SCIENCE & TECHNOLOGY EFFORTS IN INDIA ON COVID-19

Compiled by
VIGYAN PRASAR
An Autonomous Organisation of
Department of Science & Technology,
Government of India

UPDATED WEEKLY
16th July 2020

सबका साथ, सबका विकास, सबका विश्वास
Sabka Saath, Sabka Vikas, Sabka Vishwas

जय विज्ञान
जय अनुसंधान

सत्यमेव जयते

FOREWORD

डॉ हर्ष वर्धन
Dr Harsh Vardhan

स्वास्थ्य एवं परिवार कल्याण, विज्ञान और प्रौद्योगिकी व पृथ्वी विज्ञान मंत्री, भारत सरकार

Union Minister for Health & Family Welfare, Science & Technology and Earth Sciences Government of India

The 2019 Novel Coronavirus (SARS-CoV-2) has spread rapidly throughout the world and has assumed the proportion of a Pandemic. Given the lack of an efficacious vaccine as well as non-availability of suitable chemotherapeutic interventions, mankind is experiencing an unprecedented existential crisis.

2. The Ministry of Science and Technology and the Ministry of Health & Family Welfare, with their various departments, are contributing in various ways towards the national R&D efforts for developing solutions to combat COVID-19. The Department of Science & Technology under the Ministry has launched a nationwide exercise to map and boost development of COVID-19 solutions with R&D, seed capital and scale-up support. All academic and research institutions are being reoriented to focus on the development of diagnostics, vaccines, antivirals, disease models and other R&D to enable a cure for this dreadful disease. Around 15 labs of Council of Scientific & Industrial Research (CSIR), under the Department of Scientific & Industrial Research, across the country are working in close partnership with major private sector Industries, PSUs, MSMEs and other Government departments to develop solutions for COVID-19. The Department of Biotechnology (DBT) under the Ministry has also formed a consortium to support the development of Medical equipment, Diagnostics, Therapeutics, Drugs and Vaccines to meet the Healthcare Challenges. Indian Council of Medical Research (ICMR), under the Ministry of Health & Family Welfare has already isolated the virus strain successfully, which is a first step towards vaccine research. Similarly, various other organizations under Ministry of Human Resource & Development, Ministry of Defence, Ministry of Chemicals & Fertilizers, etc. are also contributing substantively to our R&D efforts. The private sector has also come forward in a big way to supplement these efforts.

3. With a view to spreading awareness about the S&T efforts of the Government of India as well as private sector in finding solutions for COVID-19, Vigyan Prasar - an autonomous institution under Ministry of Science & Technology and engaged in large-scale science communication and popularization activities - has compiled all initiatives being undertaken in this field.

4. This document "Science & Technology Efforts on COVID-19 in India" shall serve as a ready-reckoner for policy makers, scientists, researchers, scholars and other stakeholders who might be interested in understanding and keeping themselves abreast with the latest S&T efforts being made to develop solutions to combat COVID19.

(Dr. Harsh Vardhan)

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PREFACE

The COVID-19 pandemic has posed one of the biggest challenges to the entire humanity. In the wake of its outbreak, our lives have changed in ways we had never imagined before. All indications are leading to the conclusion that we all would have to learn to live with coronavirus, and there might be no early tapering off of the disease. This would require an adjustment to a NEW NORMAL of several aspects of our day-to-day life.

In these critical times, access to authentic information is of paramount importance. Vigyan Prasar (VP) has been covering the pandemic since the early days with the science communication perspective, ensuring that science and safety are the primary focus. VP is a national level organisation of the Department of Science and Technology, Government of India, engaged in science communication and popularisation. The principal objective of VP is to serve India's science popularisation agenda. This is achieved through several strategically important two-way, stakeholder-specific approaches to communicate about principles and practices of science and technology and implications for development and quality of life. Science popularisation therefore serves as a robust knowledge-led tool to fulfil various mutually reinforcing public policy objectives.

For the benefit of the stakeholders and target audience, we are preparing and publishing compilation of the most relevant initiatives and efforts by the Government of India through its various Science Ministries, Departments, and Funding organizations, in the shape of a weekly e-Newsletter. These organisations are all geared for combating the COVID-19 pandemic. These research-driven and technology-based interventions have been initiated on war footing to fight out the outburst of the pandemic. Government of India, through its various wings, like Science Ministries, Departments, and Funding organizations, has invited Calls for Proposals (CFPs) and Expression of Interest (EoIs) to enhance research and development-related activities to battle the pandemic out as well as making the nation self-reliant.

We hope this initiative of Vigyan Prasar shall be a handy guide to scientists, researchers, and scholars, especially those who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare and making the nation Atmanirbhar. Atmanirbhar Bharat, the vision of New India, will be fulfilled with aggressive implementation of the Make in India initiatives and when we would be wholeheartedly 'Vocal for Local'.

Vigyan Prasar
New Delhi

DR HARSH VARDHAN releases White Paper on 'Focused Interventions for 'Make in India': Post COVID-19' by TIFAC

10th July 2020, New Delhi

Dr Harsh Vardhan, Union Minister for Science & Technology, Health and Family Welfare and Earth Sciences today released a white paper on "Focused Interventions for 'Make in India': Post COVID-19" and "Active Pharmaceutical Ingredients: Status, Issues, Technology Readiness and Challenges", prepared by Technology Information, Forecasting and Assessment Council (TIFAC), at a virtual function. Dr V K Saraswat, Chairman TIFAC Governing Council, and Prof. Pradeep Srivastava, Executive Director, TIFAC, Dr Sanjay Singh, Scientist 'G' and Shri Mukesh Mathur, In-charge (F&A), TIFAC were also present on the occasion.

Dr Harsh Vardhan congratulated TIFAC "for bringing out this White Paper document at a right time when India is gearing up for boosting economy with a new Mantra "Local Solutions to Global Challenges - Policy and Technology Imperatives". "The road to national economy recovery would traverse through measures like Policy support to unconventional strategies, leveraging into new international partnerships in important sectors of Agriculture, Electronics, Health, ICT and Manufacturing and providing new technology stimulus", he added. Dr Harsh Vardhan requested "our Industry friends, Research and Policy Bodies to refer this White Paper in designing the path for upliftment of economy."

Pointing out that "India has been largely successful in mitigating the impacts of COVID-19 so far", Dr Harsh Vardhan said, "We got the opportunity to position ourselves as a Global manufacturing hub with a big push under 'Make In India' with adoption of appropriate technology and policy reforms and focused thrust in crucial sectors". He

emphasized that "This calls for furthering investment in developing infrastructure, industrialization, strengthening supply chain mechanism, creating demand for goods and services, converting farming into a business proposition etc." The Minister said, "The current pandemic is global, but the solutions to the challenge should be local."
Dr V K Saraswat in his address said that "The White paper has highlighted five sectors that would be critical for India's economic growth, using technology stimulus and charted out sector specific as well as aggregate policy and technological recommendations." He said, "The document also presents models of recovery of Indian economy, leveraging new international partnerships in important sectors based on national priorities and technological strength."

Prof. Ashutosh Sharma, Secretary, DST, in his message, said, "The White Paper by TIFAC presents a compelling map of high priority sectors, technologies, and strategies to fuel growth in the time of COVID-19 and immediately beyond. The sector-wise reports being worked on currently will also be an invaluable resource in defining the opportunities even more sharply."

Prof. Pradeep Srivastava, Executive Director, TIFAC gave a power-point presentation and explained that "The White Paper by TIFAC will help understand, evaluate and define the impact of the pandemic on the Indian economy and provide policymakers (Government of India) and public with the guidance that can be taken to mitigate the widespread economic shock and boost the Indian economy, cut through the noise of fall and prepare the ground for recovery using self-reliance as the new mantra."

This White Paper captures sector-specific strengths, market trends, and opportunities in five sectors, critical from the country's perspective, includes healthcare, machinery, ICT, agriculture, manufacturing, and electronics with reference to supply and demand, self-sufficiency and mass-scale production capacity. It has identified policy options primarily in the areas of Public health system, MSME sector, Global relations: FDI, recalibrated trade alignments, new-age technologies, etc. This is precisely important for the development of technology clusters in champion segments, creating Technology Start-up Exchange, identifying, supporting, and piloting ten blockbuster technologies and collaborating with new dynamics with incubators of Israel and Germany, towards promoting import substitution as well as evolving technology platforms in sunrise technologies. The recommendations are directed towards giving immediate technology and policy impetus to make India "ATMANIRBHAR." Based on the linkages and interdependencies between the outputs of different sectors, output multiplier and income multiplier for various sectors have been presented in the Paper.

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The e-newsletter is being published on a regular basis by collating all the inputs received till the preceding day of the release.

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

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19
BY

OFFICE OF THE PRINCIPAL SCIENTIFIC ADVISER (PSA)

Office of Principal Scientific Adviser, Government of India, initiates KISAN MITR, a national digital platform, to support through technologies and scientific research for farmers to become Atmanirbhar

The Office of the Principal Scientific Adviser (PSA) to the Government of India has launched an initiative called *KisanMitr*. It is a seven-phase project aimed at supporting farmers to become *Atmanirbhar* (self-reliant).

The first three phases focus on creating a repository of agricultural technologies, livestock technologies, and scientific research to catalyze modernization of farming and solve information asymmetry. The engagement stage of the platform independently helps young start-ups to showcase their agricultural technologies and easily engage with market demand. Market demand includes Industry, Incubators and Farmer Producer Organizations (FPOs).

After the recent outbreak of COVID-19 pandemic, reverse migration happened across the country, in which labours returned to their native villages. Through the KisanMitr digital platform, these migrant youths cannot just engage in farming but can also become agriculture-related entrepreneurs, helping their communities with modernization techniques.

The fourth phase focuses on creating a last-mile network for niche (nutritional, medicinal, aromatic, organic, GI-tagged) agricultural products from the fringes. Autonomous drones are being considered for development through a hub-and-spoke model of unmanned aerial vehicles (UAVs - land & Sky), especially in mountain states where the road networks might not have full coverage. Demand to be generated through charitable trusts for undernourished children as well as retail aggregators in metro cities.

The fifth phase focuses on equipping farmers with actionable agricultural insights and early weather alerts. Data related to soil health, moisture, weather, and ecology is being aggregated and analyzed to generate personalized insights related to crop selection, fertilizers requirements, and water needs for each farmer at farm-holding level. This would be provided by Ministry of Electronics and Information Technology (Meity) UMANG through an Atmanirbhar App.

The sixth and seventh phases look at micro-financing needs of the farmers and supplementing their incomes through off-farm products such as handlooms and textiles.

The project has received support from various departments of the government as well as private sector organizations.

Website Link:
https://farmer.indiancst.com/

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

Dr Harsh Vardhan releases White Paper on Focused Interventions for Make in India: Post COVID-19 by TIFAC

Dr Harsh Vardhan, Union Minister for Science & Technology, Health and Family Welfare and Earth Sciences today released a white paper on "Focused Interventions for 'Make in India': Post COVID-19" and "Active Pharmaceutical Ingredients: Status, Issues, Technology Readiness and Challenges", prepared by Technology Information, Forecasting and Assessment Council (TIFAC), at Nirman Bhawan, New Delhi. Dr V K Saraswat, Chairman TIFAC Governing Council, and Prof. Pradeep Srivastava, Executive Director, TIFAC, Dr Sanjay Singh, Scientist 'G' and Shri Mukesh Mathur, In-charge (F&A), TIFAC were also present on the occasion.

