable after service life.

With the increase in awareness arising from the COVID-19 pandemic, the utilisation of single-use or multiple-use hand gloves has been popularised and has been of massive importance. People are being expected to continue using them even after this pandemic recedes. It is of utmost importance that the gloves used by surgeons as well as common people are ensured to be free from viruses. Hence, compostable films have been developed through unique antiviral master batches having antiviral activity. This film has been transforming into the shape of hand gloves. The gloves are designed for everyday use as well as for precise laboratory work with a protective function that will be very effective at the industrial level. It is non-toxic and compostable after service life.

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INDUSTRIAL COLLABORATIONS

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

SECTION GUIDELINES

ICMR approves first kit to detect Omicron – Tata's OmiSure

Tata Medical in partnership with CSIR-IGIB develops fast-testing solution for COVID-19

AiRTH's vSure antimicrobial air purifier passes CSIR-IMTECH testing, successfully kills 99.9 per cent black fungus

CCMB invites call for applications for start-ups to join fight against COVID-19

ICMR approves first kit to detect Omicron – Tata's OmiSure

The Indian Council of Medical Research (ICMR) has approved a kit that will be used to detect Omicron. The kit is manufactured by Tata Medical and Diagnostics and is named OmiSure. The approval came on 30 December 2021.

Currently the kit that is being used to detect the Omicron variant in India is developed by US-based scientific instrumentation company Thermo Fisher. It uses the S Gene Target Failure (SGTF) strategy to detect the variant.

S gene, ORF, N gene, Rdrp, E gene, etc. are viral genes that are targeted to detect COVID-19 virus. In case of the Omicron variant, the S gene does not get detected in Thermo Fisher's Taq Path RT-PCR test due to mutation in the gene, while other gene targets such as ORF gene and N gene get detected.

In the EoI to develop and commercialise its Omicron detection kit, ICMR stated that it has developed a novel technology to detect Omicron variant and a kit for the same. It said that it is the owner of the said technology including any underlying intellectual property and commercialisation rights.

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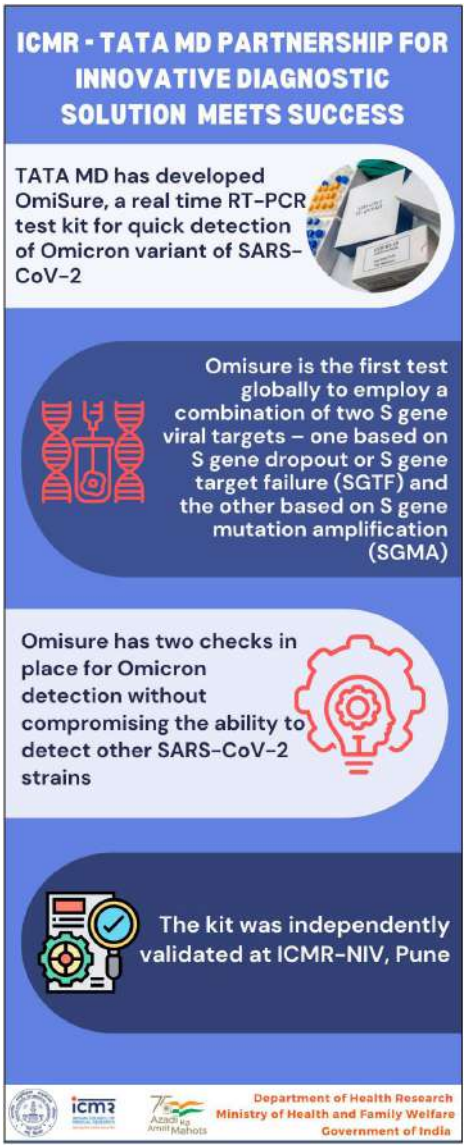
Website link:

https://www.csir.res.in/sites/default/files/01%20To%2005%20January%20%202022.pdf



Tata Medical in partnership with CSIR-IGIB develops fast-testing solution for COVID-19

Tata Medical & Diagnostics (Tata MD) said it has indigenously developed a fast-testing solution for COVID-19 to significantly boost India's testing capacity amid the Omicron variant threat.

The company claims that the solution, Tata MD CHECK Express RT-PCR, can be applied in multiple areas where quick, high volume, and reliable testing is required, such as airports and events. With studies in India pointing to a possible surge in cases, there is expected to be a multifold increase in demand for RT-PCR COVID-19 tests that are economical and give fast results, it added.

