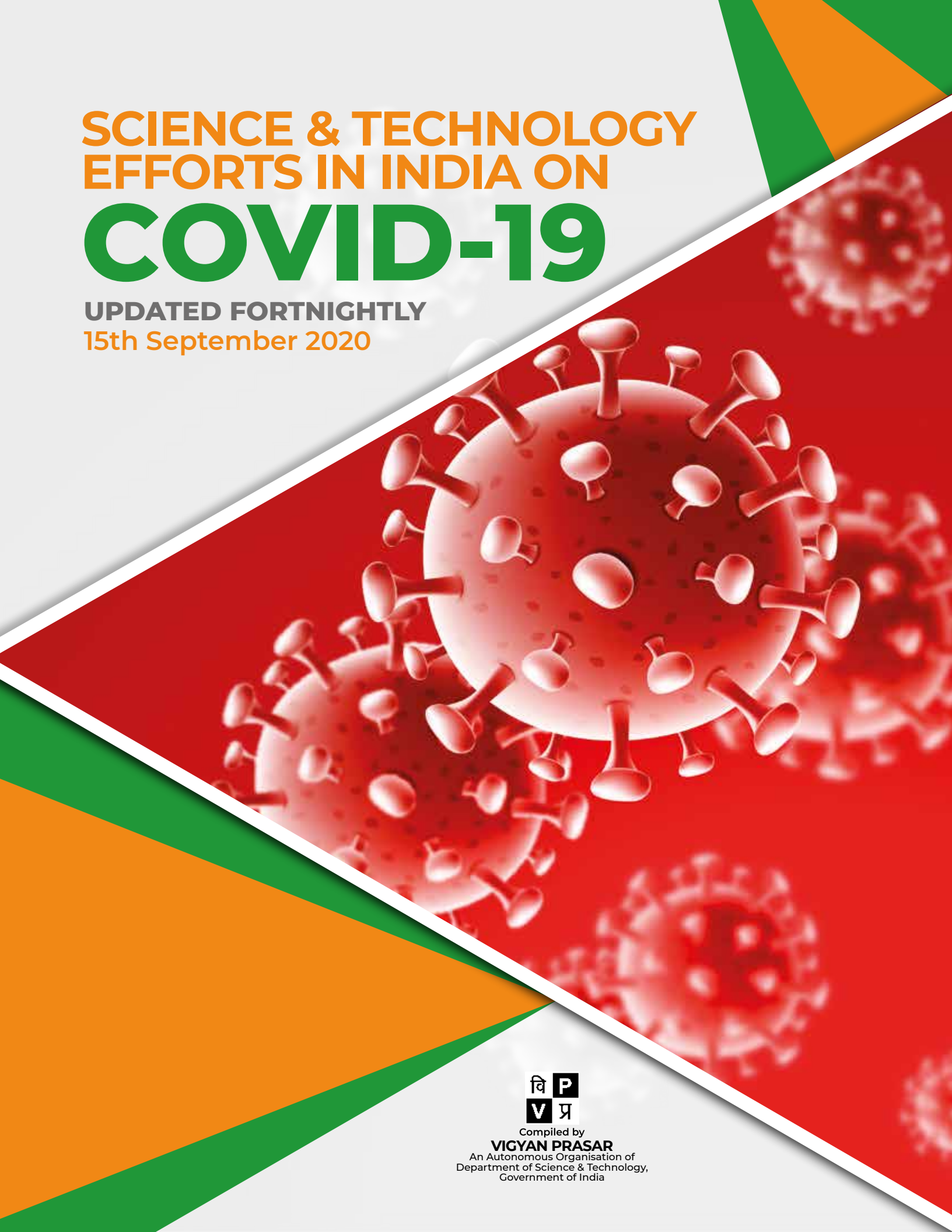
SCIENCE & TECHNOLOGY EFFORTS IN INDIA ON COVID-19

UPDATED FORTNIGHTLY

15th September 2020



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

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

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 is unleashing a human development crisis. On some dimensions of human development, conditions today are equivalent to levels of deprivation. The crisis is hitting hard on all constitutive elements of it: economy, health and education. Most of the current strategies to reduce the risk of SARS-CoV-2 transmission are based on controlling interactions between humans, including case isolation, tracking patient contacts and screening passengers crossing borders. The 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. We all are adapting to live with coronavirus and adjusting to new normal of several aspects of our day-to-day life, since there is no early tapering off of the disease.

