VIGYAN PRASAR

26TH AUGUST 2021

FORTNIGHTLY EDITION

COVID-19

Science & Technology Efforts in India

VOL. IV | ISSUE 9

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

DISCLAIMER

Contents in this e-Newsletter are for information purposes only and have been made available in public by the relevant department/organisation.

In case of any variance between what has been stated and that contained in the relevant document, the latter shall prevail.

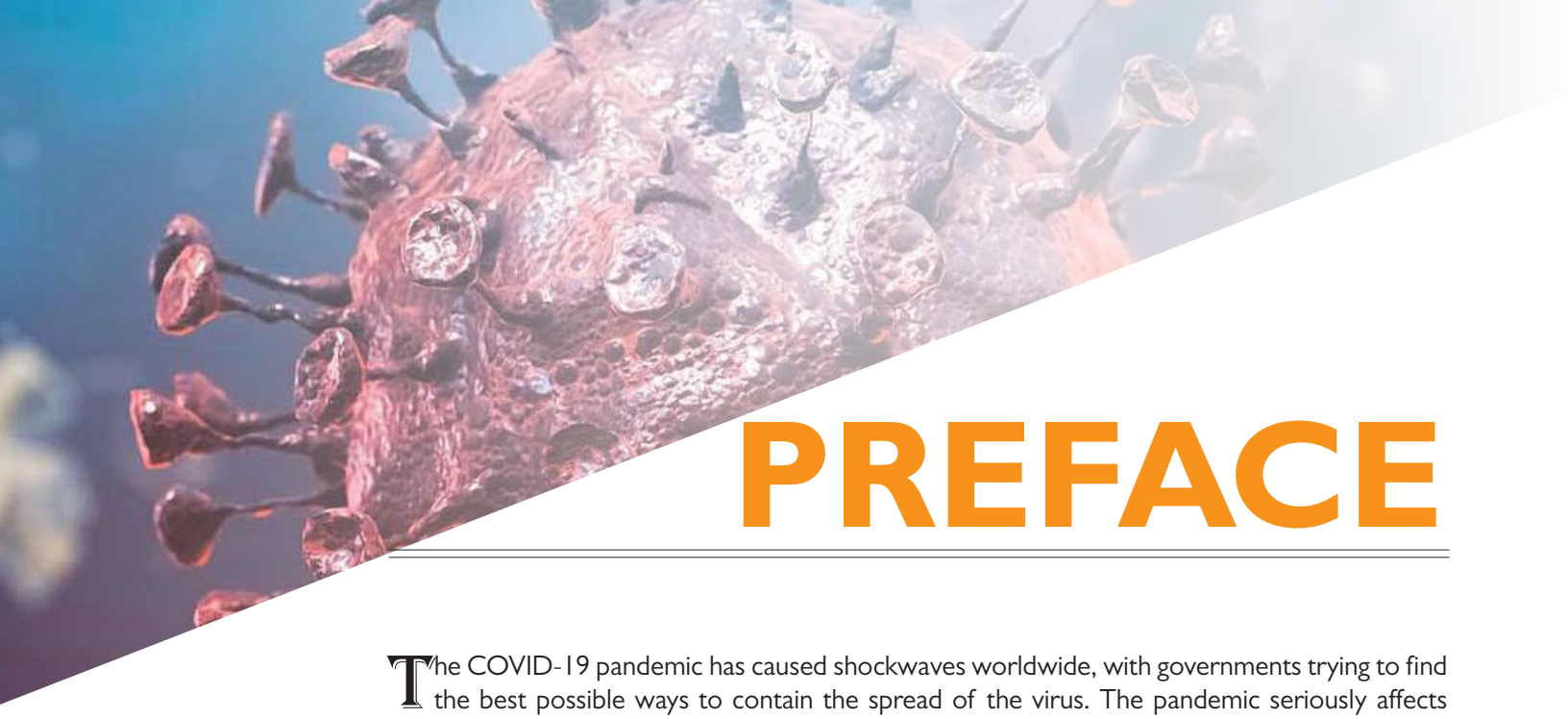
Unless otherwise specifically stated, the information contained herein is made available to the public for information purposes only.

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

This will depend on the availability of the same.

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

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



PREFACE

The COVID-19 pandemic has caused shockwaves worldwide, with governments trying to find the best possible ways to contain the spread of the virus. The pandemic seriously affects life in all countries and causes changes that are likely to be permanent in the long term. For example, the regular delivery of education and training has been impacted dramatically. There is an urgent need to reinforce the ability of educational institutions and schools to provide effective online teaching. Effective communication of these strategies to society is 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 COVID pandemic with a lot of resilience and grit. A very encouraging and precise trend is now visible as the positivity rate is declining rapidly.

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

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

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

26 August 2021

Vigyan Prasar

New Delhi

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

INDEX

1

EFFORTS IMPACTING COVID MITIGATION

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

SECTION GUIDELINES

First nasal vaccine developed by Bharat Biotech supported by DBT-BIRAC gets nod of regulator for phase-2 trial

Brazil, Russia, India, and South Africa to study the intersection of COVID-19 and tuberculosis pandemics

Ministry of Education releases guidelines for out of school children and mitigation of loss of learning

Ministry of Education issues guidelines for parent participation in home-based learning during school closure and beyond

Ministry of Education releases guidelines for the development of e-content for children with disabilities

PRAGYATA: Guidelines on digital education announced by HRD Ministry

SAFAL: Structured assessment for analyzing learning

Ministry of Education releases guidelines for health and safety protocols for reopening of schools and learning with physical and social distancing

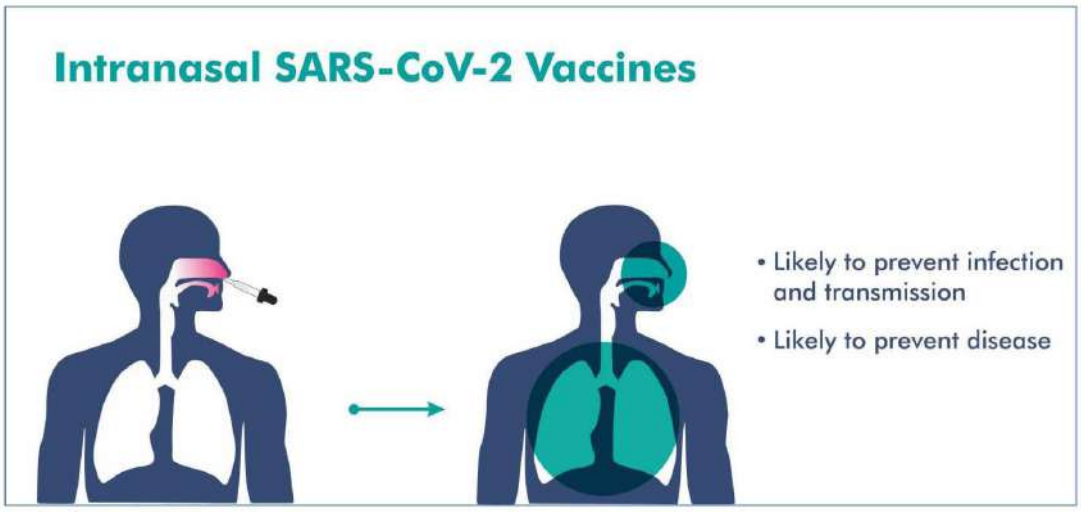
ICMR practices the principles of access to COVID-19 data