To meet this challenge, Tata MD has indigenously developed the COVID-19 testing solutions that will significantly boost India's COVID-19 testing capacity, the company said. Its solutions include Tata MD CHECK XF, a kit that has a processing time of one hour and can process 30 samples per batch per machine. It is approved by ICMR with over 95 per cent sensitivity and 100 per cent specificity. The other one is the Tata MD CHECK RT-PCR Fast 3Gene kit that uses a fast amplification protocol, with a processing time of 90 minutes and can process 90 samples per batch per machine. It is approved by ICMR with 100 per cent sensitivity and 100 per cent specificity, the company said.

TataMD CHECK, developed COVID-19 testing kit in partnership with Institute of Genomics and Integrative Biology (CSIR-IGIB). It has been approved by the Indian Council of Medical Research and Drug Controller General of India (DCGI).

Website link:

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

https://www.tatamd.com/pcr_kits/index.php

AiRTH's vSure antimicrobial air purifier passes CSIR-IMTECH testing, successfully kills 99.9 per cent black fungus

Since AiRTH commenced its operations in 2020, its products and novel vision have garnered much attention worldwide. Its antimicrobial air purifiers, the first in the world, have been tested on multiple grounds to check the efficiency and effectiveness that the company promises to deliver. Recently, the renowned CSIR- Institute of Microbial Technology (CSIR-IMTECH) lab tested AiRTH's vSure antimicrobial air purifier on black fungus entrapment and killing efficacy and concluded that the product killed 99.9 per cent of black fungus causing fungi species (*Mucor hiemalis* and *Rhizopus oryzae*). This path-breaking announcement puts AiRTH's purifiers in the front league and adds another level of protection certification to the futuristic line of products.

Though black fungus cases have dialed down in India, its threat is not only restricted to COVID-19. This is a never-ending issue, which can be caused by a number of factors like diabetes (especially uncontrolled diabetes), long-term use of steroids, weak or compromised immune system, prolonged stay in the ICU, and more. Instead of living in fear of contracting this deadly infection, it's better to bring home an AiRTH purifier. Besides eliminating harmful air pollutants, its vSure antimicrobial air purifier will successfully kill 99.9 per cent of black fungus and allow you to breathe clean and safe air.

AiRTH recently acquired funding from Whiteboard Capital, Syrma Technology, and FIRST (IIT Kanpur) and plans to disseminate it to scale its production and after-sale services, meeting the pan-India demand of its customers.

Contact info:

hello@airth.in

Website link:

https://www.csir.res.in/sites/default/files/26%20To%2031%20December%20%202021_0.pdf

https://airth.in/

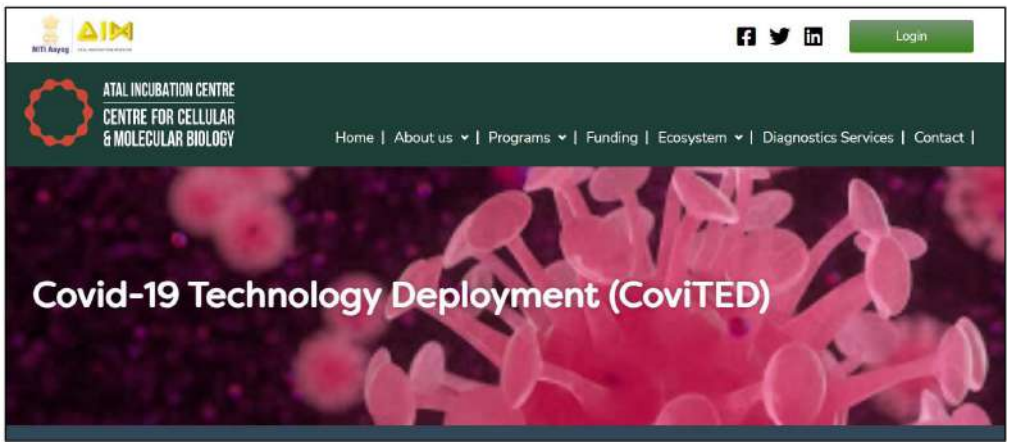
CCMB invites call for applications for start-ups to join fight against COVID-19

Atal Incubation Centre at Centre for Cellular & Molecular Biology (CCMB) is inviting entrepreneurs and innovators with promising technologies to join its COVID-19 Technology Deployment (CoviTeD) Acceleration Program.