Pointing out that "India has been largely successful in mitigating the impacts of COVID-19 so far", Dr Harsh Vardhan said, "We got the opportunity to position ourselves as a global manufacturing hub with a big push under 'Make In India' with adoption of appropriate technology and policy reforms and focused thrust in crucial sectors." He emphasized that, "This calls for furthering investment in developing infrastructure, industrialization, strengthening supply chain mechanism, creating demand for goods and services, converting farming into a business proposition etc." The Minister said, "The current pandemic is global, but the solutions to the challenge should be local." Prof. Ashutosh Sharma, Secretary, DST, in his message, said, "The

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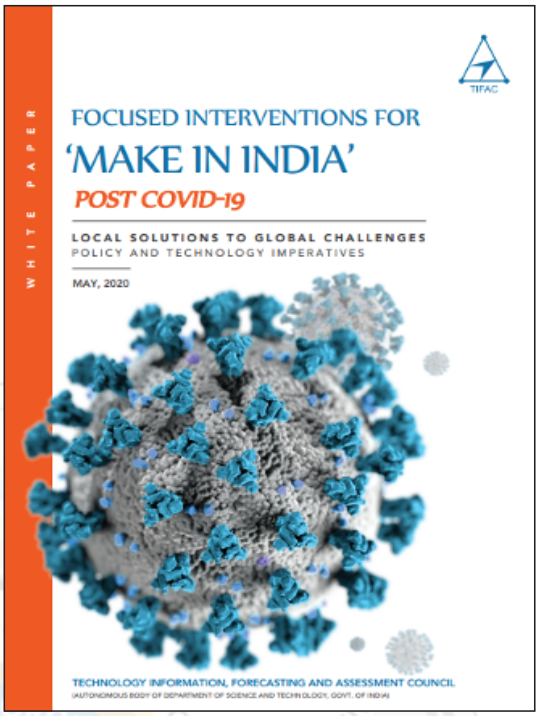


This White Paper captures sector-specific strengths, market trends, and opportunities in five sectors, critical from the country's perspective. This includes Healthcare, Machinery, ICT, Agriculture, Machinery & Manufacturing and Electronics with reference to supply and demand, self-sufficiency, and mass-scale production capacity. It has identified policy options primarily in the areas of Public Health System, MSME sector, Global Relations: FDI, recalibrated trade alignments, new-age technologies, etc. This is precisely important for the development of technology clusters in champion segments, creating Technology Start-up Exchange, identifying, supporting, and piloting ten blockbuster technologies and collaborating with new dynamics with incubators of Israel and Germany, towards promoting import substitution as well as evolving technology platforms in sunrise technologies. The recommendations are directed towards giving immediate technology and policy impetus to make India "ATMANIRBHAR". Based on the linkages and interdependencies between the outputs of different sectors, output multiplier and income multiplier for various sectors have been presented in the paper.

Website link:
https://dst.gov.in/dr-harsh-vardhan-releases-white-paper-focused-interventions-make-india-post-covid-19-tifac

https://dst.gov.in/sites/default/files/Focused%20Interventions%20for%20%E2%80%98Make%20in%20India%E2%80%99%20Post%20COVID%2019%20-%20TIFAC.pdf

TIFAC releases report on 'Active Pharmaceutical Ingredients- Status, Issues, Technology Readiness and Challenges'

Indigenous production of Active Pharmaceutical Ingredients (APIs) needs to be scaled up to a level where the production is economically viable, says a report which identified a list of APIs that need prioritized manufacturing and the associated advantages.

The report titled 'Active Pharmaceutical Ingredients- Status, Issues, Technology Readiness, and Challenges' was brought out recently by Technology Information Forecasting and Assessment Council (TIFAC), an autonomous organization under the Department of Science & Technology, Government of India.

It was released along with a white paper on 'Focused Interventions for 'Make in India': Post COVID-19' by Dr Harsh Vardhan, Union Minister for Science & Technology, Health and Family Welfare and Earth Sciences at a virtual function on 10th July 2020. Dr V K Saraswat, Member S & T NITI Aayog & Chairman, TIFAC Governing Council, and Prof. Pradeep Srivastava, Executive Director, TIFAC, Shri Sanjay Singh, Scientist 'G' and Shri Mukesh Mathur, In-charge (F&A), TIFAC were also present on the occasion.

The major recommendations presented in the report include focus on engineering and scale aspect of technology development, need for Mission mode Chemical Engineering with defined targets for uninterrupted synthesis of molecules and to create mega drug manufacturing clusters with common infrastructure in India and the technology platform to be developed for biocatalysis towards reducing process steps for cost optimization and for fluorination, Investment on priority in fermentation sector of large capacity and scale supporting techno-economic feasibility, attention to technologies like hazardous reactions, flow chemistry, cryogenic reactions, and membrane technology.

The report further suggests chiral building blocks through biocatalysis for production of niche intermediates involving enzymatic reactions or fermentation as an area of potential exploitation for Indian API industry and focus on antiviral drugs, which require nucleic acid building blocks - Thymine-Cytosine-Adenine-Guanine none of which are manufactured in India because of lack of cyanation plants.

The report recommends for Government encouragement of Indian companies working in chemical segments such as steroids, amino acids, carbohydrates, nucleosides, etc., to collaborate for technology development or quick technology transfer as well as the need for closer academia-industry interaction for technology development and commercialization.

COVID-19 pandemic has firmly put the focus of our nation on being "Atma Nirbhar". The TIFAC White Paper titled 'Focused Interventions for 'Make In India' Post COVID-19' brought out the strengths, market trends, and opportunities in five Sectors, including Healthcare, which are critical from country's perspective. This Paper strongly brought out the import dependence for APIs, especially from China. In view of changing geo-political scenario and recalibrated trade alignments, it is imperative that India becomes self-reliant in production of APIs.

The pharmaceutical industry in India is third largest in the world, in terms of volume, after China and Italy, and fourteenth largest in terms of value. It has a strong network of 3,000 drug companies and about 10,500 manufacturing units with a domestic turnover of Rs. 1.4 lakh crore (USD 20.03 billion) in 2019, with exports to more than 200 countries in the world.

Despite a very strong base, due to low-profit margins and non-lucrative industry, domestic pharmaceutical companies have gradually stopped manufacturing APIs and started importing APIs, which was a cheaper option with increased profit margins on drugs. With the availability of cheaper APIs from China, the pharmaceutical industry relies heavily on imports. The imports from China have been increasing steadily and now stand around 68%. To address this, TIFAC has recommended policies to address the requirement of APIs in short and medium term to make our country self-reliant.

Website link:
https://dst.gov.in/tifac-releases-report-active-pharmaceutical-ingredients-status-issues-technology-readiness-and

JNCASR spinoff launched molecular probes used in COVID-19 test kits

VNIR Biotechnologies Private Limited, a spinoff by Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), an autonomous institute of the DST, Government of India launched indigenous fluorescence probes and Polymerase chain reaction (PCR) mix for Reverse transcription polymerase chain reaction (RT-PCR) detection which are molecular probes used in COVID-19 test kits. VNIR Biotechnologies Private Limited is incubated at Bangalore Bio-innovation Centre (BBC) of Government of Karnataka.

"This initiative of developing products locally is in line with our Prime Minister's 'Aatmanirbhar Bharat' mission. We must take pride of the fact that we have reached this level of innovating and producing locally," said Dr. C. N. Ashwath Narayan, Deputy Chief Minister of Karnataka, who attended the product launch on July 7, 2020, at the Centre. The programme was also attended by Additional Chief Secretary IT/BT, Dr E.V. Ramana Reddy and Managing Director of Bangalore Bioinnovation Centre, Dr Jitendra Kumar.

Website link:
https://dst.gov.in/jncasr-spinoff-launched-molecular-probes-used-covid-19-test-kits

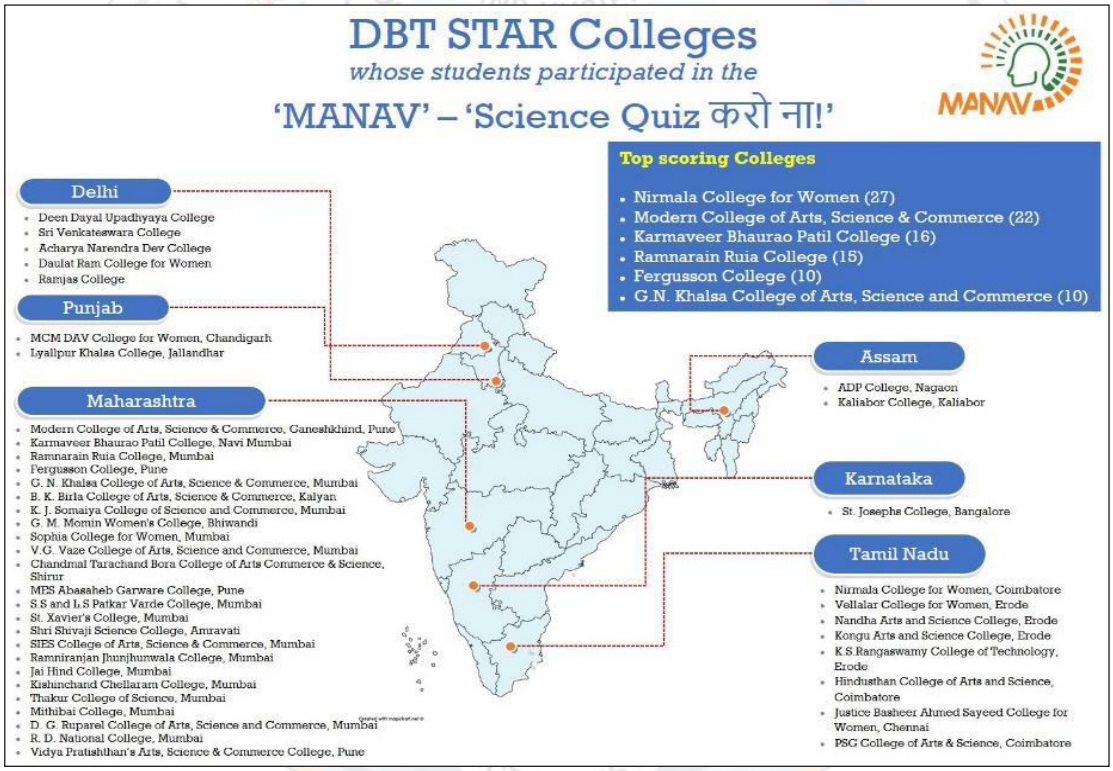
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF BIOTECHNOLOGY (DBT)

Students from DBT Star Colleges shine at 'Science Quiz - करोना!'

Living in the shadows of the COVID-19, confined to their homes, has been especially daunting for the younger generation. The plethora of information and misinformation that has been flooding the media has further added to the problem.



To help address both these issues simultaneously, the 'Manav - Human Atlas Initiative' team launched an online science quiz series, "Science Quiz - करोना!'", soon after the national lockdown was announced. 'Manav' is a project undertaken by the Department of Biotechnology's National Centre for Cell Science (DBT-NCCS) in collaboration with the Indian Institute of Science Education and Research (IISER-Pune) and Persistent Systems.

The weekly quiz series provided science enthusiasts with an engaging and fun activity that concomitantly helped raise awareness about COVID-19. The quiz aimed at nurturing scientific inquisitiveness especially among students and to disseminate correct scientific information from trusted sources like advisories released by the WHO, Ministry of Health and Family welfare, Government of India, the CDC, USA, and published scientific literature.

Links were provided in the quiz to encourage the participants to use these credible resources to learn more about the disease, even as they answered the questions. This quiz thus served as a common platform to assess as well as raise general awareness about COVID-19. It also gave students, especially graduates, post-graduates and PhD scholars, a glimpse into how science is used to address problems relevant to the society.

The quiz received an overwhelming response, with the first quiz itself having attracted participants from twenty-two Indian states. Over a thousand students from academic institutions across India, including forty-two DBT-Star Colleges, participated in this series. DBT-Star Colleges are those supported by the Department of Biotechnology, Government of India, under its `Star College' scheme. This scheme was initiated by the DBT in 2008 to support colleges and universities offering undergraduate education to improve science teaching across the country. Twenty rural colleges and ninety-six colleges from urban areas have been supported by the DBT under the scheme.

Colleges from various parts of India have also been benefiting from other initiatives of the 'Manav' project. These include workshops on "How to read scientific literature", which have been conducted at various educational institutions in the past. Webinars are currently being used to deliver this training, to cater to the requests being received from various colleges. Another webinar series in progress covers diverse aspects of data science and its applications in various disciplines, from astronomy to biology and public health.

The 'Manav' initiative, exemplary of a public-private partnership, is funded by the Department of Biotechnology and Persistent Systems. It aims to annotate the extensive data available in the scientific literature related to the human body, to serve as a proof-of-concept for the eventual goal of creating a virtual human atlas.

The project involves upskilling students by training them to comprehend and extract relevant information from scientific literature using a digital annotation tool. Students and researchers interested in participating in the project and webinars can learn more from the project's website (https://manav.gov.in/) and social media: Twitter (Manav Human Atlas; @ManavAtlas) & Facebook (MANAV Human Atlas). The Rajya Sabha TV has also featured this initiative in Gyaan Vigyaan (https://youtu.be/Ule08azR1ww) & Science Monitor (https://www.youtube.com/watch?v=IMgTw6rXTGQ).