ICMR develops a web portal for locations of COVID-19 testing labs

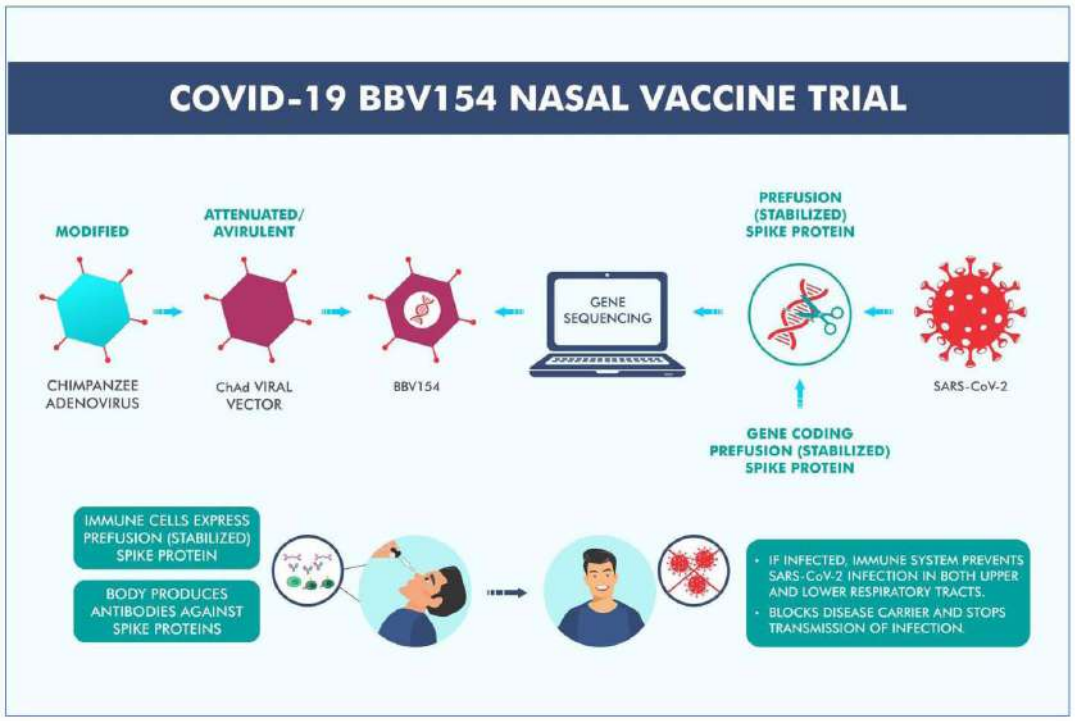
ICMR invites expression of interest for validation of rapid antigen detection assays for COVID-19

First nasal vaccine developed by Bharat Biotech supported by DBT-BIRAC gets nod of regulator for phase-2 trial

The Department of Biotechnology (DBT) and its PSU, Biotechnology Industry Research Assistance Council (BIRAC), have been at the forefront in the fight against the prevailing global crisis. They together have strategised to fast-track R&D efforts especially for vaccine development, diagnostics, drug repurposing, therapeutics and testing. The development of vaccines has been the top priority of DBT.



This Mission COVID Suraksha was launched to reinforce and accelerate COVID-19 vaccine development efforts as part of the third stimulus package, *Atmanirbhar* 3.0. The focus of the mission is to consolidate and streamline available resources towards accelerated vaccine



development to bring safe, efficacious, affordable and accessible COVID-19 vaccine to the citizens at the earliest with a focus on *Atmanirbhar Bharat*.

Bharat Biotech's intranasal vaccine is the first nasal vaccine that has received the regulatory approval for phase-2 trials. This is the first of its kind COVID-19 jab to undergo human clinical trials in India. BBV154 is an intranasal replication-deficient chimpanzee adenovirus SARS-CoV-2 vectored vaccine. BBIL has in-licensed technology from Washington University in St Louis, USA.

Phase-1 clinical trial has been completed in age groups ranging ≥18 to ≤60 years. The company reports that the doses of the vaccine administered to healthy volunteers in the phase-1 clinical trial, has been well tolerated. No serious adverse events have been reported. Previously, the vaccine was found to be safe, immunogenic and well tolerated in the pre-clinical toxicity studies. The vaccine was able to elicit high level of neutralising antibodies in animal studies.

The regulatory approval has been received for conducting 'a phase-2 randomised, multi-centric, clinical trial of heterologous prime-boost combination of SARS-CoV-2 vaccines to evaluate the immunogenicity and safety of BBV152 (COVAXIN®) with BBV154 (adenoviral intranasal COVID-19 vaccine) in healthy volunteers'.

Website link:

https://dbtindia.gov.in/pressrelease/first-nasal-vaccine-developed-bharat-biotech-supported-dbt-birac-gets-nod-regulator

Brazil, Russia, India, and South Africa to study the intersection of COVID-19 and tuberculosis pandemics

A consortium of doctors and researchers from India, Brazil, Russia, and South Africa have, partnered to conduct a study on the epidemiological impact and intersection of COVID-19 and tuberculosis pandemics in these countries.

Under this joint research, the teams from these countries will explore the negative impact of COVID-19 pandemic on the epidemiological characteristics of TB infection and search for mechanisms responsible for the interaction of these two processes. They will also search for strategies to mitigate the negative consequences of the pandemic and develop individual recommendations for each participating country, which can help overcome the impact of the epidemic of respiratory viral diseases on the epidemic of tuberculosis.

Brazil, Russia, India, and South Africa currently rank second to fifth in the number of cases of COVID-19 and belong to 24 countries recognised by World Health Organization (WHO) with the highest burden of tuberculosis in the world. Moreover, BRICS countries have the largest number of cases of drug-resistant tuberculosis. Hence, the research will be conducted in these four BRICS countries where one of the highest-burden rates of both COVID-19 and tuberculosis has been recorded simultaneously.