Covid-19 Technology Deployment (CoviTeD) Acceleration Program is a CSR initiative of Security Printing and Minting Corporation of India Limited (SPMCIL). The programme aims to provide high impact mentoring, financial, regulatory and marketing support to take these products and technologies to market.

The applicant must be a start-up/company registered in India, with at least 51 per cent Indian shareholding, and with a competent team in place, preferably with a domain expertise. Association with the incubator (resident or virtual mode) would be preferred. Individual innovators with promising technologies can be supported.

MSMEs needing scale-up, quality assurance and regulatory support can also apply with preferably ready-to-deploy product within a few weeks. Products requiring approval from competent authorities and start-ups whose technologies/products are deemed to be of huge importance in the ongoing fight against COVID, will be recommended for NIDHI-Seed Support Scheme of Department of Science & Technology.



The last date for application: 31 January 2022

Contact info:

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Website link:

https://aic.ccmb.res.in/covited/

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5

COVID RESOURCES AND OUTREACH

The efforts made by multiple agencies and institutions in compiling the information, releasing the knowledge products in print or digital form, and reaching out to multiple target audiences are gathered here for one point, ready-to-use evidence. These include resource books, newsletters, magazines, exclusive editions, and so on.

SECTION GUIDELINES

Jan Bhagidari, the world's largest and most successful vaccination drive completes one year

Over 40 lakh children got the first jab on first day – Young India strengthening the fight against COVID-19

COVID19: Learn & Lead - a self-paced online course curated by the experts of ICMR-NIE

Outreach initiatives by India Science Channel

Press Information Bureau releases daily bulletin on COVID-19

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

CSIR bulletin on COVID news and updates about the pandemic

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

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

Jan Bhagidari, the world's largest and most successful vaccination drive completes one year

Dr Mansukh Mandaviya, Union Minister of Health and Family Welfare today released a commemorative postal stamp on COVID-19 vaccine to mark the first anniversary of India's national COVID-19 vaccination programme along with Dr Bharati Pravin Pawar, Union Minister of State for Health & Family Welfare and Shri Devusinh Chauhan, Union Minister of State for Communications.

The commemorative stamp design features a healthcare worker inoculating a senior citizen with COVID-19 vaccine, along with an image of 'COVAXIN' vial. This stamp signifies the remarkable work done by our frontline healthcare workers and scientific community across the country in protecting the people against the COVID-19 pandemic.

Speaking on the occasion, Dr Mandaviya said, "This is a historic occasion for us as a postal stamp is being released on the completion of one year of the world's largest COVID-19 vaccination programme, which was rolled out in India on 16 January 2021. Within a span of one year, we have administered more than 156 crore COVID-19 vaccinations. Our vaccination programme is in fact a role model for the global community. It is because of Jan Bhagidari that India was able to achieve this feat. He thanked all the healthcare professionals, scientific community, vaccine manufacturers and all the people for their relentless hard work and dedication in fighting the COVID-19 pandemic.

Highlighting the remarkable efforts of all the stakeholders in our collective fight against COVID-19, the Union Health Minister said "The entire world community is surprised with our efforts in fighting the COVID pandemic. Despite having a high density of population, we have been able to administer more than 156 crore COVID-19 vaccine doses. India has encountered various challenges along the journey but it is the resolve and dedication of more than 135 crore people that we could overcome every challenge. Credit goes to our indigenous research and development and streamlined production and distribution of vaccines. Amidst the environment of criticism and disbelief, the country gathered its spirits and worked against those who wanted to spread doubts and misinformation against indigenous vaccines and create vaccine hesitancy."

He further highlighted that India's vaccination programme is a story of the unparalleled journey of the country. It showcases the Indian model and the extraordinary achievement of our country guided by the unshakeable conviction of the Prime Minister in the hidden potential and capabilities of the citizens of our country.

Dr Mandaviya said that "The enormous preparation required with little time has made it an unparalleled journey. Understanding the highly infectious nature of the disease and the need to ensure overall healthcare availability across the country was vital." India did a strategic re-purposing of the existing health infrastructure to ensure that the health systems providing primary healthcare at grassroots levels were strengthened, he added.

The Union Minister remarked that proactive, pre-emptive, and graded entire Government and the society approach are the hallmarks of India's COVID-19 response. Earlier, the process of vaccine research to vaccine availability for common people took several years but it was the visionary leadership of our Prime Minister that it could be achieved in just nine months. Our Prime Minister has always encouraged our scientific fraternity and development of indigenous COVID-19 vaccines in record time is an outcome of his strong belief, he added.