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Website link:
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01S_13July2020.pdf

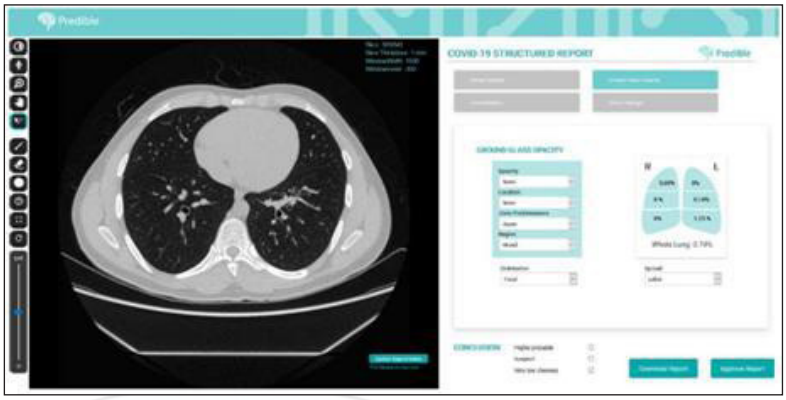
A potential solution for monitoring severity of COVID-19 patients

Application of Artificial Intelligence (AI) is revolutionizing various sectors including healthcare. Innovators are already using AI to deliver better health-related facilities for the masses through Apps. AI is marching forward in the medical field.

A start-up Predible Health Pvt. Ltd has come up with an innovation called Lung IQ. This innovation is a holistic AI-based application for the diagnosis and monitoring of respiratory conditions. The solution enables early detection of lung cancer, characterization of chronic obstructive pulmonary diseases and monitoring of interstitial lung diseases.

This innovation has been developed by using large proprietary datasets with customized algorithms for detection, qualification and diagnosis. It is compatible with all kinds of CT

scanners. It can help radiologists detect and quantify findings better in daily practice. It is also available as a joint solution with teleradiology for an end-to-end reading.



The DBT's public sector undertaking Biotechnology Industry Research Assistance Council (DBT-BIRAC) is supporting the innovation. It is a potential solution for monitoring the severity of COVID-19 patients. It can help radiologists detect, quantify and communicate COVID-19 findings from Lung CT images. The findings of COVID-19 are very similar to that of other infectious and inflammatory diseases and this ready-to-use product can be helpful in the fight against COVID-19 pandemic.
Contact Info: Dr Shirshendu Mukherjee; Dr Hafsa Ahmad; Ms Ginny Bansal (mdpmubmgf@birac.nic.in, nbm9@birac.nic.in, pmubmgf6@birac.nic.in)

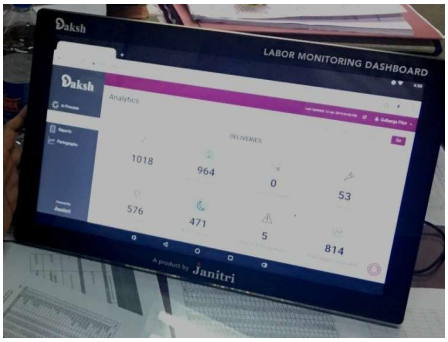
Website link:
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_13July2020.pdf
https://birac.nic.in

A potential solution to manage pregnancies amidst COVID-19

The DBT's public sector undertaking Biotechnology Industry Research Assistance Council (DBT-BIRAC) is supporting a new advanced intrapartum monitoring tool for an automated partograph generation developed by Janitri Innovations.

Named DAKSH, the patented technology can help a staff nurse to register and enter vital signs of a pregnant woman, remind her to monitor the labour vitals, as per the standard WHO intrapartum protocol and generate alerts in case of complications, based on an in-built algorithm. With this system, a doctor at a remote location can also view the live labour progress and guide the staff nurse.

The technology can be of immense use in the current COVID-19 crisis. During the labour phase, women visit hospitals and get admitted for at least 48 hours. During their hospital stay, they can be exposed to the risk of COVID-19 in multiple ways. For instance, the doctors have to visit them frequently and the SBAs (Skilled Birth Attendants) assigned to labour rooms are also in constant contact.



Further, in this unfortunate situation of Corona spread, the work burden of the medical professionals has increased manifold. Among other things, they need to handle documents regularly and consequently have to keep washing their hands every now and then. DAKSH can be useful in addressing these issues:

It provides for remote monitoring: The doctors can guide the nurses without visiting them. The progress of labour can be seen by the doctor remotely.

Patient management can be made easier: Multiple patients can be observed on a single screen, and audio and critical alerts can be generated based on the complications and reminders can be set for the measurement of vitals.

The technology offers digital documentation: This is a paperless system. Automated partographs are generated and case sheets will be maintained digitally. This means less contact and less exposure. It also has unlimited cloud storage.

Contact Info: Dr Shirshendu Mukherjee; Dr Hafsa Ahmad; Ms Ginny Bansal (mdpmubmgf@birac.nic.in, nbm9@birac.nic.in, pmubmgf6@birac.nic.in)

Website link:
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_03S_13July2020.pdf
https://birac.nic.in

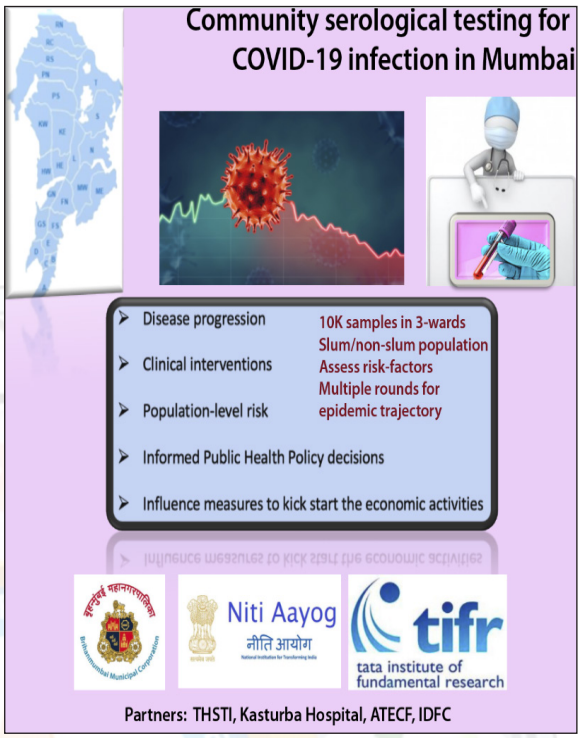
THSTI files patent for a candidate vaccine against SARS-CoV-2

At DBT's Translational Health Science and Technology Institute (THSTI), Faridabad, a research team led by Dr Sweety Samal and Dr Shubbir Ahmed and supervised by Prof. Gagandeep Kang has identified and synthesized synthetic peptides that target neutralizing B-cell or T-cell epitopes for developing antibodies against SARS-CoV-2. This elicits a desirable immune response that could block viral invasion. The preliminary non-clinical studies in mice are promising. They have further developed a multiepitope-based vaccine candidate by stitching the desired peptides to produce the protein. This approach is unique as it generates potential neutralizing antibodies, while also reducing antibody-dependent enhancement or pulmonary immune pathology, a hallmark of SARS-CoV-2 infection.

The COVID-19 pandemic caused by the new coronavirus has resulted in 11,739,167 cases and 540,660 deaths globally, causing panic and significant economic damage across the world. Researchers all around the world are racing to develop a vaccine and antiviral drugs. Currently, most SARS-CoV-2 vaccines under development focus on inactivated SARS-CoV-2 or its full-length spike (S) protein. However, based on the learning and experience of SARS, there are concerns about the induction of harmful immune responses or inflammatory reactions against non-neutralizing epitopes.

Website link:
https://thsti.res.in/
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01B_13July2020.pdf

THSTI scientists studying sero-prevalence of SARS-CoV-2 in Mumbai



The DBT's Faridabad-based institute, the Translational Health Science and Technology Institute (THSTI) has tied up with institutes in Mumbai for sero-surveillance to gain an understanding of (i) number of people infected with SARS-CoV-2, (ii) the virus SARS-CoV-2, and (iii) how it is spreading through the population.

Mumbai has been at the heart of the COVID-19 pandemic. In just a few months, the tiny virus has taken over a city of about two crore population. On July 1, 2020, the number of cases in the city touched 1.8 lakhs.

Consequently, THSTI, entered into an agreement with the Tata Institute of Fundamental Research (TIFR) Mumbai, Kasturba Hospital, A.T.E Chandra Foundation, IDFC Institute, and Municipal Corporation of Greater Mumbai. The collaborative project aims to estimate the prevalence of current and past COVID-19 infections in various representative communities in Mumbai at different time intervals. This study will aid in understanding how the virus has spread over time in Mumbai.

For surveillance, serology testing will be done for better understanding of how many infections with SARS-CoV-2 have occurred at different points in time within Mumbai. Serology tests look for antibodies in blood. If antibodies are found, that means there has been a previous infection. Antibodies are proteins that can fight off infections.

Investigations using serology testing are called sero-prevalence surveys. These surveys also help us in understanding the underlying risk factors of the disease including a person's age, location, or comorbidities. DBT and THSTI are also involved in vaccine development. The study's prospects to determine how long antibodies last in people's bodies following infection will be useful for such projects also.

Contact Info: Dr Siuli Mitra; smitra@thsti.res.in

Website link:

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02B_13July2020.pdf

https://www.tifr.res.in/TSN/news_detail.php?id=MEtGM2pvMXA4L0REQUg4RDFLU2ttZz09

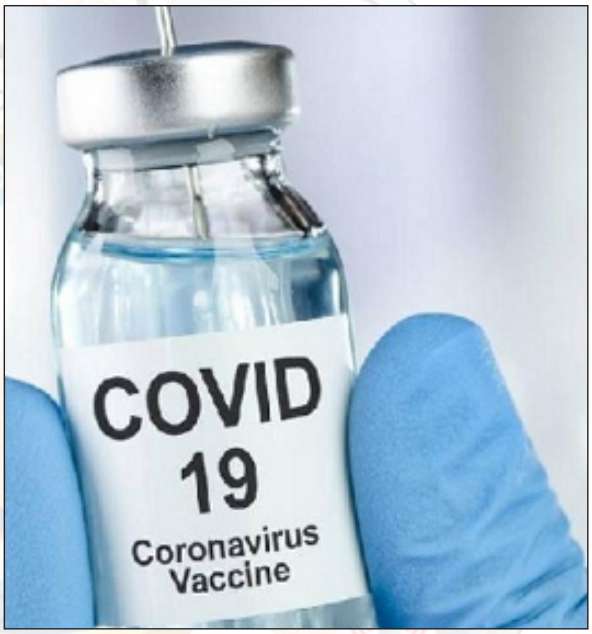
https://www.tifr.res.in/TSN/

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

Indigenous Indian COVID-19 vaccines in the global race to end the pandemic



With the announcement of COVAXIN by Bharat Biotech and ZyCov-D Vaccine by Zydus Cadila the proverbial silver line in the dark clouds of COVID-19 appears at the horizon. The nod given by the Drug Controller General of India CDSCO (The Central Drugs Standard Control Organisation) for the conduct of the human trial for the vaccines marks the beginning of the end.

In the past years, India has emerged as one of the significant vaccine manufacturing hubs. Indian manufacturers account for 60% of vaccine supplies made to UNICEF. The vaccine for novel coronavirus may be developed anywhere in the world, but without involving Indian manufacturers, production of required quantity is not going to be possible.

More than 140 candidate vaccines are under various stages of development. One of the leading candidates is AZD1222 developed by Jenner Institute of University of Oxford and licensed to AstraZeneca British-Swedish multinational pharmaceutical and biopharmaceutical company headquartered in Cambridge, England. The MRNA-1273 vaccine developed by Kaiser Permanente Washington Health Research Institute, Washington and taken up for production by the US-based Moderna Pharmaceutical is just a step behind. Both these firms have already inked an agreement with Indian manufacturers for production of the COVID-19 vaccines.
Parallelly, Indian institutions have also engaged in R&D for the development of vaccines in India. With the primary scientific inputs coming from ICMR's Pune-based institution National Institute of Virology and Hyderabad-based CSIR institution Centre for Cellular and Molecular Biology, six Indian companies are working on a vaccine for COVID-19. Along with the two Indian vaccines, COVAXIN and ZyCov-D, the world over, 11 out of 140 vaccine candidates have entered the human trials.