This research supported by the Department of Science and Technology (DST) is being led by Prof Urvashi B Singh from All India Institute of Medical Sciences, New Delhi, India, along with Dr KS Sachdeva, Regional Director, South East Asia, International Union Against TB and Lung Diseases, Dr Mandal, Deputy Director-General, and Dr Sanjay Mattoo from National TB Elimination Program, India and Dr Randeep Guleria, Director, AIIMS, New Delhi among others

from the Indian side. The leaders from the other countries include Dr Anete Trajman, State University of Rio de Janeiro, Social Medicine Institute, Brazil, Dr Irina G Felker, Novosibirsk Tuberculosis Research Institute, Department of the Tuberculosis Epidemiology, Novosibirsk, Russia, and Prof Anneke Hesseling, Desmond Tutu TB Centre Department of Pediatrics and Child Health, Stellenbosch University, South Africa.

Website link:

https://dst.gov.in/brazil-russia-india-and-south-africa-study-intersection-covid-19-and-tuberculosis-pandemics

Ministry of Education releases guidelines for out of school children and mitigation of loss of learning

The COVID-19 pandemic has caused an unprecedented public health emergency, affecting almost all countries and territories globally. The pandemic has led to severe disruptions in normal life, including closure of schools.

To mitigate the impact of the pandemic, schools will not only have to remodel and reimagine the way teaching and learning have happened so far, but will also need to introduce a suitable method of delivering quality education through a healthy mix of schooling at home and at school.

The department has taken several initiatives in 2020-21 to ensure that the schoolgoing students don't lag behind in their studies during the COVID-19 pandemic.

Website link:

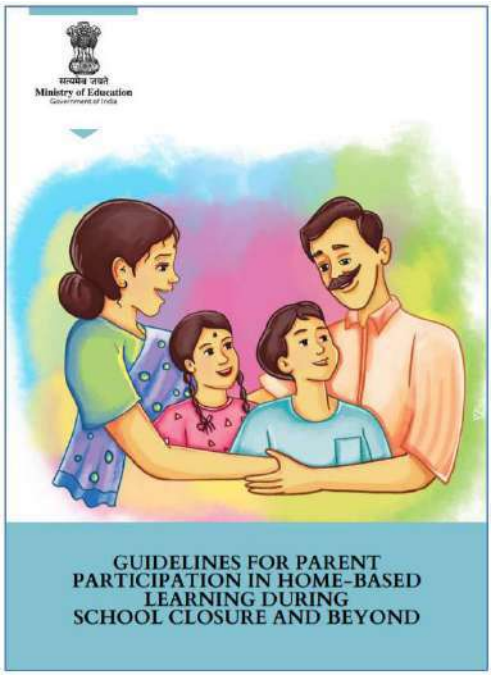
https://www.education.gov.in/sites/upload_files/mhrd/files/Covid_Action_Plan.pdf

Ministry of Education issues guidelines for parent participation in home-based learning during school closure and beyond

The Department of School Education and Literacy (DoSEL), Ministry of Education (MoE) has released 'Guidelines for Parent Participation in Home-based Learning during School Closure and Beyond'.

The guidelines on home-based learning emphasise on the need for parents to create a safe, engaging and a positive learning environment, have realistic expectations from the child, take care of health and eat healthy, while also having fun with children. These guidelines are not only meant for parents but also for caregivers, other family members, grandparents, community members, and older siblings who are all engaged in promoting the welfare of children.

The guidelines provide many simple tips for parents and others to make home-based learning easy for children. These suggestive activities are in accordance with the various stages of school education as per National Education Policy (NEP) 2020. Age-appropriate art activities have been categorised on the basis of 5+3+3+4 system via Foundation Stage (3-8 years); Preparatory Stage (8-11 years); Middle Stage (11-14 years); and Secondary Stage (adolescent to adult 14-18 years). The activities are simple and suggestive, which can be adapted and adopted to local needs and contexts. The guidelines appreciate the role of art as a therapy for children under stress or trauma.



The guidelines lays significance on improving children's learning by monitoring and addressing their learning gaps. Collaboration of parents with teachers in documenting and reflecting on the progress that children are making in their learning is important for both teachers and parents.

The guidelines also advise the schools to involve parents by providing information and ideas on how to help students at home with homework and other curriculum-related activities, decisions, and planning, and involve them in school decisions. Resources like sending newsletters, emails, memos, etc. may be provided to parents.

Resources have been made available to children with special needs, which may be explored by the parents. In this regard, they can approach the teachers for guidance. There are other agencies and organisations that provide information about such avenues that could be sought from SMCs/gram panchayat, school administrators, etc.

A separate chapter has been included in the guidelines for supporting parents with low/no literacy. Schools, teachers and volunteers may take suggestive steps to provide support to such parents.

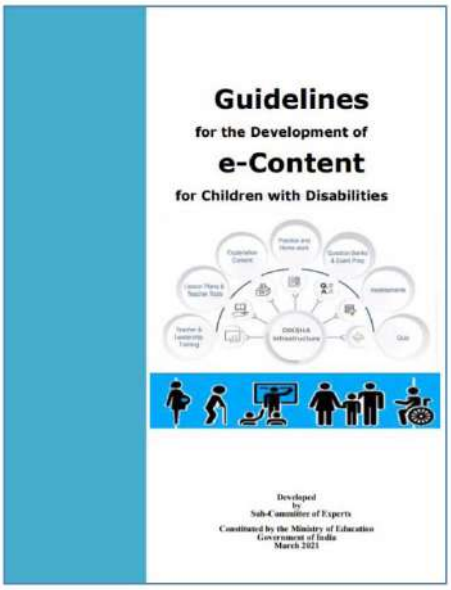
Website link:

https://www.education.gov.in/sites/upload_files/mhrd/files/MoE_Home_Learning_Guidelines.pdf

Ministry of Education releases guidelines for the development of e-content for children with disabilities

For the first time, an attempt has been made to prepare guidelines for children with disabilities (CwD), also referred to as Children with Special Needs (CWSN), so that the goal of inclusive education is fulfilled. A Committee of the Ministry of Education (MoE) submitted a report titled 'Guidelines for the Development of e-Content for Children with Disabilities' comprising 11 sections and two appendices.

The salient highlights of the guidelines in the report are:



- e-Content for CwDs should be developed based on four principles: perceivable, operable, understandable and robust.
- e-Content including text, tables, diagrams, visuals, audios, videos, etc. should comply with accessibility standards: national standards (GIGW 2.0) and international standards (WCAG 2.1, E-Pub, DAISY, etc).
- Distribution platforms, on which content is uploaded (e.g. DIKSHA), and reading platforms / devices on which content is accessed and interacted (e.g. e-pathshala), must comply with technical standards.
- Reasonable pedagogical accommodations have been recommended to meet the specific needs of CwDs.
- The technical standards and guidelines have been detailed in Section 4 of the report.