Applauding the collective efforts of all, the Union Health Minister said that India's vaccine drive is indeed an example of what India can achieve if citizens come together in the spirit of Jan Bhagidari as remarked by the Prime Minister.

Website link:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1790343

Over 40 lakh children got the first jab on first day – Young India strengthening the fight against COVID-19

The countrywide vaccination drive was rolled out on 16 January 2021 and vaccination of all the eligible population above 18 years of age started from 1 May 2021. The next phase of COVID-19 vaccination has commenced from 3rd January 2022, for adolescents in the age group of 15-18 years.The move is likely to aid in normalisation of education in schools and will reduce the worry of the parents with school going children.

Over 40 lakh children between ages 15-18 have been given COVID-19 vaccine jabs on the first day of vaccination drive for children. The drive continued till 8 pm as per data shared by the CoWIN portal.

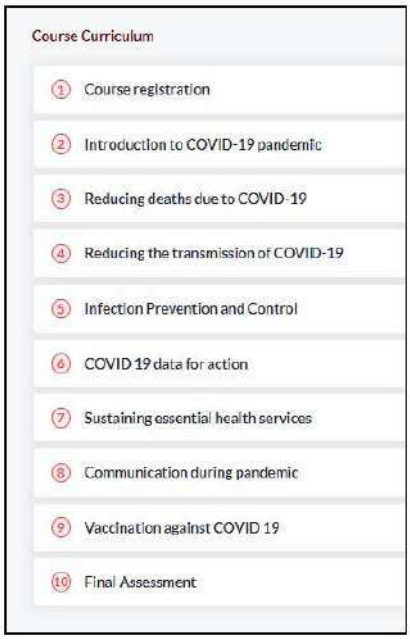
Website link:

https://pib.gov.in/PressReleasePage.aspx?PRID=1787282

COVID19: Learn & Lead - a self-paced online course curated by the experts of ICMR-NIE

While omicron is spreading panic in the country, let all try & make sure we are firm in our understanding of the pandemic by registering in a self-paced online course curated by the experts from ICMR-National Institute of Epidemiology (NIE) – COVID19: Learn & Lead.

ICMR- NIE conducts several Field Epidemiological Training Programme to build the capacity of medical professionals from various state health departments. ICMR- NIE is the South Hub for India Epidemic Intelligence Service (EIS) programme. The course COVID-19: Learn & Lead is one of the initiatives under the India EIS program. The study summarises the scientific evidence and best practices to reduce the spread and save lives from COVID. The course has eight modules with 17 sessions which can be completed in 6 to 7 hours. The learners can go through the course at their own pace and receive a completion certificate upon finishing the final assessment.



Eligibility: This course has been primarily designed to train healthcare professionals involved in COVID-related activities. Other professionals involved in COVID response may also find this course helpful. However, the content is highly technical and suits the best for the health care professionals and biology students.

Contact info:

director.nie@icmr.gov.in

Website link:

https://www.nielearncovid.in/course/covid19#/home

Outreach initiatives by India Science Channel

India Science is an Internet-based Over-The-Top (OTT) science TV channel. An initiative of the Department of Science and Technology (DST), Government of India, it is implemented and managed by Vigyan Prasar (VP), an autonomous organisation of the DST. This 24x7 video platform is dedicated to science and technology knowledge dissemination, with a strong commitment to spreading scientific awareness, especially with Indian perspectives, ethos and cultural milieu. The initiative is supported by the National Council of Science and Technology Communication (NCSTC), DST.

Science and technology are the main driving forces of the nation and fundamental to progress and growth. So, the advantages of science and technology must reach all sections of the society through popular media of communication. India's large Internet user base of 500 million is split between 305 million urban Indians and 195 million rural Indians, all of whom need to be reached with authentic science and technology content. And to do so, the Internet is fast becoming the most accessible and preferred media for content delivery.