Website link:
https://vigyanprasar.gov.in/isw/Indigenous-Indian-COVID19-vaccines-in-global-race-to-end-the-pandemic.html

CSIR-IGIB and IIT Alumni Council sign MoU for joint research to tackle COVID-19

Nearly all countries in the world have speeded up their research efforts on novel coronavirus. In this context disease research and patient data analysis are key elements. To work on these important aspects Institute of Genomics and Integrative Biology (IGIB) and IIT Alumni Council announce a Memorandum of Understanding (MoU) for COVID-19 research and patient data analysis.

The joint research by CSIR-IGIB and IIT Alumni Council will focus on catalysing the creation of an ecosystem for diagnostics and therapeutics for COVID-19 as well as flexible platforms for pandemic preparedness. The ecosystem will enable an indigenous value chain with multi-domain expertise spanning digital health, artificial intelligence, molecular diagnostics, next generation sequencing, antibody harvesting, and production of monoclonal antibodies.

IIT Alumni Council has handed over the first set of 8500 patient imaging data from Mumbai to IGIB, which will soon be made available in de-identified form, through a public open data platform co-hosted by IGIB and ICMR to enable research.

Both parties are viewing this partnership as an opportunity not only to create a world class testing and treatment ecosystem in the country but also to establish global data leadership. "This would enable open data access to every scientist and innovator in the world for development of bleeding edge testing and treatment solutions. IIT Alumni Council believes that together with IGIB, we shall be able to create a robust high security Data Architecture for health Data," said Ravi Sharma, President and Chief Volunteer, IIT Alumni Council.

This partnership will help in two of IIT Alumni Council initiatives – World's largest MegaLab in Mumbai for testing and India's largest MegaTx antibody facility for treatment based on biologics. "This partnership will open the doors for newer forms and formats of collaboration between the Government and domestic non-profits like IIT Alumni Council. One can see it as a data and engineering social initiative driven by volunteers, which would be of much use to the biomedical community," said Sharma.

"The key element of this MoU is that IIT Alumni Council is generating a lot of data from their charitable work that they would like to make public in a secure and ethical way through us," said Dr Anurag Agrawal, Director, CSIR-IGIB. Members of CSIR-IGIB and IIT Alumni Council have been brainstorming regarding areas of testing and treatment for COVID-19 since April 2020.

Website Link:
https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-1-9-July-20.pdf

CSIR-IMTECH to have biorepository of COVID-19 samples

The Microbial Type Culture Collection and Gene Bank (MTCC) at the Institute of Microbial Technology, Chandigarh (IMTECH) will host the biorepository of COVID-19 samples. The institute will store clinical samples of COVID-19 patients for research.

The blood samples collected will be stored at a designated biorepository centre. These blood samples may be used to assess the performance of antibody tests as well as immune markers of disease and disease severity for COVID-19.

The centre has been identified as one of the 16 national COVID-19 biorepositories by the Government of India for collecting, storing, and maintaining clinical samples of positive patients. Data obtained from the patient related to the blood samples will be recorded using a unique study identification number. Any publication arising from this study will maintain the patient's anonymity by excluding all information that could potentially identify the person.

Institute of Microbial Technology, Chandigarh

Some studies indicate that the viral load, which is the number of virus a person has at the time of the onset of the symptoms, is linked to the severity of the disease. Those with lesser viral load are said to suffer only a mild to moderate COVID-19 disease; while in case of the patients who become critical, the viral load is said to be as high as 60 times. Nevertheless, there is no clear evidence for it. The samples will help researchers understand the early predictors of disease severity and how it develops given the immune response and other factors. The selected biorepositories will collect different samples like oropharyngeal swab/throat swab, nasopharyngeal swab/nasal swab, bronchoalveolar lavage, sputum, blood, urine and stool.

"The biorepository will be critical to steer research towards innovating the development of new diagnostics, therapeutics, and vaccines," said Dr Sanjeev Khosla, Director, IMTECH, Chandigarh. If we can identify who will suffer only a mild COVID-19 and who may become critically ill, then appropriate medical attention could be provided. The data stored in the repository would help researchers to identify potential markers.

Website Link:
https://vigyanprasar.gov.in/isw/CSIR-IMTECH-to-have-biorepository-of-COVID-19-samples.html#:~:text=The%20Microbial%20Type%20Culture%20Collection,COVID%2D19%20patients%20for%20research.

Faster coronavirus testing method can scale up testing capacity by three-fold: CSIR-CCMB Director

A safer, cheaper and faster SARS-CoV-2 or coronavirus testing method, if approved, can scale up testing capacity by three-fold immediately, says Dr Rakesh Mishra, Director of CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB).

In current methods of RT-qPCR (reverse transcription quantitative polymerase chain reaction) testing are done in the form of swabs from samples received in Viral Transport Medium (VTM) followed by RNA extraction and RT-qPCR. Now, CSIR-CCMB has generated a simplified protocol for this test where dry swabs are collected and directly used for RT-qPCR. This method has been established to have no loss of sensitivity and is at par with the current gold standard of testing.

Given this simplification, the method becomes safer as there is no liquid sample handling and leakage and fear of contamination for the persons handling the sample in BSL-3 (Biosafety Level 3) facilities, says Dr Rakesh Mishra, Director of CSIR-CCMB.

"It is also faster by about 5 hours as there is no RNA extraction and VTM containing tube handling. Further, it is cheaper too as there is no RNA extraction and no VTM, correspondingly less manpower is needed," he said.

In addition to this, the major bottleneck in testing today is the process of RNA extraction, because of time and manpower constraints, said Dr Mishra. Removal of this step can improve the capacity of testing by about three-fold, without any additional inputs.

This method, Dry Swab Direct RT-qPCR, is under consideration with ICMR and appropriate advisory is expected soon which will help in getting more tests done at much lower costs and give us a better chance at managing the pandemic.

"India is doing 2 lakh tests per day as more than that will require extra funds, setup of test labs and, more importantly, trained manpower, which is not there. If our method is used, we can triple that capacity within (and less than) currently used resources (manpower, labs, and even the money)," said Dr Mishra.

Website Link:
https://www.csir.res.in/slider/faster-coronavirus-testing-method-can-scale-testing-capacity-three-fold-csir-ccmb-director

सीएसआईआर ने मांगी तीन दवाओं के संयोजन के परीक्षण की अनुमति

कोरोना वायरस से लड़ने में अपने प्रयासों के तहत वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) ने कोविड–19 मरीजों पर तीन अलग–अलग दवाओं के संयोजन के तीसरे चरण के नियंत्रित चिकित्सीय परीक्षण की नियामक मंजूरी मांगी है। सीएसआईआर द्वारा यह परीक्षण हैदराबाद की लैक्साई लाइफ साइंसेज प्राइवेट लिमिटेड द्वारा मिलकर किया जाएगा।

इस पहल के अंतर्गत जिस दवा संयोजन का परीक्षण किया जाना है, उसमें फेविपिरावीर + कोलकिसिन, यूमिफेनोविर कोलकिसिन और नेफामोस्टेट + 5–एएलए शामिल हैं। इस चिकित्सीय परीक्षण का उद्देश्य तर्कसंगत रूप से एंटीवायरल दवाओं के संयोजन का परीक्षण कोविड–19 रोगियों पर करना और दवा संयोजन के प्रभाव एवं सुरक्षा का आकलन करना है। सीएसआईआर द्वारा मंगलवार को जारी एक बयान में यह जानकारी दी गई है।

म्यूकोविन नामक यह परीक्षण मेदांता मेडिसिटी के साथ साझेदारी में किया जाएगा। यह परीक्षण चार समूहों में कुल 300 रोगियों पर किया जाएगा और प्रत्येक समूह में 75 मरीज शामिल होंगे। परीक्षण 17 से 21 दिन के लिए किया जाएगा।

डॉ शेखर सी. मांडे, महानिदेशक, सीएसआईआर ने कहा है कि कोविड–19के उपचार के लिए इस मिश्रित रणनीति में एंटी–वायरल एवं होस्ट डायरेक्टेड थेरैपी (एचडीटी) के साथ पूरक, एडिटिव और सिनर्जिस्टिक भूमिका वाली दवाओं का नये सिरे से उपयोग शामिल है। इससे चिकित्सीय विकल्पों को बढ़ाने और रोगियों को तेजी से ठीक करने में मदद मिल सकती है। इस चिकित्सीय परीक्षण में सीएसआईआर से संबद्ध इंडियन इंस्टीट्यूट ऑफ केमिकल टेक्नोलॉजी, हैदराबाद और इंडियन इंस्टीट्यूट ऑफ इंटिग्रेटिव मेडिसिन, जम्मू शामिल हैं।

लैक्साई लाइफ साइंसेज के मुख्य कार्यकारी अधिकारी डॉ. राम एस. उपाध्याय ने कहा है कि ष्इस अध्ययन का उद्देश्य वायरस के बढ़ने के लिए जरूरी वायरल प्रोटीन को लक्ष्य बनाना है। इसके साथ ही, इसमें यह भी अध्ययन किया जाएगा कि कौन से मेजबान कारक वायरल जीवन चक्र को प्रभावित करते हैं और साइटोकीन स्ट्रोम में योगदान करते हैं।"

Website Link:
https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-9-July-20.pdf

''नवाचार के लिए ज्ञान से भी अधिक महत्वपूर्ण है कल्पनाशीलता''

नवाचार के लिए ज्ञान जरूरी है, लेकिन कल्पनाशीलता उससे भी अधिक महत्वपूर्ण है। किसी विचार को धरातल पर तभी उतारा जा सकता है, जब उसे कल्पना की कसौटी पर भी परखा गया हो। वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) के पूर्व महानिदेशक प्रोफेसर समीर के. ब्रह्मचारी ने ये बातें कही हैं। वह हाल में सीएसआईआर द्वारा आयोजित समर रिसर्च ट्रेनिंग प्रोग्राम (एसआरटीपी) के अंतर्गत आयोजित एक ऑनलाइन व्याख्यानमाला को संबोधित कर रहे थे।

प्रोफेसर समीर के. ब्रह्मचारी

सीएसआईआर–एसआरटीपी के तहत आयोजित 'पावर ऑफ इमेजिनेशन ऐंड नॉलेज इन वाट्सऐप ऐंड फेसबुक इरा' विषय पर बोलते हुए प्रोफेसर ब्रह्मचारी ने छात्रों एवं शोधकर्ताओं के सफल होने के लिए जरूरी विभिन्न आयामों को रेखांकित किया है। देश के जाने–माने वैज्ञानिक प्रोफेसर ब्रह्मचारी जे.सी. बोस नेशनल फेलो रहे हैं। इसके अलावा, वह सीएसआईआर–आईजीआईबी के संस्थापक निदेशक, ओपन सोर्स ड्रग डिस्कवरी के चीफ मेंटर, एकेडमी ऑफ साइंटिफिक ऐंड इनोवेटिव रिसर्च में प्रोफेसर और वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग के सचिव जैसे महत्वपूर्ण पदों पर काम कर चुके हैं।

प्रोफेसर ब्रह्मचारी ने छात्रों एवं शोधकर्ताओं से कहा कि उन्हें उत्कृष्ट शिक्षकों, बुद्धिजीवियों के करीब रहकर उनसे संवाद करने से कभी हिचकना नहीं चाहिए। इसके साथ ही, एक अच्छे मेंटर का होना भी बेहद जरूरी है। उन्होंने कहा कि विज्ञान जैसे विषय को सीमाओं से पार जाकर समझने के लिए हमेशा तत्पर रहना चाहिए। इस दिशा में अन्य क्षेत्रों के विशेषज्ञों को पढ़ना एवं उन्हें सुनना सीख लें तो मुश्किलें आसान हो सकती हैं। उन्होंने कहा कि आंकड़ों का विश्लेषण, और फिर उन्हें सूचना एवं ज्ञान में परिवर्तित करना सीखना भी जरूरी है।

Website Link:
https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-3-8-July-20.pdf

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR) AND MINISTRY OF HEALTH & FAMILY WELFARE (MOHFW)

ICMR invites Expression of Interest for validation of rapid antigen detection assays for COVID-19