The Committee has also recommended that textbooks may be adapted into accessible digital textbooks (ADTs), in a phased manner. The content of ADTs should be provided in multiple formats (text, audio, video, sign language, etc) with turn-on and turn-off features. Further ADTs should provide flexibility to CwDs to respond to its content / exercises in multiple ways. The detailed guidelines for developing ADTs along with existing international and national experience, in the development of prototypes, including NCERT's 'Barkha: A Reading Series for All' (in print and digital forms), 'Accessible Textbooks for All' and UNICEF's 'Accessible Digital Textbooks using Universal Design for Learning' (for learners with and without disabilities), have been presented in Section 5 of the report.

- In addition to ADTs, in Sections 6 to 9 the Committee has recommended specific guidelines for the development of supplementary e-content as per 21 disabilities specified in the RPWD Act 2016 for students having intellectual and developmental disabilities, multiple disabilities, autism spectrum disorders, specific learning disabilities, blindness, low vision, deafness and hard of hearing and others.
- A summary of the recommendations has been presented in Section 10 of the report for sharing widely with content creators, content designers, developers, publishers.
- The implementation roadmap along with the suggestions to strengthen compliance to the accessibility guidelines have been presented in Section 11 of the report.
- Comprehensive guidelines and technical standards for the production of sign language videos have been provided at Appendix-1 of the report.
- Universal Design for Learning (UDL) guidelines for content development and pedagogical accommodations are given in Appendix 2 of the report.

These guidelines will initiate the creation of high quality content for digital education to children with special needs. They are dynamic in nature, and should be improved based on experience and advent of better technology.

Website link:

https://www.education.gov.in/sites/upload_files/mhrd/files/CWSN_E-Content_guidelines.pdf

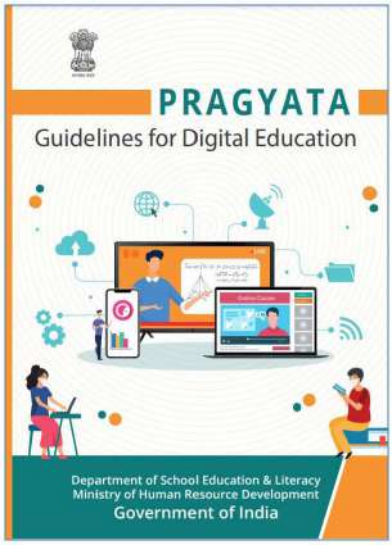
PRAGYATA: Guidelines on digital education announced by HRD Ministry

The Human Resource and Development (HRD) Ministry has announced guidelines for online classes, operationalised by schools amid the COVID pandemic.

PRAGYATA guidelines have been developed from the perspective of learners, with a focus on online, digital education for students who are presently at home due to lockdown. These guidelines on digital education provide a roadmap to carry forward online education to enhance the quality of education.

The guidelines will be relevant and useful for a diverse set of stakeholders including school heads, teachers, parents, and teacher educators. They will also stress upon the use of the alternative academic calendar of NCERT, for both, learners having access to digital devices and learners having limited or no access.

The PRAGYATA guidelines include eight steps of digital learning – Plan, Review, Arrange, Guide, Yak (talk), Assign, Track, and Appreciate. These steps guide the planning and implementation of digital education step-by-step with examples. The guidelines also emphasise the need to unify all efforts related to digital, online education, benefitting schoolgoing children across the country.



Website link:

https://www.education.gov.in/sites/upload_files/mhrd/files/pragyata-guidelines_0.pdf

SAFAL: Structured assessment for analyzing learning

Structured Assessment for Analyzing Learning (SAFAL) levels, is an assessment that ensures the progress of students throughout the school years. It provides diagnostic information about students' learning to schools and thus, supports school education to move towards competency-based education. The results of this assessment are largely used to provide development feedback to schools and not for the promotion of students to the next grade. The CBSE board is working towards it and invites all schools to participate in SAFAL in 2021-22.

SAFAL results will provide diagnostic data and insights to each school for promoting development of students.

SAFAL establishes a formal protocol to collect valid and reliable data to chart students' performance on competencies at and below the grade level and monitor progress. It can report school-level performance on key competencies and proficiency levels, and be used to measure effectiveness of a system through systematic monitoring and reporting of learning levels. School management and school systems (e.g. Kendriya Vidyalaya Sangathan, Navodaya Vidyalaya Samiti, state government schools affiliated to CBSE board, etc.) can use this data to target academic support and data-based management. SAFAL will provide a reliable and comparable 'absolute' measure of learning for parents, schools and state officials to assess school performance on core concepts.

Website link:

http://cbseacademic.nic.in/web_material/Manuals/Safal_handbook.pdf

Ministry of Education releases guidelines for health and safety protocols for reopening of schools and learning with physical and social distancing

The DoSEL, MoE has issued standard operating procedures (SOPs)/guidelines for reopening of schools in a graded manner, for which the state/UT governments may take a decision in consultation with the respective school/institution management, based on their assessment of the situation and subject to the following conditions:

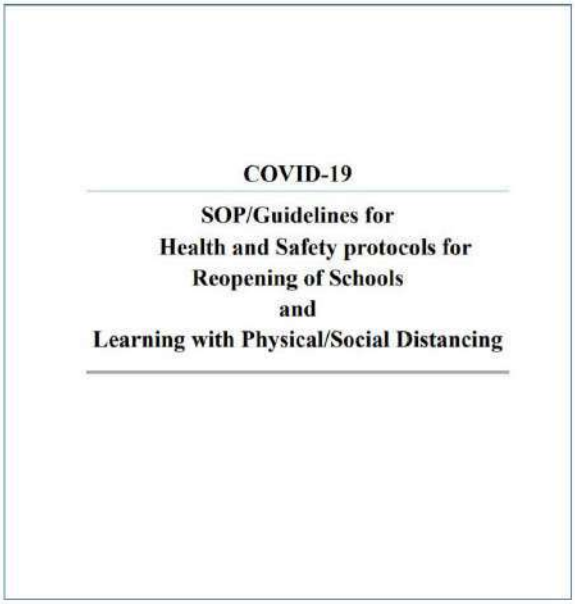
a. Online/distance learning will continue to be the preferred mode of teaching and will be encouraged.

b. If schools are conducting online classes, and some students prefer to attend them rather than physically attend school, they may be permitted to do so.

c. Students can attend schools/institutions only with the written consent of parents.

d. Attendance must not be enforced, and must depend entirely on parental consent.

e. States/UTs will prepare their own SOPs regarding health and safety precautions for reopening of schools/institutions based on SOPs to be issued by DoSEL), MoE, Government of India, keeping local requirements in view.