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. For the benefit of the stakeholders and target audience, Vigyan Prasar is preparing and publishing compilation of the most relevant initiatives and efforts taken by the Government of India through its various Science Ministries, Departments, and Funding organizations, in the shape of daily, weekly, and now fortnightly e-Newsletter. 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, has invited Calls for Proposals (CFPs) and Expressions of Interest (EoIs), announced various hackathons and challenges and reached out to general public through various apps, pledges, etc. to enhance research and development-related activities to battle the pandemic out as well as making the nation aware and self-reliant.

The pandemic was superimposed on unresolved tensions between people and technology, between people and the planet, between the haves and the have-nots. These tensions were already shaping a new dimension of inequalities pertaining to enhanced capabilities and the new necessities of the 21st century. But the response to the crisis carries the potential to shape strategies on how those tensions can be addressed and how inequalities in human development are reduced. 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

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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)

India to double its testing capacity - InDx - a new project facilitated by Office of the PSA

A major project has been launched to indigenously manufacture, in bulk quantities and at much lower costs, all reagents needed for RT-qPCR-based and other molecular methods of diagnostics of COVID-19. The Rockefeller Foundation has provided financial support for the project executed by the Bangalore Life Science Cluster, which would improve access to COVID-19 diagnostics across the country.

The COVID-19 pandemic has been unprecedented and has severely affected countries across the world. India, with its population of more than 1.3 billion, is scaling to test rapidly and widely across its population. Considering the nature of the virus, its mode of transmission and non-availability of effective drugs and vaccines, the best way to check the spread of the infection and save lives (and livelihoods) is by testing larger number of individuals and isolating the positive cases. In this context, there is an urgent need to scale up the production of RT-PCR and other molecular diagnostic testing kits in the country.

The newly launched project called Indigenisation of Diagnostics (InDx), anchored at Centre for Cellular and Molecular Platforms (CCAMP), aims to build a robust supply-chain network of Indian MSMEs capable of producing reagents that go into a testing kit as well as manufacture testing kits. The project involves identifying bottlenecks in the supply-chain network, short-falls in quality levels and gaps in the ability of these MSMEs to scale-up. The project would hand-hold MSMEs in meeting both quality and quantity such that the network would be able to put together a million indigenous kits a day. The project employs a dynamic digital supply-chain platform developed pro-bono by Tata Consultancy Services (TCS). In addition, the project envisages providing support to maintain a sustainable business plan for the consortium with the help of experts in the field.

Prof K VijayRaghavan, the Principal Scientific Advisor to the Govt of India, who is overseeing India's efforts of indigenisation of biomedical products, said "this is a multipurpose project addressing not only the COVID-19 crisis but aimed at helping MSMEs to expand their business opportunities and to improve the overall healthcare system by developing more high quality, but low cost molecular diagnostics. Important collaboration with The Rockefeller Foundation will enable our MSMEs to meet global standards."

"The generous support by The Rockefeller Foundation and enthusiastic response by MSMEs to participate in the proposed supply-chain network has given the confidence that we would be able to meet the target of one million kits per day within the next few months," says Dr Taslimarif Saiyed, CEO of CCAMP, who heads the project at Bangalore Life Science Cluster.

Prof Satyajit Mayor, Director of NCBS, Bangalore, an advisor to the project says "This initiative may help innovations in our ability to meet global quality and thereby our MSMEs may not only be able to serve the Indian market and be able to export to the other needy countries at very competitive prices. We hope to expand the project to include other new molecular diagnostic methods such as Lateral Flow Assays or LAMP-based assays for COVID-19 testing, newly developed saliva-based sampling tests, which are point of care tests and also scalable to test at scale."