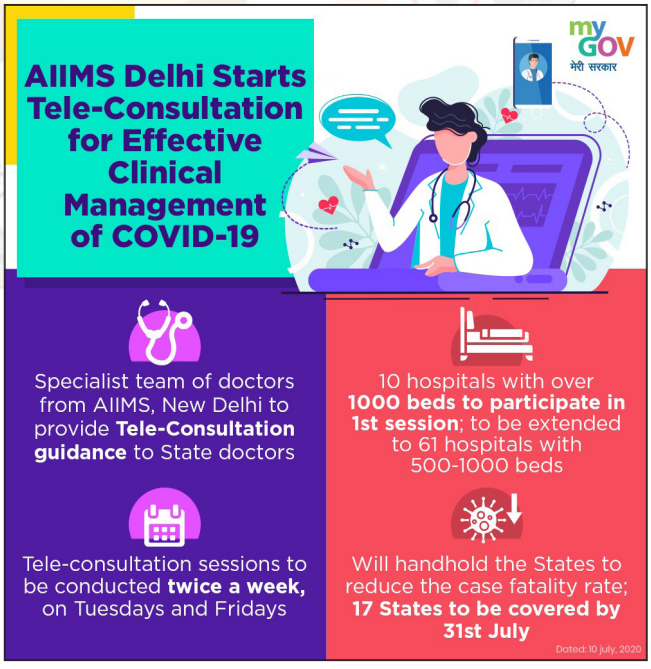
ICMR invites applications for validation of rapid antigen detection tests for COVID-19 from all manufacturers who have developed such test. The gold standard RT-PCR diagnostic test for COVID-19 has limitations in terms of widespread availability. In view of this, there is urgent requirement of reliable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

Contact Info: guptanivedita.hq@icmr.gov.in

Website Link:
https://www.icmr.gov.in/pdf/tender/Revised_EOI_for_Ag_kit_validation.pdf
https://www.icmr.gov.in/tender.html

AIIMS Delhi starts tele-consultation guidance to State doctors on COVID-19 clinical management

Tele-consultation is a critical component of the clinical intervention protocol for COVID-19. To strengthen Government of India's efforts to reduce COVID mortality, a specialist team of doctors from AIIMS, New Delhi shall provide guidance on effective clinical management of COVID-19 patients in the ICUs of different State hospitals through tele/video consultation. They will handhold the States in clinical management of COVID-19 patients to reduce the case fatality rate. These tele-consultation sessions for providing timely and expert guidance to the doctors in the States shall be conducted twice every week, on Tuesdays and Fridays.



This tele-consultation exercise has been initiated with 10 hospitals which shall be extended to another 61 hospitals that have the bed capacity ranging from 500-1000 on twice-a-week basis. A calendar of these expert-led tele-consultation sessions has been drawn up to cover the States till 31st July. Total of 17 such States shall be covered (Delhi, Gujarat, Telangana, Kerala, Andhra Pradesh, Karnataka, Bihar, West Bengal, Tamil Nadu, Haryana, Odisha, Rajasthan, Uttar Pradesh, Madhya Pradesh, Punjab, Jharkhand and Maharashtra). Up to two doctors handling ICU patients from each hospital along with the Director General of health Services (DGHS) of the concerned State will participate in the VC interaction.

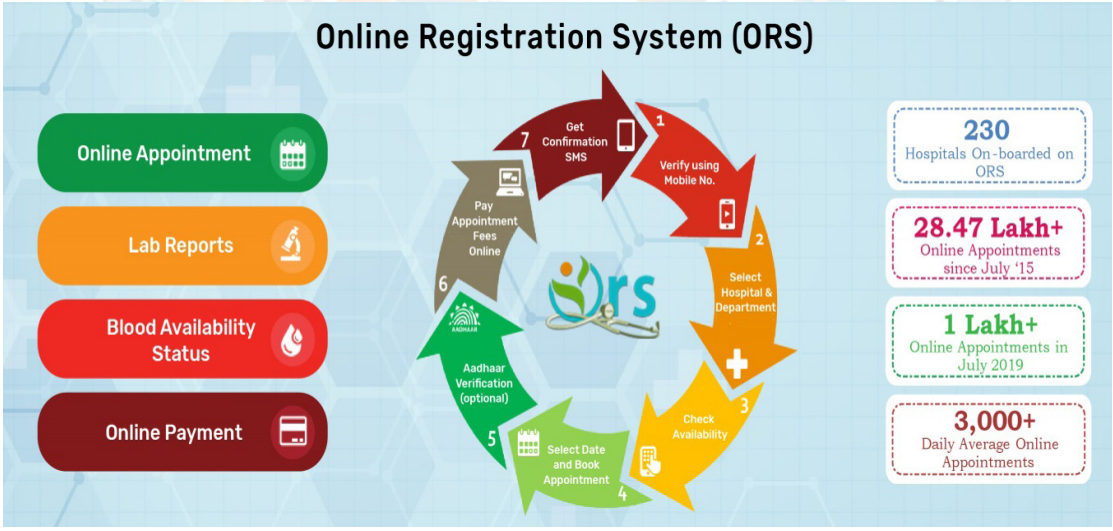
Website link:
https://pib.gov.in/PressReleseDetailm.aspx?PRID=1637175

MoHFW comes up with an online registration framework portal, for getting OPD appointments, lab reports and blood availability

Since physical and social distancing have become the new normal after the outbreak of COVID-19 pandemic, Ministry of Health & Family Welfare (MoHFW) has come up with an online registration framework portal for getting OPD appointments, lab reports and blood availability. For the patient, the first visit to hospital, registration and appointment with the doctor have been made simpler. All one needs to do is to verify using Aadhaar number, select hospital and department, select date of appointment and receive SMS for the appointment.

Online Registration System (ORS) is a framework to link various hospitals across the country for Aadhaar-based online registration and appointment system, where counter-based OPD registration and appointment system through Hospital Management Information System (HMIS) has been digitalized.

Total number of hospitals for which appointment can be taken through web along with their departments for which online appointment can be taken can be seen in reports. Detail reports showing information about new and old patients taking appointment through this portal can be seen. Hospitals can come on board in using this platform and provide their appointment slots for online booking by patients. The system facilitates the hospitals to easily manage their registration and appointment process and monitor the flow of patients.



Website link:
https://ors.gov.in/index.html

Dr Harsh Vardhan chairs 18th meeting of Group of Ministers (GOM) on COVID-19

The 18th meeting of the high-level Group of Ministers (GoM) on COVID-19 was held on 9th July 2020, under the chairpersonship of Dr Harsh Vardhan, Union Minister of Health & Family Welfare by a video-conference. He was joined by Dr S. Jaishankar, Union Foreign Minister; Shri Hardeep S. Puri, Union Minister of Civil Aviation; Sh. Ashwini Kumar Choubey, Minister of State, Health & Family Welfare; and Sh. Mansukh Mandaviya, Minister of State, Chemical and Fertilizers, & Shipping. Dr Vinod Paul, Member (Health), Niti Aayog joined the meeting through video conference as well.

At the outset, the GoM was briefed on the current status of COVID-19 in India. The global comparison between the five most affected countries clearly depicted that India has one of the lowest cases per million (538) and deaths per million (15) compared the global average of 1453 and 68.7, respectively. Within the country, eight states (Maharashtra, Tamil Nadu, Delhi, Karnataka, Telangana, Andhra Pradesh, Uttar Pradesh and Gujarat) contribute to around 90% of the active caseload and 49 districts account for 80% of active caseload, as of today. Moreover, six states (Maharashtra, Delhi, Gujarat, Tamil Nadu, Uttar Pradesh and West Bengal) account for 86% of total deaths, and 32 districts account for 80% deaths. The GoM was briefed that special efforts were made in the regions showing higher Case Fatality Rate.

Dr Harsh Vardhan stated that "as we move forward, our focus shall be on the management of COVID-19 through strict containment measures and surveillance; utilizing full testing capacity; focus on monitoring of co-morbid and elderly population; predicting emerging hotspots leveraging digital tools such as Aarogya Setu; ensuring seamless patient admission processes; focus on infrastructure preparedness (critical care beds, oxygen, ventilators and logistics)." He pointed out that "along with States/UTs, our aim is to reduce and keep the Case Fatality Rate low by early identification and effective clinical management."

Website Link:
https://pib.gov.in/PressReleasePage.aspx?PRID=1637517

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

MeitY launches Digital India Atmanirbhar Bharat Innovate Challenge

Ministry of Electronics and Information Technology (MeitY) in partnership with Atal Innovation Mission – Niti Aayog launches Digital India Atmanirbhar Bharat Innovate Challenge to identify the best Indian Apps that are already being used by citizens and have the potential to scale and become world class Apps in their respective categories. This Innovation Challenge with various cash awards and incentives of featuring Apps on Leader Boards seeks to create an ecosystem where Indian entrepreneurs and start-ups are incentivised to ideate, incubate, build, nurture, and sustain Tech solutions that can serve not only citizens within India but also the world.

The Aatmanirbhar Bharat App Innovation Challenge has been launched in eight broad categories, along with several sub categories and problem tests. These problem tests include some of the challenges thronged by the COVID-19 pandemic also.

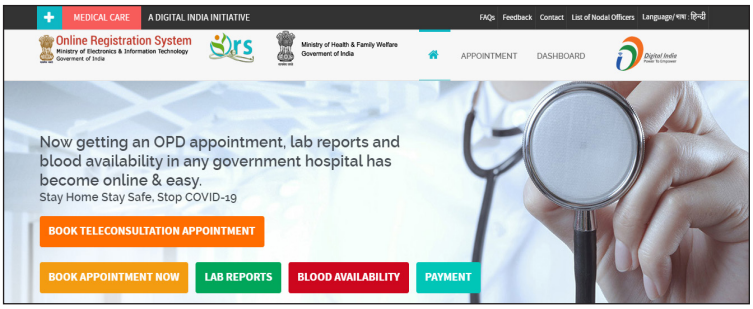
Last date of Submission: 18th July 2020

Website Link:
https://innovate.mygov.in/app-challenge/#tab1

MeitY develops an online registration framework portal, a digital India initiative

Online Registration System (ORS) is a framework to link various hospitals across the country for Aadhaar-based online registration and appointment system, where counter-based OPD registration and appointment system through Hospital Management Information System (HMIS) has been digitalized. The application has been hosted on the cloud services of National Informatics Centre (NIC). Portal facilitates online appointments with various departments of different Hospitals using eKYC data of Aadhaar number, if the patient's mobile number is

registered with UIDAI. And in case mobile number is not registered with UIDAI it uses the patient's name. New Patient will get appointment as well as Unique Health Identification (UHID) number. If the Aadhaar number is already linked with the UHID number, then the appointment number will be given and UHID will remain same.



One of the features that ORS provides is that of booking a medical appointment online, get an OPD appointment, lab reports and blood availability in any government hospital of any state registered in ORS.

Website link:
https://ors.gov.in/index.html

NIC develops two Mobile Apps: Rapid Antibody Test of India (RATI) and RT-PCR Test of India

National Informatics Centre (NIC) has developed RT-PCR and RATI Mobile Apps on Android and iOS platforms and a web portal to ensure quality and accurate data of patients at location for surveillance and immediate transfer of sample details to ICMR for use by authorized laboratories.

RT-PCR Test of India App: The App is used by collection centre technicians to enter details of the samples being collected for COVID-19 RT-PCR test. It helps in preparing SRF form which is sent along with the sample to the laboratory.

RATI (Rapid Antibody Test of India) App: RATI App captures test results data of Rapid Antibody Tests. The App is used by collection centres conducting the Rapid Antibody Test for COVID-19, on behalf of ICMR.

Web Portal: The web portal at https://covid19cc.nic.in ensures authorizations of sample collectors and testers across country with viewing rights to Government officials at State and District level.

Website link:
https://meity.gov.in/writereaddata/files/major_achievements_month_of_may_2020.pdf

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

https://nichimachal.nic.in/news/two-mobile-apps-rapid-antibody-test-of-india-rati-and-rt-pcr-test-of-india-designed-and-developed-in-android-and-ios-platforms/

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

SCIENTIFIC AND ACADEMIC INSTITUTIONS

IIT Mandi develops 98% efficient face masks from waste plastic bottles at nearly one tenth the cost

Researchers at Indian Institute of Technology (IIT) Mandi developed high-efficiency facemasks out of waste plastic bottles. The PET bottles were successfully converted into a nanofibre membrane. This membrane can be layered with nylon on both sides to create the mask. Research scholars Ashish Kakoria and Sheshang Singh Chandel produced the mask under the guidance of Prof Sumit Sinha Ray. To extract the fibres, they shredded the waste plastic bottles and dissolved the pieces using a combination of solvents. Later, they extruded the nanofibres from the solution. The nanofibre membrane so developed is 250 times thinner than a human hair. By this, they can remove minute air particles with 98% efficiency.