COVID-19

SOP/Guidelines for
Health and Safety protocols for
Reopening of Schools
and
Learning with Physical/Social Distancing

f. Schools that are allowed to open will have to mandatorily follow the SOPs issued by education departments of states/UTs prepared as above.

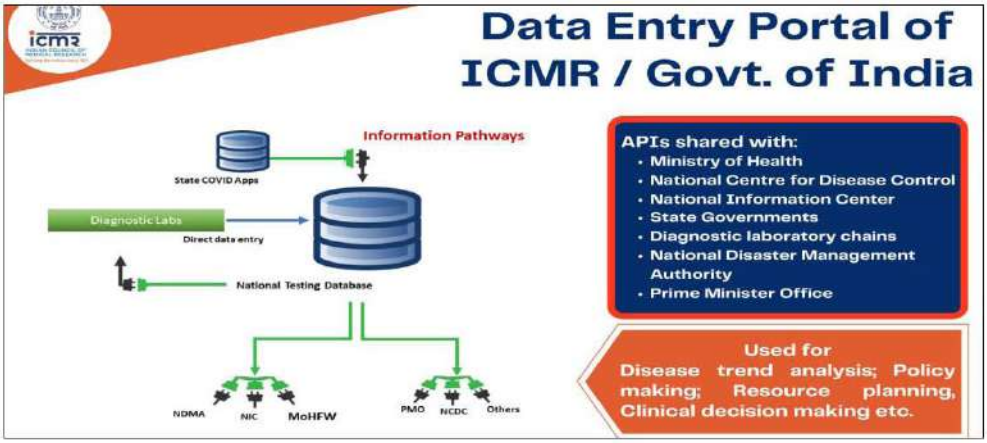
Website link:

https://www.education.gov.in/sites/upload_files/mhrd/files/SOP_Guidelines_for_reopening_schools.pdf

ICMR practices the principles of access to COVID-19 data

ICMR hosts the data entry portal of COVID-19 testing. This data entry portal is used for disease trend analysis, policymaking, resource planning, clinical decision making, etc.

MoHFW captures hospital capacity, clinical or mortality-related information. All ICMR testing data is accessible to various central and state government agencies. ICMR data are linked with limited personal identifiers of patients. In the interest of patient confidentiality, anonymised data access is used. Request for data access is reviewed through a well laid out and systematic process.



Website link:

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

ICMR develops a web portal for locations of COVID-19 testing labs

ICMR has established various COVID-19 testing labs in India to check blood samples for COVID-19 virus. ICMR has developed a website to depict these labs. On this website, information about various government and private labs has been given along with their locations.

Website link:

https://covid.icmr.org.in/map/map.html

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

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

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

Deadline: Open till next announcement

Contact info:

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

Website link:

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

***

2

RESEARCH SUPPORTS

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

SECTION GUIDELINES

An easy method for developing fusion enabled SARS-CoV-2 virus fusion mimic (SCFM), by bypassing the need for biosafety level facility

A peptide derived synthetic scaffold protein, being developed by instem, to target SARS-CoV-2 entry into host cells

CIAB studying natural garlic essential oil as potential inhibitors of relevant proteins for treatment of COVID-19

RGCB, Thiruvananthapuram considering a rapid approach to generate immortalised B cells for monoclonal antibody generation from SARS-CoV-2 recovered and vaccinated people

NCCS is developing therapeutics using machine learning for COVID-19

Identification of therapeutic potential of natural plant products for the prevention of SARS-CoV-2 by NIPGR

NII working on a novel vaccine evaluation platform to support SARS-CoV-2 vaccine development in resource-limiting settings

An open label prospective interventional study to assess the prophylactic effect of Guduchi Ghan Vati in COVID-19: A community-based study by Ministry of AYUSH

Study on the effect of Chyavanprash Lehyam as a prophylactic measure among high risk population exposed to COVID-19

Impact of Ayurvedic intervention (Guduchi Ghan Vati) in prevention of COVID-19 infection in containment areas of Himachal Pradesh: A community-based study

The efficacy of Siddha medicine, Kabasura Kudineer (KSK) compared to Vitamin C and zinc (CZ) supplement in the management of asymptomatic COVID-19 cases: A structured study protocol for a randomised controlled trial

In silico computational screening of Kabasura Kudineer, official Siddha formulation and JACOM, against SARS-CoV-2 spike protein

An easy method for developing fusion enabled SARS-CoV-2 virus fusion mimic (SCFM), by bypassing the need for biosafety level facility

NIAB is working on the highly infective nature of SARS-CoV-2 that restricts experimentation with the virus to biosafety level (BSL3) facilities only. Fusion-enabled, non-replicating, non-biohazardous mimics of SARS-CoV-2 virus fusion were generated, where viral S or S&M protein is expressed on mammalian cells. They can be used as a valuable substitute for studying viral fusion (with lung cells) for testing the efficacy of various inhibitors/therapeutics.

The tools and assays thereof can reduce the time of screening new antiviral agents. Assays can be developed to evaluate the extent of responses elicited by vaccinated or immune individuals, helping do such analyses without the need for cumbersome BSL3 facilities.

Contact info:

Subeer S Majumdar (subeer@niab.org.in),
Nirmalya Ganguli (ganguli@niab.org.in)

A peptide derived synthetic scaffold protein, being developed by instem, to target SARS-CoV-2 entry into host cells

Preventing the interaction between viral surface proteins and receptors at the host cell membrane is an attractive therapeutic target, that is, spike protein interaction with the ACE2 receptor in SARS-CoV-2. Identifying protein binders or nano-bodies against spike protein and characterising them will be a significant step in stopping infection.

A peptide derived synthetic scaffold protein with a strong affinity binder/nano-body will potentially neutralise the SARS-CoV-2 virus, thus potentially aiding in prophylactic measures. The research has the potential to produce critical molecules in our fight against SARS-CoV-2. The initiative is implemented at Institute for Stem Cell Science and Regenerative Medicine (inStem), an autonomous institute of Department of Biotechnology (DBT).

Contact info:

Minhaj Sirajuddin (minhaj@instem.res.in)

CIAB studying natural garlic essential oil as potential inhibitors of relevant proteins for treatment of COVID-19

A full investigation of garlic essential oil with respect to its qualitative compositional analysis and biological activity (in vitro and in vivo assays) against the ACE2 protein and the main protease PDB6LU7 of SARS-CoV-2 were carried out by researchers from CIAB.

Characterisation of garlic essential oil, including its component, refractive index, viscosity and density is essential for a conclusive study. End-use related studies are also essential for its educative use/consumption in the management of COVID-19 patients. This study may open

the door to using essential garlic oil to discover and treat SARS-CoV-2 to prevent the current pandemic. The initiative is implemented at Center of Innovative and Applied Bioprocessing (CIAB), an autonomous institute of Department of Biotechnology (DBT).