Since the occurrence of COVID-19, India Science has been working tirelessly to connect with the people, in the form of regular bulletins, documentaries, interviews, bytes and live sessions of scientists, doctors, experts, science administrators and policymakers. The following is a brief account of the information products produced by India Science:

1. COVID-19 Explained: Short films to explain the important research findings related to COVID-19 and COVID-19 vaccination in layman's language are produced on a weekly basis. The topics chosen for COVID-19 Explained cater to the curiosity of the common man towards the pandemic.
2. Facebook live sessions on interviews of various stakeholders on COVID-19 vaccination programme.
3. Facebook and India Science live sessions on interviews with experts on COVID-19 vaccination.
4. 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.
5. ndia 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.
6. India Science makes infographics on COVID-19-related different issues regularly.
7. COVID-19 vaccine: Fact File also telecast every Saturday from India Science.
8. Produced COVID-19 related videos in Self Reliant series.
9. Special interview telecast with Secretary, DBT on COVID-19 related work done by DBT.

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https://www.indiascience.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 its outbreak. The bulletin contains press releases concerning COVID-19, issued in the last 24 hours, inputs from PIB field offices, and fact checks undertaken by PIB. These bulletins are published in 14 languages: Hindi, English, Urdu, Marathi, Telugu, Tamil, Punjabi, Bangla, Kannada, Oriya, Gujarati, Assamese, Malayalam and Manipuri. The following data points were released on 19th January 2022.

158.88 cr vaccine doses have been administered so far under Nationwide Vaccination Drive
India's Active caseload currently stands at 18,31,000
Active cases stand at 4.83%
Recovery Rate currently at 93.88%
1,88,157 recoveries in the last 24 hours increases Total Recoveries to 3,55,83,039
2,82,970 new cases recorded in the last 24 hours
8,961 Total Omicron cases detected so far; an increase of 0.79% since yesterday
Daily positivity rate (15.13%)
Weekly Positivity Rate (15.53%)
70.74 cr Total Tests conducted so far; 18,69,642 tests conducted in the last 24 hours

Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1791031

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 150 crore vaccine doses (1,59,67,55,879) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 20 January 2022, 08:00 AM, it stands at 3,82,18,773 cases, of which 3,58,07,029 have recovered. The recovery rate stands at 93.69 per cent while the case fatality rate has been pegged at 1.28 per cent.

Website link:

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

CSIR bulletin on COVID news and updates about the pandemic

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

Website link:

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

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

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

In the critical times of the COVID-19 outbreak, the web portal serves as a one-stop online information guide to bring together a collection of resources in response to COVID-19. These resources are generated by efforts made by numerous initiatives and schemes taken up by several departments and ministries of the Government of India and a string of institutions spread across the country. The content presented here relies on the best available scientific understanding of the disease and its transmission.

The web portal provides all information related to COVID-19, from presenting symptoms to vaccine science, distribution strategy, and preventive measures initiated for envisaged

future waves. It contains content on fact-checks and myth-busters in the question and answer format, contributions from the research fraternity, start-up spotlights, industry collaborations, communications and resources, reaching out to society and so on. A dedicated focus has been given to exhibiting funding opportunities catering to the second wave of the COVID-19 pandemic.

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Website link:

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

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

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

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

The latest edition was digitally published on **20th December 2021**.

Contact info:

covidnewsletter@vigyanprasar.gov.in

Website link:

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

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6

COVID FACT-CHECKS

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

SECTION GUIDELINES

1. COVID-19 & Cancer
2. COVID-19: OMICRON Variant
3. SARS-CoV-2 surveillance in India
4. COVID-19: Delta and Delta Plus variants
5. COVID-19 vaccination for pregnant women
6. COVID-19 & Children
7. COVID-19 and White Fungus infection
8. COVID-19 & Use of oxygen
9. COVID-19 & Therapeutics
10. COVID-19 & Black Fungus Disease
11. COVID-19 & Indoor Air

1. COVID-19 & Cancer

Q. Should patients with cancer receive the COVID-19 vaccine?

A. The data on efficacy and safety of COVID-19 vaccination in patients with cancer is limited. However, as patients with cancer are more prone to contract a severe form of illness due to COVID-19 infection, the benefits of getting vaccinated are more than the risks.

Q. Should people who have completed their treatment for cancer receive the COVID-19 vaccine?

A. Patients who have completed their treatment for cancer should receive the COVID-19 vaccine as soon as it is available to them as long as there are no major allergies.

Q. What does it mean to be immune-compromised?

A. 'Immune compromised' refers to individuals whose immune system is considered weaker, more impaired, or less robust than that of the average healthy adult. The primary role of the immune system is to help fight off infection. Individuals with compromised immune systems are at a higher risk of getting infections, including viral infections such as COVID-19. There are many reasons that a person might be immune-compromised. Health conditions such as cancer, diabetes, or heart disease, older age, or lifestyle choices such as smoking can all contribute to weakened immune systems.