Prof Sinha and the team have been developing an efficient filter out of this nanofibre membrane since 2018. By March this year, they were almost close to finding their final product. They decided to focus their efforts on creating a facemask out of this developed membrane. Mr Kakoria and Mr Chandel continued to work during the lockdown while observing the necessary distancing norms and safety precautions in the lab. They are eager to get their work for public service. The team is looking for an industrial partner to manufacture the membrane and the mask on an industrial scale.

Website link:
http://www.iitmandi.ac.in/Newspaper_reports/index.php
http://iitmandi.ac.in/Newspaper_reports/pdf_news/The%20Optimist%20Citizen%20-%20IIT%20Mandi.png

IIT Delhi incubated start-up Chakr Innovation launches 'Chakr DeCoV' to decontaminate N95 masks, a sustainable solution to fight COVID-19

Realising high reliability on N95 masks by the healthcare workers to fight against the coronavirus, IIT Delhi incubated cleantech start-up, Chakr Innovation has developed Chakr DeCoV, an ozone-based decontamination device to enable safe reuse of N95 masks.

This decontamination device has been launched at a time when the country needs it most to strengthen the fight against COVID-19 pandemic as unsafe re-use of N95 masks may put lives

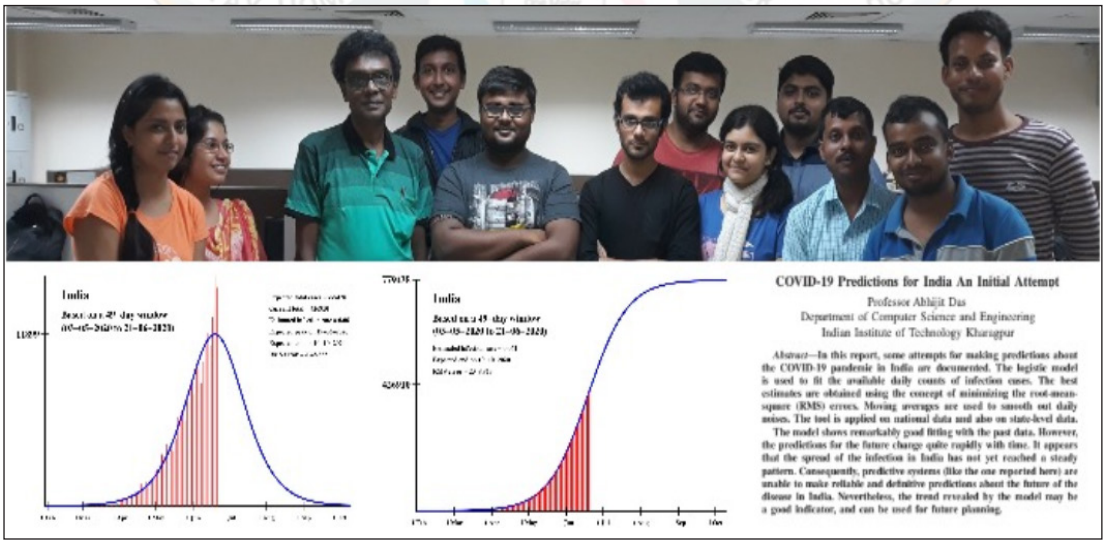
of the healthcare professionals at risk. Moreover, increase in the biomedical waste could cause additional infection and environmental risk. Determined to solve these problems, IAN Fund-backed, IIT Delhi-incubated start-up Chakr Innovation has come up with this unique, cost-effective technology that helps decontaminate N95 masks in only 90 minutes for safe reuse.

Designed in the shape of a cabinet, Chakr DeCoV is built with an innovative decontamination mechanism, which utilises the high penetrability of Ozone gas for cleaning the pores of the N95 mask, ensuring complete decontamination of its intricate layers. Ozone is a strong oxidizing agent that destroys viruses by diffusing through the protein coat, resulting in damage to the viral RNA. Proper dosage and exposure of Ozone can result in inactivation of SARS-CoV-2 and a 99.9999% reduction in bacterial load, after which an N95 mask can be reused for up to 10 times without any impact on the filtration efficiency (as tested by SITRA).
Some of the commonly available systems with UV light-based decontamination are insufficient due to shadow effects and limited penetration through the pores of N95 masks. The viricidal effectiveness has also been tested by ICMR-NIV showing virus inactivation in desired material (permeable material including N95 masks). The system is designed with biosafety door and a catalytic reduction system to ensure utmost safety against any human exposure to ozone.

Website link:
https://home.iitd.ac.in/news-chakr.php

IIT Kharagpur develops COVID-19 Predictive Model for Decision-making

Indian Institute of Technology Kharagpur (IITKGP) has developed a prediction system to help predict the future spread of COVID-19 and help decision-making in healthcare, industry, economy, and even academics. Prof Abhijit Das from the Department of Computer Science



and Engineering has developed a logistic model which can be used to fit the available daily counts of infection cases. The data used for the predictions pertain to the entire country and for the eight most affected states in the country including Maharashtra, Tamil Nadu, Delhi, Gujarat, Uttar Pradesh, Rajasthan, West Bengal, and Madhya Pradesh.

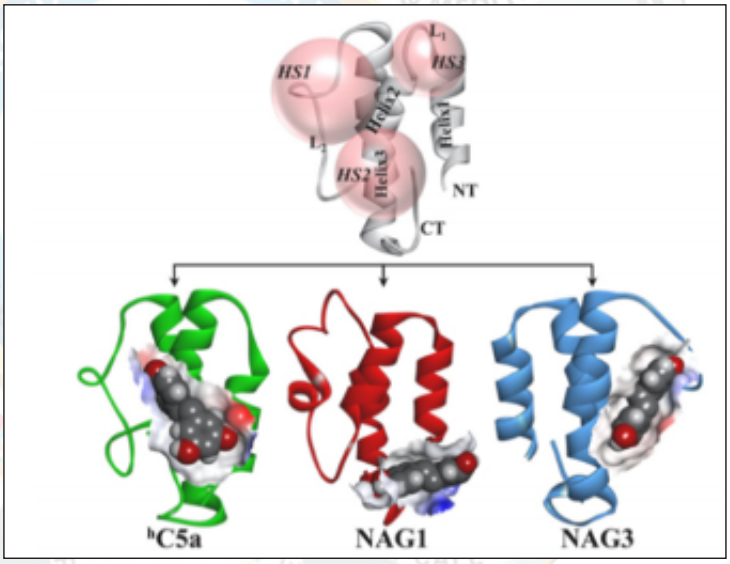
However, the predictions for the future change quite rapidly with time. There are several potential factors for this such as different mobility patterns of people in different phases of lockdown, large-scale migration of labourers, change in diagnostic facilities, evolution of the coronavirus, and so on. These are well beyond the control of the logistic model or any other currently known prediction model for that matter.

Although the implementation fails to generate stable and reliable predictions at the moment, the trend clearly reveals that the disease is going to stay in the country for many more months.

Contact Info: Prof Abhijit Das; abhij@cse.iitkgp.ac.in

Website link:
https://kgpchronicle.iitkgp.ac.in/iit-kharagpur-develops-covid-19-predictive-model-for-decision-making/

A study at IIT Bhubaneswar suggests polyphenols may be beneficial in COVID-19 management



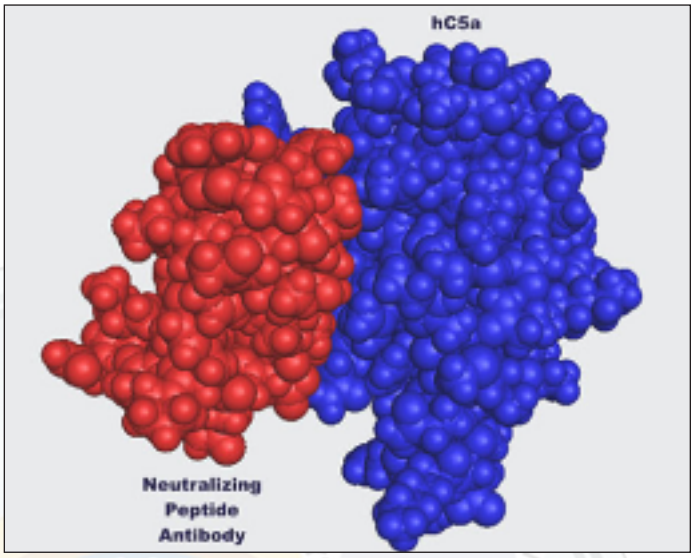
Resveratrol, the active pharmaceutical ingredient (API) found in several fruits, nuts and marketed nutraceuticals is one of the promiscuous polyphenolic phytoalexin known to promote good health, famously associated with "French Paradox". The health benefits of resveratrol could be due to its antioxidant activity or its direct interaction with target proteins, resulting modulation of several cells signalling and inflammatory pathways. Indeed, published study indicates that resveratrol can effectively inhibit replication of influenza A virus, including the MERS coronavirus. Moreover, resveratrol can also upregulate the ACE2 receptor expression, providing protective effect against the severity of SARS-CoV-2 infection.

Interestingly, the research group of Dr. S. Rana (Chemical Biology Laboratory), School of Basic Sciences, IIT Bhubaneswar have recently shown (Journal of Biomolecular Structure and Dynamics, 2020, doi: 10.1080/07391102.2020.1738958) that resveratrol can strongly bind the proinflammatory protein h C5a of the complement system, which may be beneficial for controlling the inflammatory response triggered by the complement system, whenever challenged by infectious pathogens like SARS-CoV-2.

Website link:
https://www.iitbbs.ac.in/modulation-of-the-c5ar-signalling-axes-by-resveratrol-binding-to-human-complement-fragment-5a--hc5a.php

IIT Bhubaneswar working on rational design and development of neutralising peptide antibody for human complement fragment 5a (hc5a)

COVID-19 is a disease caused by the SARS-CoV-2, which triggers aggressive inflammation response in the host body. Virus entry into the host cell triggers unregulated complement activation, resulting the onset of 'cytokine storm', which plays a significant role in acute lung injury. It is worth mentioning that respiratory distress is the prime reason behind the coronavirus-related mortality. Controlling the proinflammatory response of hC5a may work as an alternative to prevent acute lung injury triggered by the exposure to SARS coronavirus.



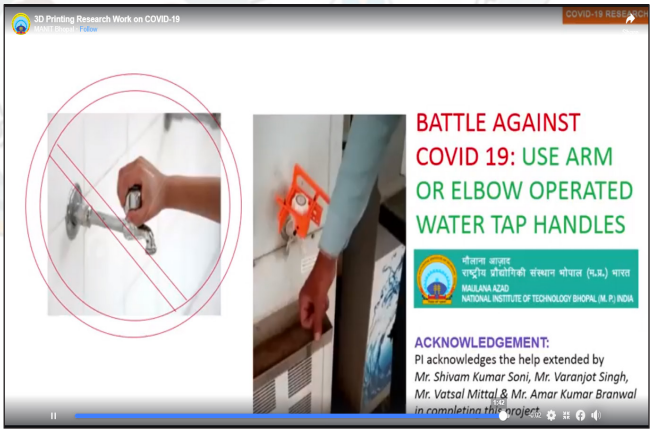
The research group of Dr S Rana (Chemical Biology Laboratory), School of Basic Sciences, IIT Bhubaneswar is on a mission to design and develop peptide-based synthetic antibody for neutralizing the harmful proinflammatory function of hC5a.

The computational biology aspect of the project will be conducted through HPC facility of IIT Delhi, which has recently approved the project through a special call for funding the COVID-19-related research.

Website link:
https://www.iitbbs.ac.in/working-on-rational-design-and-development-of-neutralizing-peptide-antibody.php

NIT Bhopal develops 3D printing arm-operated water tap to combat COVID-19

Water taps are set to be among the most contagious because of common washrooms having been permitted at crowded places. Therefore, to prevent direct contact, 3D printing has been utilised to fabricate arm- or elbow-operated water tap handles. Maulana Azad National Institute of Technology (MANIT) Bhopal has taken the challenge to convert this concept into implementation without removing any existing components and permit to open normal water tap handles along with different water flow rates by arm or elbow to make the water taps safer during public use of common washrooms at the crowded places.



Website link:
http://www.manit.ac.in/content/3d-printing-research-work-covid-19

NIT Silchar developing movable COVID-19 disinfection chamber based on UV irradiation

The COVID-19 pandemic is the global threat which transcends territorial, political, religious, cultural, and definitely academic boundaries. Healthcare workers and biologists are at the frontline, working for mitigating the outbreak of the disease. Although the current challenge apparently seems far from the physical scientists and engineers who generally deal with inanimate objects, there is a scope for them to contribute to this global crisis. To address this challenge, National Institute of Technology (NIT) Silchar planned to set up a movable COVID-19 disinfection chamber operated by UV-C light (wavelength of 200-280 nm in the electromagnetic spectrum) that has been known for long to disinfect a variety of substances including food and water.