Contact info:

Dr Bhuwan Bhushan Mishra (bhuwan@ciab.res.in)

RGCB, Thiruvananthapuram considering a rapid approach to generate immortalised B cells for monoclonal antibody generation from SARS-CoV-2 recovered and vaccinated people

Studies done at RGCB have demonstrated that ectopically expressed BCL6 and Bcl-xL synergise with CD40L and IL-21 to increase the proliferative lifespan of B cells in vitro. This approach has been envisioned as an alternate for generating monoclonal antibody-producing cells like fusion with immortalised cells and Epstein Bar Virus infections approach. It is proposed to identify a subset of COVID-19 recovered patients and immunised volunteers with high titer neutralising antibodies for the *in vitro* B cell immortalisation for neutralising antibody generation.

Contact info:

Dr TR Santhosh Kumar (trsanthosh@rgcb.res.in)

NCCS is developing therapeutics using machine learning for COVID-19

National Centre for Cell Science (NCCS) is studying computational prediction for COVID-19 mitigation using machine learning (ML) methods that can expedite and facilitate potential prospects with therapeutic effects. Machine learning algorithms were used to select diverse viral sequences of COVID-19 reported from India and other countries. Four peptides were identified, showing binding affinity against the main protease of SARS-CoV-2 (Mpro). Simulation studies suggest that the peptides are stable. If found effective, these peptides may help develop therapeutics for COVID-19.

Contact info:

Dr Shailza Singh (singhs@nccs.res.in)

Identification of therapeutic potential of natural plant products for the prevention of SARS-CoV-2 by NIPGR

Researchers from National Institute of Plant Genome Research (NIPGR) are working on Glucosinolate derived isothiocyanates (ITC) from cruciferous vegetables, which have been studied extensively in cells and animals for their preventive and therapeutic effects. Sulforaphane (SFN), the significant ITC present in Broccoli, has been well-recognised as an antioxidant, antitumour compound and potent immune modulator against the attack of microbes. There are also indications that glucosinolate-derived ITCs have antiviral activity. The research, being done at NIPGR aims to test the efficacy of one particular glucosinolate derived isothiocyanate as an antiviral against COVID-19 and produce it cheaply from plants.

Contact info:

Dr Naveen C Bisht (ncbisht@nipgr.ac.in)

NII working on a novel vaccine evaluation platform to support SARS-CoV-2 vaccine development in resource-limiting settings

Researchers from NII attempt to develop a platform for vaccine evaluation in resource-limiting settings. Here, the advanced knowledge from vaccine immunology will be applied to develop an animal model for vaccine evaluation. For antibody neutralisation assays and challenge experiments in the routine BSL-2 facilities, SARS-CoV-2 pseudovirus system is being developed against both the parental strain and variants of concerns.

The major outcome of this research will be the knowledge on an animal model for pre-clinical vaccine evaluation and the tools for vaccine efficacy assessment like SARS-CoV-2 pseudovirus and Tfh-tetramer. The research outcome will be highly beneficial by proving the animal model and research tools for vaccine efficacy assessment in the BSL-2 settings. The research initiative is being supported by DBT-BIRAC COVID-19 research consortium.

Contact info:

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

An open label prospective interventional study to assess the prophylactic effect of Guduchi Ghan Vati in COVID-19: A community-based study by Ministry of AYUSH

Guduchi Ghan Vati/Sudarshan Ghan Vati was administered as a prophylactic measure among high-risk populations (healthcare workers/containment zone population) in 19 cities through 15 CCRAS institutes across the country. The total participants were 20,000 in the trial group and 10,000 in the control group. A criterion for assessment was the Immune Status Questionnaire (ISQ) score.

Considering that COVID-19 requires a structured approach covering preventive care – management at home in the early stages of the confirmed disease as well as hospital care for moderately and critically ill patients – the capacity of the AYUSH sector must be harnessed to ensure optimal use of the scarce healthcare resources available in the country.

The study depicted the better immune status of the participants in the Ayurveda intervention group and has generated evidence-based data for preventive measure in COVID-19.

Contact info:

mkchagamreddy@gmail.com; sandiprbaheti@gmail.com

Study on the effect of Chyavanprash Lehyam as a prophylactic measure among high risk population exposed to COVID-19

COVID-19 occurs after exposure to severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). For persons at high risk of exposure, the standard of care is personal protection from getting infected.

An open label randomised controlled trial was conducted among 500 high risk populations (healthcare workers/containment zone population) exposed to COVID-19 in Hyderabad, where Chyavanprash Lehyam was administered as a prophylactic measure. Immune Status Questionnaire (ISQ) and WHO quality of life scale were used as criteria for assessment.

The positivity rate of COVID-19 was less in the Ayurveda intervention group. Good improvement was recorded in immune status and quality of life in the Ayurveda intervention group.

Contact info:

prasadpeyyala@yahoo.co.in

Impact of Ayurvedic intervention (Guduchi Ghan Vati) in prevention of COVID-19 infection in containment areas of Himachal Pradesh: A community-based study

The outbreak of SARS-CoV-2 is *Janapadoddhwamsa Vikara* (epidemic disease) in Ayurveda, where *rasayana* drugs (immunomodulators or rejuvenating therapy) have been advocated for controlling the diseases. Therefore, Guduchi Ghan Vati, a plant containing the drug Guduchi (*Tinospora cordifolia*), is selected to prevent COVID-19 and to learn of the efficacy and safety of Ayurvedic intervention, i.e. Guduchi Ghan Vati, in preventing COVID-19 infection among the community of containment areas.

It is an open label, prospective, non-randomised, community-based interventional study, carried out by the Ministry of AYUSH, from 6 May to 23 June 2020, in a containment zone of Bijhari area, district Hamirpur, Himachal Pradesh. Guduchi Ghan Vati was provided to the community in 500 mg twice a day with lukewarm water on an empty stomach for 30 days. The demographic and health-related data and follow up of the same subjects was done on the 30th day through telephonic interviews using the e-format.

A total of 1165 participants' data were analysed to assess the efficacy and safety of Guduchi Ghan Vati. In the sample, 97.6 per cent participants had no systemic disorders till the 30 days of follow up. None of the COVID-19 positive patients were admitted to the hospital or required ventilation or had any serious complications.

Ayurvedic intervention (Guduchi Ghan Vati) was safe and effective as a prophylactic measure for COVID-19 infection. This intervention helped improve physical and psychological well-being with minimal adverse drug reaction/adverse effects.