Q. Does receiving chemotherapy or radiation raise your risk of getting COVID-19 or having a more serious course of illness?

A. To date, limited evidence is available to suggest that any cancer treatment raises your risk for getting COVID-19 any more or less than anyone else who is exposed to the virus. There is some evidence that patients with cancer may experience more serious COVID-19 infection if they acquire it, more so because cancer and cancer treatment can contribute to weakened immune systems, which can then lead to a reduced ability to fight off infections. It is not clear at this point if cancer patients who have received chemotherapy or radiation in the past are at increased risk for COVID-19. The risk of infection may depend, in part, on the specific treatment received, the type of cancer treated, and how much time has passed since the treatment was completed.

Q. Should people who are on cancer-directed therapy receive the COVID-19 vaccine?

A. Patients who are on cancer-directed therapy can receive the vaccine after discussing it with their treating oncologist. The oncologist will suggest a suitable time based on the ongoing therapy (surgery, radiation, chemotherapy, immunotherapy, or stem cell transplant). Please inform the treating oncologist if you have had any drug allergies in the past.

Q. Which COVID-19 vaccine is the best for patients with cancer?

A. All the approved vaccines have been shown to be effective. There are no direct comparisons between the available vaccines for efficacy or safety. Therefore, it is suggested that you take any vaccine approved for use and available in your vaccination centre.

Q. Is there any contraindication for the COVID-19 vaccine in patients with cancer?

A. Patients who are allergic to polyethylene glycol (PEG) should not receive the COVID-19 vaccine. Individuals with a known history of polysorbate-80 allergy (used as excipient in certain chemotherapeutic drugs) should not receive COVID-19 vaccine.

Q. Should patients with a previous history of COVID-19 infection be vaccinated?

A. Yes, cancer patients who had been infected and recovered from the illness should also receive the COVID-19 vaccine as it will protect from re-infection.

Q. Should the vaccine be given to patients with positive COVID-19 antibodies?

A. The COVID-19 vaccine should be given to all patients with cancer irrespective of their antibody status. Serological testing should not be used to guide the decision and timing of vaccination.

Q. What are the side effects that may occur after the COVID-19 vaccine?

A. You may expect some minor side effects like soreness of the shoulder (injection site) for a few days after the vaccination. Also, you may have mild fever, tiredness for a day or two after the injection. Serious side effects are extremely rare, but we advise you to consult your doctor in case of any troublesome symptoms.

2. COVID-19: OMICRON Variant

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

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

Q. Why is it called Omicron?

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

Q. How easily does Omicron spread?

A. The Omicron variant is more likely to spread than the original SARS-CoV-2 virus. How quickly Omicron spreads, compared to Delta, is unknown. The CDC expects that anyone infected with

Omicron will be able to spread the virus to others, even if they have been vaccinated or do not have symptoms.

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

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

Q. Should we be concerned about the new VoC?

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

Q. Will Omicron cause more severe illness?

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

Q. What precautions should we take?

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

Q. Will there be a third wave?

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

Q. Will the existing vaccines be effective against Omicron?

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

Q. Why do variants occur?

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

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

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

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

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

A. Previous studies have stated that the Delta variant or other variants can sometimes increase the severity of COVID-19 in cancer patients. COVID-19 has been reported to promote cell senescence and oxidative stress, which is linked to complications of COVID-19 in cancer patients. Additionally, various studies have reported that COVID-19 can cause increased cytokine secretion, which is linked to the aggressiveness of COVID-19. However, more studies are needed to better understand the impact of the Omicron variant in cancer patients.

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

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

Q. How is India responding?

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

3. SARS-CoV-2 surveillance in India

Q. What is INSACOG?

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

Q. What is the objective of INSACOG?

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

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

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

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

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

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

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

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

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

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

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

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

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

Source:

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

4. COVID-19: Delta and Delta Plus variants

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

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

- Random error during replication of virus

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

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

Q. What are variants of interest (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, monitors the genomic variations in SARS-CoV-2 on a regular basis through a pan-India multi-laboratory network. It was set up with 10 national labs in December 2020 and has been expanded to 28 labs and 300 sentinel sites from where genomic samples are collected. The INSACOG hospital network looks at samples and informs INSACOG about the severity, clinical correlation, breakthrough infections and re-infections.