The technology works by its germicidal effects, destroying microorganisms such as virus, bacteria by cleaving their DNA structures upon absorption of UV. The intensity of UV-C light and exposure time will be adjusted depending on the dimension of the chamber and the amount of substances to be cleaned. The designed chamber is made of plywood and comprising of wheels that make the system movable. The current approach is powerful and more convenient in terms of its low cost and non-invasive nature, in comparison to existing wet-chemical methods. This chamber can be used to disinfect a variety of daily used items including groceries, vegetables, wallet, currency, spectacles, luggage, books, pen, mobile phones, wristwatches, leather shoes, specifically the items which are susceptible to be damaged by detergent washing or other wet chemical methods. However, the present approach can only be applicable to disinfect non-living objects.

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Website link:
http://www.nits.ac.in/covid19.php

CESSI studies various aspects of lockdown in India

The Center of Excellence in Space Sciences India (CESSI) at IISER Kolkata has utilized their in-house modelling and data analytics capabilities to create resources intended for spreading scientific awareness about the pandemic among the general public and guiding future policies relating to the same. The resources available here are based on the CESSI-nCoV-SEIRD model which has been optimized for the Indian context at IISER Kolkata, data analysis of India-specific and some global data on the progress of the pandemic, and informational graphics and social media messages created by the Indian Scientists' Response to CoViD19 (ISRC) group – to which IISER Kolkata scientists have contributed.

The study highlights some issues that are very relevant to the coronavirus pandemic in the Indian context. It can pose some outstanding questions and provide model-based solutions that can guide public policy and catalyse socio-scientific awareness. These answers are backed by model predictions and data analysis of the observed trends in India. The study tries to find out the possible explanations of the following seven pertinent questions related to lockdown in India.

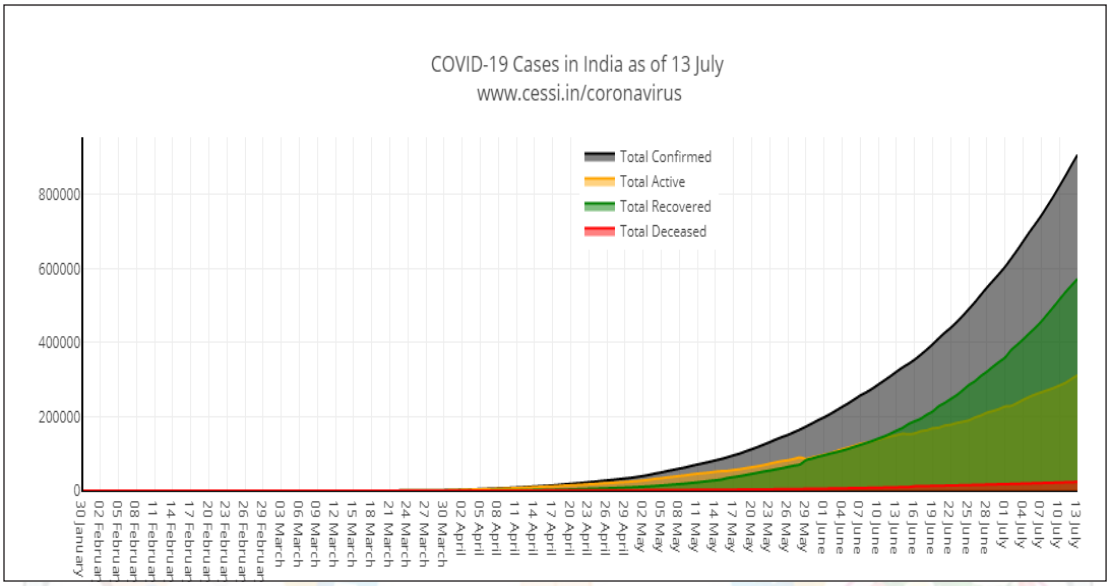
i) Is the Indian national lockdown necessary; what would have happened if there were no lockdown?
ii) How efficient is the Indian national lockdown?
iii) What is the simulated most-likely-scenario of novel coronavirus progression in India; what does this India-specific simulation tell us about the national containment efficiency and eventual numbers of affected individuals?

iv) Would it have been better if India imposed a complete national lockdown even earlier in February 2020?

v) What do empirical fits to the data tell us about the progression of the disease?

vi) Does empirical model fitting to the observed data on the novel coronavirus pandemic progression in India motivate the extension of the Indian national lockdown to 17 May 2020; how reliable are such empirical model fitting-based extrapolations?

vii) What is the best strategy for continuing a national lockdown or isolated regional lockdowns in various parts of India?



Contact Info: Prof. Dibyendu Nandi; dnandi@iiserkol.ac.in

Website link:
http://www.cessi.in/coronavirus/

SCIENCE OUTREACH & POPULARISATION EFFORTS

Initiatives taken towards Science Outreach & Popularisation

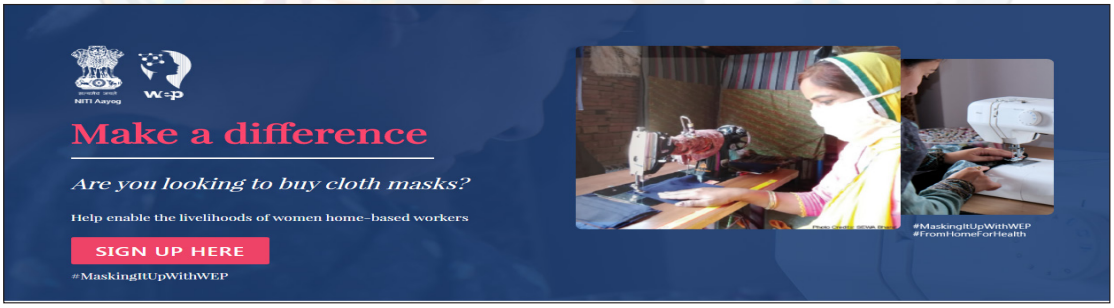
Since the outbreak of COVID-19 pandemic, the Ministry has supported numerous research projects and technology interventions through its various Departments, Autonomous Organisations, Professional Bodies, Statutory Bodies, and Laboratories. In the expedition of science outreach and popularisation, a number of knowledge and information products have been generated and released.

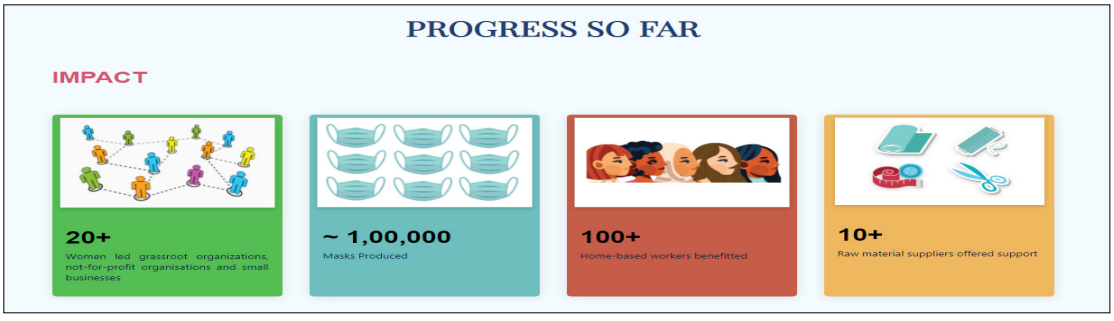
Efforts from Science Ministries, Departments & Scientific Organisations

Masking up with Women Entrepreneurship Platform, NITI Aayog's flagship initiative to promote women entrepreneurship

NITI Aayog has launched a campaign, termed as Women Entrepreneurship Platform (WEP), to enable and promote the livelihoods of women home-based workers making reusable cloth masks, in the aftermath of COVID-19 pandemic outbreak. The platform is a flagship initiative to promote women entrepreneurship in the country.

Home-based workers, especially women, are struggling to make ends meet in the uncertain time of the pandemic and are looking for alternate sources of income. Women working with grassroots organisations and small women-led businesses who have the required skill set and capability to stitch have adapted to the need of the hour by making reusable cloth masks.





The 'Masking it Up with WEP' initiative empowers women home-based workers from grassroots organisations, not-for-profit organisations and women-led small businesses during the pandemic by facilitating connections with potential buyers. In these times of economic distress, WEP hopes to reach out to allies who may be interested in supporting the livelihoods of India's home-based workforce as she works to build the post-COVID India.

Contact Info: snmohanty.iic@gmail.com; wep-niti@gov.inwep-niti@gov.in

Website Link:
https://wep.gov.in/wepmask.html

Government of India presents regular COVID-19 India Factsheet

India's coronavirus cases have crossed 8-lakhs mark and now, as on 13th July 2020, 8:00 AM, stands at 8,78,254 cases out of which 5,53,471 have recovered. Government of India, through its Open Government Data (OGD) Platform https://data.gov.in/, has taken the initiative to present the regular factsheet related to COVID-19.

OGD platform is aimed at supporting Open Data initiative of Government of India. The portal is used by various Ministries, Departments, and their organizations, to publish datasets, documents, services, tools and applications collected by them for public use. It intends to increase transparency in the functioning of Government and also opens avenues for many more innovative uses of Government Data to give different perspective.

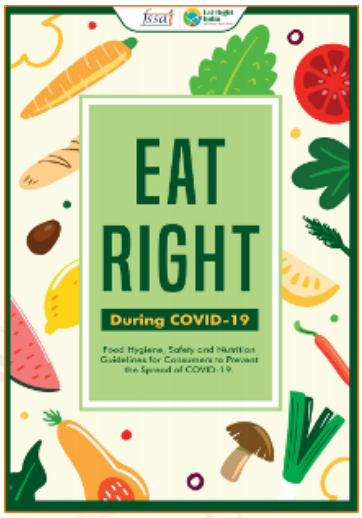
Website Link:
https://community.data.gov.in/covid-19-india-factsheet-as-on-13th-july-2020-800-am/

CSIR comes up with a compendium on technologies for COVID-19 mitigation

CSIR brings about a compendium on technologies for COVID-19 mitigation to provide an insight into the COVID-19 technologies developed by CSIR so far as well as to spur more innovations. With an 'Aatmanirbhar Bharat' high on its agenda, CSIR is eager to partner with more industries to take these technologies to the users although around 60% of technologies listed in this compendium have already been transferred to industry partners.

Website Link:
https://www.csir.res.in/sites/default/files/CSIR%20Technologies%20for%20COVID-19%20Mitigation.pdf

FSSAI issues food hygiene, safety and nutrition guidelines for consumers to prevent the spread of COVID-19



Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2 virus is the latest threat whose clinical and epidemiological characteristics are still being documented and has impacted the food industry adversely. The disease is spreading rapidly and the number of cases is rising in most of the countries and in India as well. The potential for food-borne transmission is a concern with every new emerging infection.

Food Safety and Standards Authority of India (FSSAI), the apex regulatory body for food safety in India, has issued the guidelines on food hygiene, safety and nutrition for consumers to prevent the spread of COVID-19. The pandemic has posed a threat to our health and wellbeing in recent times. The document highlights the best practices to be followed in the new normal of COVID-19 during food handling. It includes nutritional tips, standard operating procedures for food establishments, and community kitchens. It also provides clarifications on myths related to food hygiene and safety.