"Strengthening India's ability to develop fully indigenous diagnostic kits is expected to improve the entire healthcare system as affordable molecular diagnostics may soon be available for other diseases, particularly cancer and rare tropical diseases" says Prof. LS Shashidhara, Dean (Research) at Ashoka University, who is also an advisor to the project.

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SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

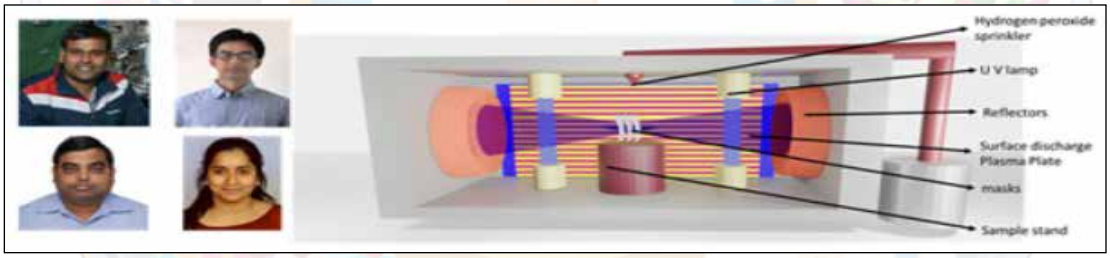
DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

Portable sterilization unit using new hybrid technology can decontaminate PPEs rapidly

Scientists have developed a portable sterilization unit using a new technology called the hybrid sterilization system that can decontaminate personal protective equipment (PPE) necessary for combating COVID-19, easily and rapidly, allowing them to be used multiple times.

It can be used by health professionals and other COVID warriors for whom PPEs are essential and can prevent generation of hazardous solid waste from PPEs.

IIT Tirupati (IITT) and IISER Tirupati have jointly developed the Portable Optical Cavity Sterilization Unit (POSCU) to provide efficient and rapid decontamination of PPE and other household items.A working point-of-use sterilization unit has been developed with the support of Science and Engineering Research Board (SERB), a statutory body under the DST.



The schematic design of the sterilization unit along with the contributors Dr Reetesh Kumar Gangwar (top left); Dr Arijit Sharma (bottom left); Dr Shihabudheen M. Maliyekkal (top right); and Dr Vasudharani Devanathan (bottom right).

Website link:
https://dst.gov.in/portable-sterilization-unit-using-new-hybrid-sterilization-technology-can-decontaminate-ppes-rapidly

Canister bag that solidifies infectious secretions like COVID-19 can save health workers from exposure during handling

Infectious secretions from contagious diseases such as COVID-19, tuberculosis (TB), and influenza pose high risk for healthcare workers. Their exposure to the high-risk hazard while handling the waste can soon be controlled with a canister bag that solidifies the secretions rapidly, making disposal safer.

For the safe management of infected respiratory secretions, the researchers at Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), an autonomous institute under the DST, Govt. of India, have come up with a method for safe handling and disposal of respiratory secretions in hospitals for ICU patients or those with copious respiratory secretions treated in the wards. They have developed canister bags lined with super-absorbent material containing an effective disinfectant, named "AcryloSorb".

Website link:
https://dst.gov.in/canister-bag-solidifies-infectious-secretions-covid-19-can-save-health-workers-exposure-during

CeNS surges ahead with COVID solutions & novel nano- and soft-functional materials.

The Centre for Nano and Soft Matter Sciences (CeNS) engaged in materials research at all relevant length scales, with current focus on a variety of metal and semiconductor nanostructures, liquid crystals, gels, membranes and hybrid materials has recently contributed significantly to the COVID-19 challenge. When the whole world was debating about the effectiveness and breathing comfort of face masks to fight COVID-19 effectively, its innovation attracted headlines for their uniqueness. One of them was a cup-shaped design of the mask that helps to create enough space in front of the mouth while speaking. It has been transferred to a Bengaluru-based company for mass production.