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

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

A. Sample selection is done under three broad categories:

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

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

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

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

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

A. It is not possible to say whether the mutations noticed will increase transmission. Also, until there is scientific evidence that proves a correlation between the rising number of cases and variant proportion, we cannot confirm there is a surge in the particular variant. Once mutations are found, it is analysed every week to find out if there is any such correlation between the surge of cases and variant proportion. Public health action can be taken only if scientific proofs for such correlation are available.

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

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

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

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

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

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

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

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

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

Q. Why is continuous monitoring of mutations important?

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

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

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

Source:

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

5. COVID-19 vaccination for pregnant women

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

A. Pregnancy does not increase the risk to COVID-19 infection. Most pregnant women will be asymptomatic or have mild disease, but their health may deteriorate rapidly and that might

affect the foetus too. It is important that they take all precautions to protect themselves from COVID-19, including taking the vaccination against the same. It is, therefore, advised that a pregnant woman should take the COVID-19 vaccine.

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

A. Higher risk of infection involves with:

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

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

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

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

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

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

A. Pregnant women who are:

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

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

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

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

A. The available COVID-19 vaccines are safe and the vaccination protects pregnant women against COVID-19 like other individuals. Like any medicine a vaccine may have side effects, which are normally mild. After getting the vaccine, she can get mild fever, pain at the injection

site, or feel unwell for 1-3 days. The long-term adverse effects and safety of the vaccine for the foetus and the child born is not established yet. Very rarely, (one in one to five lakh people) the beneficiary may, after the COVID-19 vaccination, experience some of the following symptoms within 20 days after getting the injection, which may need immediate attention.

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

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

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

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

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

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

Source:

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

6. COVID-19 & Children

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

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

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

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

A. In the first wave, primarily the elderly and individuals with co-morbidities were affected with severe disease. In the current (second) wave, a large number of younger population (30-45 years) have developed severe disease as also those without co-morbidities. After the second wave is over, if we do not continue following COVID appropriate behaviour, the third wave, if it occurs, is likely to infect the remaining non-immune individuals and that may include children also. The latest sero survey (December 2020 to January 2021) showed that the percentage of infected children in the age group of 10-17 years was around 25 per cent, the same as adults. This indicates that while children are being infected like adults, they are not getting the severe disease.

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

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

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

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

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

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

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

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

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

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

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

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

above the age of two to five years can be trained to use a mask; however, the adults have to follow the COVID-appropriate behaviour. IAP has also set guidelines for the safe reopening of schools for the safety of the children.

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

Q. What is the plan for vaccinating children?

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

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

Source

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

7. COVID-19 & 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.

8. COVID-19 & Use of oxygen

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 22nd April 2021, moderate and severe cases of COVID-19 where the infection induces shortage of oxygen in the body due to its impact on lungs require medical oxygen and immediate oxygen therapy. Oxygen acts as a life-saver for COVID-19 patients.

Q. What are moderate COVID-19 cases?

A. In moderate COVID-19 cases, a patient has upper respiratory tract symptoms (and/or fever) with shortness of breath. They have a respiration rate more than or equal to 24/minute and 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 set the ventilator to control how often it pushes air into the lungs and how much air the patient gets. The patient may be fitted with a mask to get air from the ventilator into the lungs. Or, they may need a breathing tube if their breathing problem is more serious.

Q. Can mechanical ventilation be given at home?

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

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

A. The six minute walk test (6MWT) is an exercise test that measures functional status in chronic obstructive pulmonary disease (COPD) patients and provides information on oxygen desaturation. This test is also being used for COVID-19. In case of COVID-19 symptoms, 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

9. COVID-19 & Therapeutics

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

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

Q. What is Remdesivir? How does Remdesivir work?

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

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

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

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

Q. Can Remdesivir be taken at home?

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

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

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

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

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

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

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

Q. Is Favipiravir effective in treating COVID-19?

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

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

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

10. COVID-19 & Black Fungus 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

11. COVID-19 & Indoor Air

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

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

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

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

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

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

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

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

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

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

Source:

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

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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 e-Newsletter, focused on the second wave of the pandemic?

1. The overall appearance

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

2. Ease to read and flow of information

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

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

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VOL. V | ISSUE 2

MONTHLY EDITION | JANUARY 2022

COVID-19

Science & Technology Efforts in India

TOGETHER WE CAN AND WE WILL BEAT THE PANDEMIC OUT

For suggestions and feedback, write to us at:
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