Contact info:

drvineetanegi@gmail.com

The efficacy of *Siddha* medicine, Kabasura Kudineer (KSK) compared to Vitamin C and zinc (CZ) supplement in the management of asymptomatic COVID-19 cases: A structured study protocol for a randomised controlled trial

A team of researchers led by Dr K Kanakavalli from the Central Council for Research in Siddha (CCRS), Ministry of AYUSH has determined the efficacy of *Siddha* medicine, Kabasura Kudineer, in reducing SARS-CoV-2 viral load and reducing the onset of symptoms in asymptomatic COVID-19 when compared to Vitamin C and zinc (CZ) supplement. In addition, the trial examines the changes in the immunological markers of the *Siddha* medicine against control. The trial evaluates the safety of the *Siddha* medicine and documents the clinical profile of asymptomatic COVID-19 as per the principles of the *Siddha* system of medicine.

The study shows that there was a significant reduction of viral load (ct value): 66.7 per cent of negative conversion in the study group (Kabasura Kudineer) compared to the control (vitamin C and zinc). There was no incidence of symptoms like fever, cough and breathlessness in both groups during the study period. No adverse events were reported in both the groups.

Contact info:

dgccrs@gmail.com

Website link:

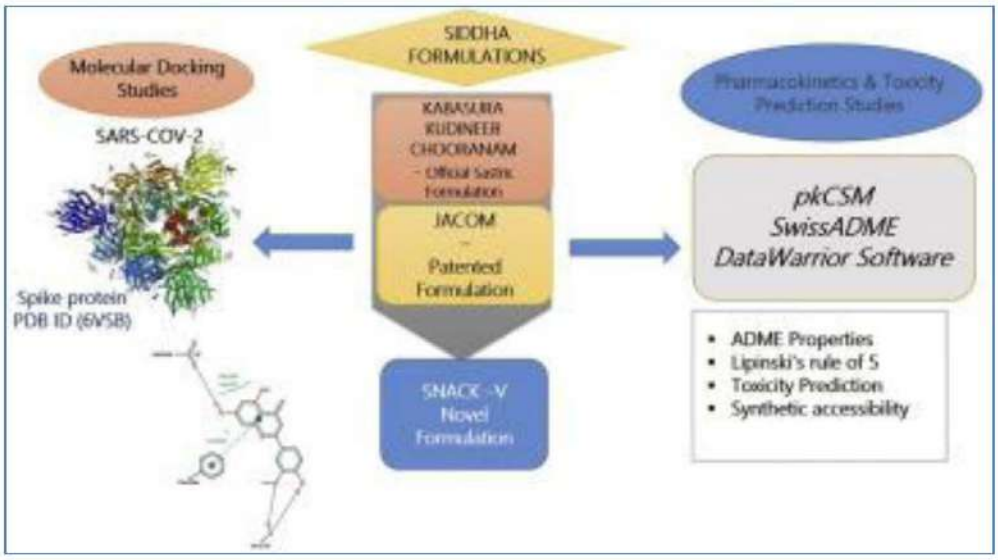
https://rdcu.be/b9jr8

In silico computational screening of Kabasura Kudineer, official *Siddha* formulation and JACOM, against SARS-CoV-2 spike protein

Siddha medicine is a valuable therapeutic choice classically used for treating viral respiratory infections. This principle of medicine is proven to contain antiviral compounds. The study aims to execute the in silico computational studies of phytoconstituents of *Siddha* official formulation Kabasura Kudineer and novel herbal preparation, JACOM, which are commonly used in treating viral fever respiratory infectious diseases and could be effective against the ongoing pandemic novel coronavirus disease, SARS-CoV-2.

Molecular docking studies for phytoconstituents of *Siddha* official formulation Kabasura Kudineer are used in treating viral fever and respiratory diseases and a novel herbal preparation, JACOM, against SARS-CoV-2 spike protein. Further, we also conducted prediction studies on the pharmacokinetics (ADME) properties and the safety profile to identify the best drug candidates using pkCSM and SwissADME web servers.

The nine phytoconstituents have the highest binding affinity with spike protein. This bitter tasting herbal formula increases *pittam* and expels *kapham* for their immunomodulation properties, expectorant and antipyretic.



Contact info:

ms.shreedevi@gov.in

Website link:

https://www.sciencedirect.com/science/article/pii/S0975947620300243

***

3

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

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

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

Press Information Bureau releases daily bulletin on COVID-19

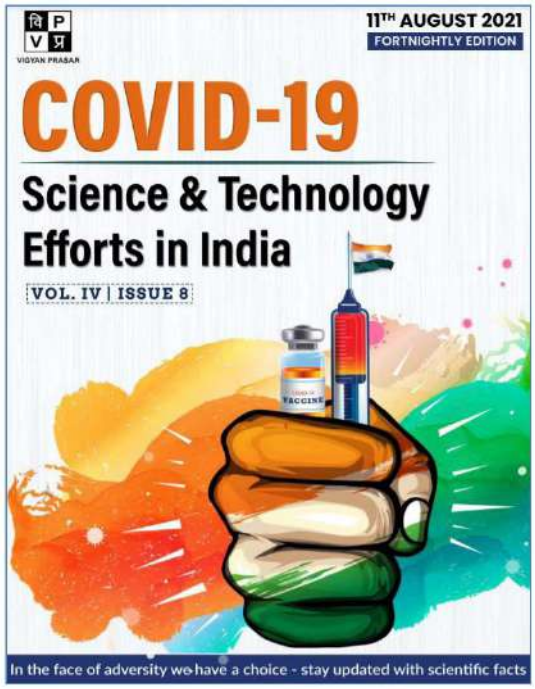
Government of India presents a regular COVID-19 India factsheet and immunisation programme

Outreach initiatives by India Science Channel

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

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

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 11 August 2021.

Contact info:

covidnewsletter@vigyanprasar.gov.in

Website link:

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

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

The India Science, Technology and Innovation Portal (ISTI) is a one-stop window for information about developments in India on science, technology, and innovation. The vision is to provide a single-window source of information on a web portal about all data related to the Indian STI

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

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

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

Contact info:

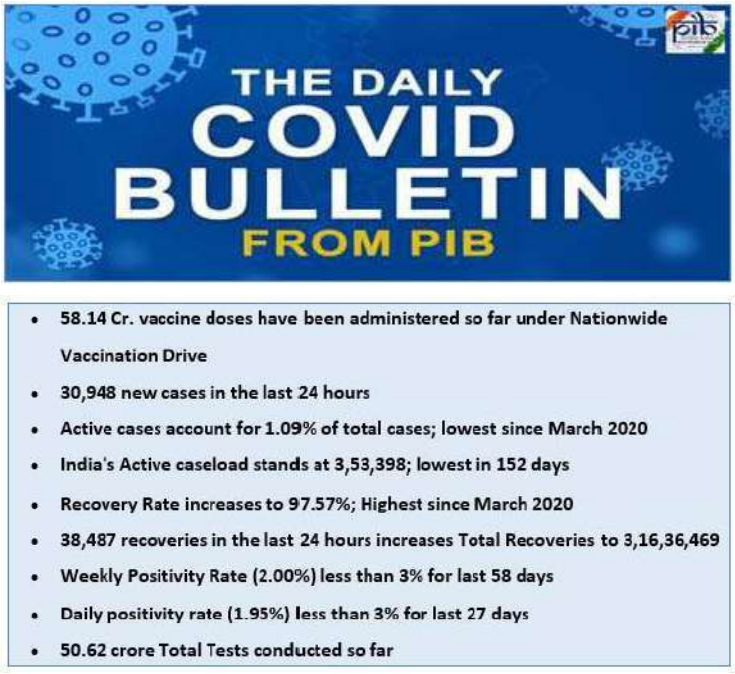
kdgm@vigyanprasar.gov.in

Website link:

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

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19, starting from the early days of the COVID-19 outbreak. The bulletin contains press releases concerning COVID-19, issued in the last 24 hours, inputs from PIB field offices, and fact checks undertaken by PIB. These bulletins are published in 14 languages: Hindi, English, Urdu, Marathi, Telugu, Tamil, Punjabi, Bangla, Kannada, Oriya, Gujarati, Assamese, Malayalam and Manipuri. The following data points are released on 22 August 2021.



Website link:

https://pib.gov.in/PressReleseDetailm.aspx?PRID=1748000

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 58 crore vaccine doses (58,25,49,595) to States/UTs.

India's coronavirus cases have crossed three crores, and as of 23 August 2021, 08:00 AM, it stands at 3,24,49,306 cases, of which 3,16,80,626 have recovered. The recovery rate stands at 97.63 per cent while the case fatality rate stands at 1.34 per cent.

Website link:

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

Outreach initiatives by India Science Channel

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

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

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

1. Weekly COVID-19 video bulletin: Produced in both Hindi and English on a weekly basis from 7 July 2020, COVID-19 bulletin apprises the audience about the latest developments happening in the S&T scenario in India that are helping in managing and overcoming the challenges thrown up by the pandemic. Vigyan Prasar produced a daily COVID-19 bulletin from 11 April to 6 July 2020. Thereafter, a weekly bulletin is being produced, which provides details about the most important S&T updates from the country related to COVID-19. From January 2021 onwards the COVID-19 bulletin carried news about the vaccination drive initiated by the Government of India.

2. COVID-19 Explained: Short films to explain the important research findings related to COVID-19 and COVID-19 vaccination in layman's language are produced on a weekly basis. The topics chosen for COVID-19 Explained cater to the curiosity of the common man towards COVID-19.

3. Facebook live sessions on interviews of various stakeholders on COVID-19 vaccination programme.

4. Facebook and India Science live sessions on interviews with experts on COVID-19 vaccination.

5. Live phone in programme: A live phone in programme on COVID-19 vaccination is telecast from India Science on every Monday and Tuesday. Experts from the field give answers to the questions related to COVID-19 vaccination received from the audience.

6. India Science started 'Corona Ko Harana Hai' from April 2021. In this programme, India Science team conduct interviews on COVID-19-related different issues with top medical professionals of the country.

7. India Science makes infographics on COVID-19-related different issues regularly. 8. COVID-19 vaccine: Fact File also telecast every Saturday from India Science.

Contact info:

kapil@vigyanprasar.gov.in

Website link:

https://www.indiascience.in/

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

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

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

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

Last date: 31 December 2021

Website link:

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

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

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

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

Last date: 31 December 2021

Website link:

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

***

4

COVID FACT-CHECKS

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

SECTION GUIDELINES

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

1. Delta and Delta Plus variants

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

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

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

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

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

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

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

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

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

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

Q. What are Delta and Delta Plus variants?

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

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

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

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

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

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

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

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

Q. How often are these mutations studied in India?

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

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

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

A. Sample selection is done under three broad categories:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. Why is continuous monitoring of mutations important?

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

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

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

Source:

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

2. COVID-19 vaccination for pregnant women

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

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

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

A. Higher risk of infection involves with:

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

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

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

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

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

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

A. Pregnant women who are:

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

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

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

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

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

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

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

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

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

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

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

Source:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. What is the plan for vaccinating children?

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

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

Source

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

4. COVID-19 and White Fungus infection

Q. What is White Fungus?

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

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

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

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

Q. Who can get infected by white fungus?

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

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

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

Q. Is White Fungus contagious?

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

Q. What are the symptoms of White Fungus?

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

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

Q. How can White Fungus be treated?

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

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

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

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

Q. Are 8 breaths per minute normal?

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

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

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

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

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

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

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

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

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

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

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

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

Q. Is pure oxygen used in hospitals?

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

Q. What is the use of medical oxygen?

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

Q. What is the need for medical oxygen?

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

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

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

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

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

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

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

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

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

Q. What is moderate COVID-19 cases?

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

Q. What is severe COVID-19 cases?

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

Q. When does a patient require mechanical ventilator support?

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

Q. Can mechanical ventilation be given at home?

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

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

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

Source:

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

6. Related to drugs and medications to fight the disease

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

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

Q. What is Remdesivir? How does Remdesivir work?

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

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

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

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

Q. Can Remdesivir be taken at home?

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

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

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

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

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

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

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

Q. Is Favipiravir effective in treating COVID-19?

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

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

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

7. Related to Black Fungus and COVID-19 disease

Q. What is Black Fungus?

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

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

A. Risk Factors are:

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

Q. Why the sudden increase in Black Fungus cases?

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

Q. How serious is Black Fungus?

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

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

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

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

A. One can take the following precautions:

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

Q. What are the early signs of Black Fungus?

A. Some of the early signs are:

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

Q. Is Black Fungus treatable?

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

Q. Which specialist should I visit for Black Fungus?

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

Source:

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

8. Related to indoor air and COVID-19 disease

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

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

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

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

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

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

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

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

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

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

Source:

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

***

FEEDBACK FORM

COVID-19

Science & Technology Efforts in India

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

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

1. The overall appearance

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

2. Ease to read and flow of information

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

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

COVID-19

Science & Technology Efforts in India

VOL. IV | ISSUE 9 | 26th AUGUST 2021

TOGETHER WE CAN AND WE WILL BEAT THE PANDEMIC OUT

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

VIGYAN PRASAR

A-50, Institutional Area, Sector-62

NOIDA 201 309 (Uttar Pradesh), India

Phones: 0120-240 4430-35

Fax: 91-120-240 4437

E-mail: info@vigyanprasar.gov.in