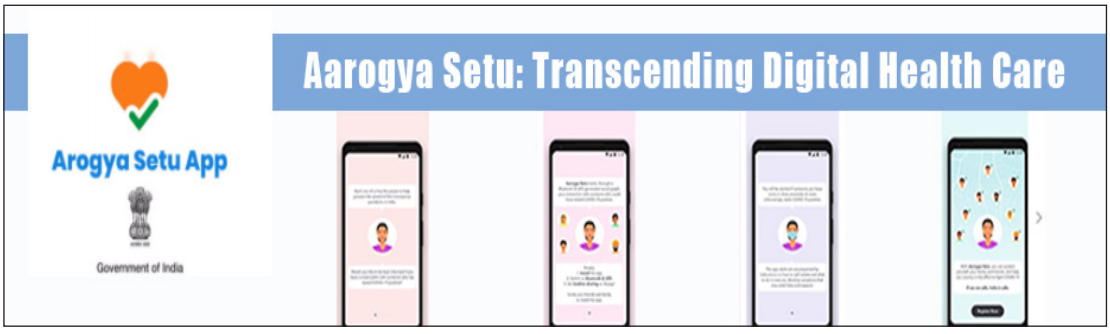
Website Link:
https://fssai.gov.in/upload/uploadfiles/files/Guidance_Document_Eat_Right_07_06_2020.pdf

Aarogya Setu: Transcending digital healthcare

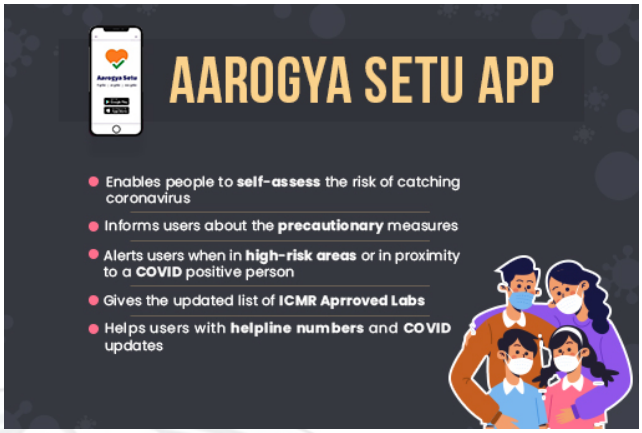
Aarogya Setu is a mobile application developed with an objective of enabling Bluetooth-based contact tracing, mapping of likely hotspots and dissemination of relevant information about COVID-19, by the National Informatics Centre (NIC) under the Ministry of Electronics and Information Technology (MeitY), Government of India on 2nd April 2020, to safeguard the citizens of India in the fight against COVID-19.

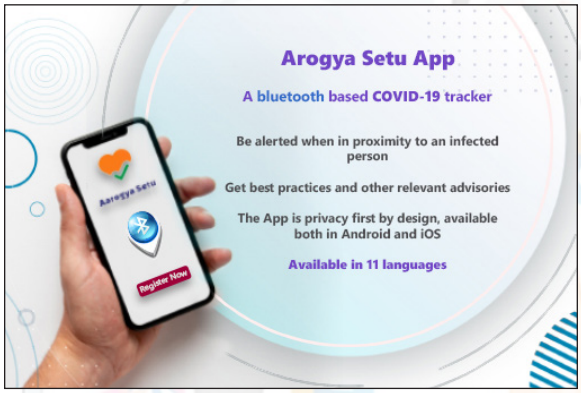
The app is aimed at intensifying the initiatives of the Government of India in proactively reaching out to and informing app users regarding risks, best practices and relevant advisories pertaining to the containment of COVID-19. The app utilises the data provided by the users, to track if one may have come in close contact with a COVID-positive person, via Bluetooth and location-generated social graphs. It uses contact tracing to record details of all the people one may have come in contact with during normal activities.

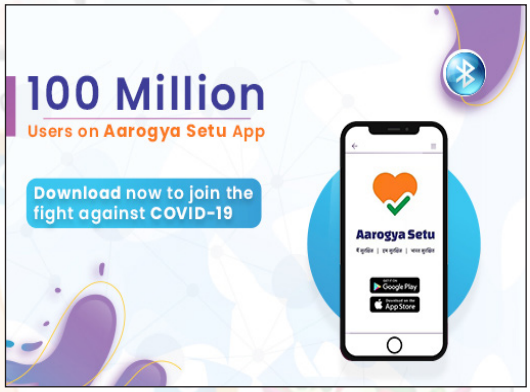
Since the app draws its functionality from location and user-generated data, it mandates more amount of data from different locations for improved efficiency. The app also consists of features such as the Self-Assessment Test, a complete list of helpline numbers across the country, and a Twitter feed that displays all the latest tweets from the Ministry of Health.



The Government of India is constantly working towards making the country safer. Aarogya Setu App is designed solely focusing on the health and wellbeing of the citizens. By registering, you can contribute to the common fight against Coronavirus and receive timely alerts, protect your family, friends and others around you from the virus transmission. Everyone, including researchers and users of Aarogya Setu, is encouraged to report any vulnerability impacting the privacy and the information security posture of Aarogya Setu application. In addition to security, suggestions for the code change for enhanced efficiency are also encouraged.







Website Link:
https://blog.mygov.in/aarogya-setu-transcending-digital-health-care/

MHRD launches MANODARPAN initiative to provide psychosocial support and mental health promotion for students, parents & faculty during COVID-19 pandemic and beyond

An effective, robust and stimulating psychosocial environment is fundamental to learning and progress to attain one's objectives in life. With the emerging needs and concerns of students coming from diverse backgrounds, different needs and aspirations, a holistic and comprehensive guidance system in the form of counselling services for mental health and well-being of university/college students is imperative. The aim of such services is to ensure students live their lives effectively and productively and become resilient over time with the help of life skills, even in the face of challenges, hard times and roadblocks.

Daily exposure to news about COVID-19 (Coronavirus) may result in a range of responses, particularly for students who have either been personally affected by the virus or are getting emotionally affected through their loved ones. Reactions can be emotional, somatic, and/or behavioural, and can impact mental and physical health of the youth country-wide.

'Manodarpan' is an initiative of the Ministry of Human Resource Development (MHRD) to provide Psychosocial Support for university/college students, parents and the faculty to deal with the current circumstances and sudden changes in life as a result of this pandemic.

Advisory for School Students:
https://mhrd.gov.in/covid-19/assets/img/pdf/advisory_for_school_students_0105.pdf

Advisory for College & University Students:
https://mhrd.gov.in/covid-19/assets/img/pdf/advisory_for_university_students_0105.pdf

Contact Info: manodarpan-mhrd@gov.in

Website link:
https://mhrd.gov.in/covid-19/

CSIR-NISCAIR brings out weekly e-Newsletter on COVID-19

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is bringing out a newsletter dedicated for the COVID-19 outbreak. The newsletter covers stories and information on various aspects, like research, technology and innovation efforts to fight out the pandemic and related awareness and sensitisation information.

Website Link:
https://www.niscair.res.in/covidbulletin/view/11

https://www.niscair.res.in/covidbulletin

Efforts from Vigyan Prasar

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 Department of Science and Technology. 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 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 of the information products produced by India Science.

1. Weekly COVID video bulletin: Produced in both Hindi and English language weekly basis from 7 July 2020, COVID bulletin apprises the audience about the latest development happening in S&T in India that are helping in managing and overcoming the challenges thrown up by the pandemic. Vigyan Prasar has produced daily COVID-19 Bulletin during 11 April to 06 July 2020.
2. COVID Explained - Short films to explain important research finding related to COVID-19 in layman's lingo produced on weekly basis. The subjects chosen for this short film caters to the curiosity of common man related to COVID-19.
3. Facebook live sessions on interviews of various stakeholders and media with DST Secretary.

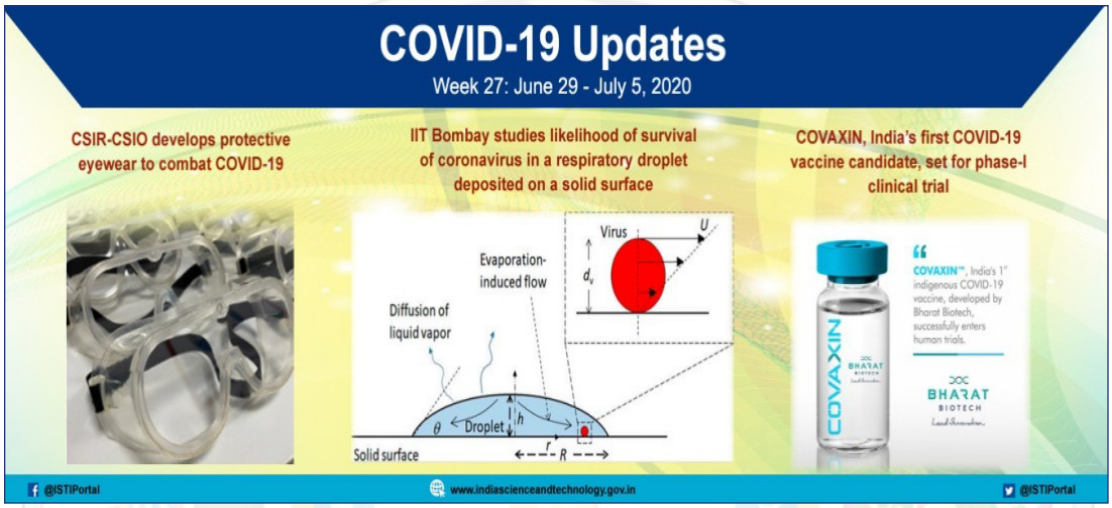
Contact info: kapil@vigyanprasar.gov.in

Website link:
https://www.indiascience.in/

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 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 & award opportunities spanning from school to faculty level; pooling together conferences, seminars and events; and projecting science in India with its major achievements. The ISTI web portal has been developed by Vigyan Prasar, an autonomous organisation of the Department of Science and Technology (DST).

In the critical times of outbreak of COVID-19 pandemic, the web portal serves as a one-stop online information guide to bring together a collection of resources in response to the COVID-19. These resources are generated by efforts made by numerous initiatives and schemes taken up by several Departments and Ministries of Government of India. These are



being implemented by public-supported research institutions in India. 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, its presentation of symptoms, transmission modes and mechanisms, and various models of protection of individuals, healthcare professionals & prevention from spreading to the community. The reasons, usefulness and impact of social distancing have been communicated in an easy-to-understand manner.

The Research and Development efforts made at Ministry level and various funding organisations are enumerated here on as-and-when-available basis. The innumerable infographics have been provided here are sourced from various organisations for efficient delivery of the information and targeting the common people as the largest stakeholder. The frequently asked questions and myth busters are also answered here.

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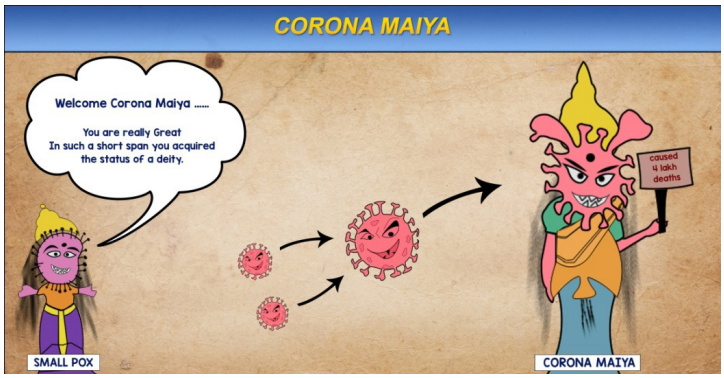
Website link:
http://indiascienceandtechnology.gov.in/covid-19-the-pandemic

Storytelling through Comic Characters

The COVID-19 pandemic has posed multiple prevalent challenges to the entire humanity. In the wake of its outbreak, our lives have changed in ways none had ever imagined before. All indications are leading to the conclusion that we all would have to learn to live with coronavirus, and there might be no early tapering off of the disease. This would require an adjustment to a

new normal of several aspects of our day-to-day life. It is only natural to feel scared, stressed and saddened because of it. However, there are measures that we can take to be both physically safe and mentally healthy in these times. Dr B K Tyagi, Senior Scientist at Vigyan Prasar is continuously preparing several interesting awareness material in which the information is depicted with the help of comic characters. Contact Info: bktyagi@vigyanprasar.gov.in



Website Link:
https://drive.google.com/file/d/1HSOsvn2EoewALc-KsqBnnMxqdloiNjEp/view

Weekly Publication of e-Newsletter on COVID-19

For the benefit of its stakeholders and target audience, Vigyan Prasar is bringing out a weekly e-Newsletter on the most relevant initiatives and efforts taken by Government of India through its various Science Ministries, Departments, and Funding Organisations. These organisations are continuously striving for combating the outbreak of COVID-19. These research-driven and technology-based interventions have been initiated on war footing to fight out the outburst of the pandemic.

The consolidated edition, dated 9th July 2020, consisted of the compilation of the developments in the preceding week of the publication as well as impactful initiatives taken in the last quarter (Apr-Jun 2020) in fighting the evil out. The e-Newsletter aims to be a handy guide to scientists, researchers, and scholars, especially those who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare and making the nation Atmanirbhar.

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Website link:
https://vigyanprasar.gov.in/covid19-newsletters/

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