CeNS Jalahalli Campus

CeNS Materials Laboratory Arkavathi Campus

Website link:
https://dst.gov.in/cens-surges-ahead-covid-solutions-novel-nano-and-soft-functional-materials

Eleven Indo-US scientist teams selected to jointly scout for COVID-19 solutions

Eleven teams of Indian and US scientists will soon start jointly scouting for out-of-the-box solutions ranging from novel early diagnostic tests, antiviral therapy, drug repurposing, ventilator research, disinfection machines, and sensor-based symptom tracking for COVID-19.

The teams have been selected to take up these initiatives through a rigorous binational review process of proposals received for an invitation under COVID-19 Ignition Grants in April 2020 issued by the U.S.-India Science and Technology Endowment Fund (USISTEF).

The USISTEF announced the awards to eleven bilateral teams proposing out-of-the-box, innovative ideas to address the COVID-19 challenge. The USISTEF has been established by the Government of India (through the DST) and the governments of the United States of America (through the Department of State) for the promotion of joint activities that would lead to innovation and entrepreneurship through the application of science and technology.

Website link:
https://dst.gov.in/eleven-indo-us-scientist-teams-selected-jointly-scout-covid-19-solutions

Scientific Endeavours by Department of Science & Technology (DST) subsequent to COVID-19 emergence

India was heading towards being a developed economy following the vision of Dr APJ Abdul Kalam, by identifying its competence, youth talent and available natural resources. It was the time to break the barriers towards national development and allow free flow of amenities including Information, Communication and Technological aids, that is, solar-powered equipments, smart agriculture practices, and best and new healthcare practices such as telemedicine, to connect with rural people. Food, Water, Sanitation, Education, Healthcare, Energy and Employment security were top regional and national priority to achieve Sustainable Development Goals (SDGs) by 2030.

All of a sudden in March 2020, the entire world stagnated due to unprecedented outbreak of the COVID-19 disease, affecting human lives globally and thus changing our national priorities. All Line/Functional Departments/Ministries started working concurrently for management, prevention and corrective procedures such as setting up quarantine centres, treatment facilities, preventive measures, virtual awareness programmes, developing shelter homes, running community kitchens, producing Personal Protective Equipment (PPE) etc. across the country. This was a crucial time to work for the underprivileged sections of the society, especially farmers, farm workers, artisans and other self-employed or wage-employed workers in rural areas, facing the deprivations and hardships during the lockdown. Some of the initiatives have been listed in the following section.

RESEARCH & TECHNOLOGY

Centre for Augmenting WAR with COVID-19 (CAWACH) Program

The program is meant to support product, solutions and innovations in the areas of diagnostics, therapeutics (drugs, vaccines, devices, ventilators and PPEs, informatics including bio-informatics and information management systems, any intervention) for the control of COVID-19 and/or start-up ideas to address/mitigate various challenges faced by country/society due to severe impact of COVID-19.

The Society for Innovation and Entrepreneurship (SINE), the TBI (Technology Business Incubator) supported by DST at Indian Institute of Technology, Bombay was identified as the Implementing Agency of the Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH). The CAWACH program has been implemented in partnership with associations with Satellite Centres, Ancillary Centres and partners who are having expertise and track record of supporting start-ups in healthcare areas.
The CAWACH centre is in the process of completing the modalities with regards to documentation and finalising the agreements with reference to deliverables, milestones, utilisation of funds etc.

Seed Support System

The NSTEDB, DST-supported Seed Support System (SSS) is to ensure timely availability of the seed support to the deserving incubatee start-ups within an incubator, thereby enabling them to take their venture to next level and facilitate towards their success in the market place. The scheme also enables the incubator to widen their pipeline of start-ups and also share the success of their start-ups which would also result in ensuring their long-term operational sustainability.

DST has extended directives to the TBIs to utilise seed fund on priority basis for supporting start-ups working solutions for COVID-19-related challenges. The incubators have also initiated specific calls on this and funded start-ups providing solutions for COVID-19-related challenges.

Initiatives by Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST)

In the wake of the crisis situation during the COVID-19 pandemic, the three wings of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) namely the Biomedical Technology Wing (BMT), Achutha Menon Centre for Health Science Studies (AMCHSS) and the Hospital Wing have tried their best to face the unprecedented emergency situation.

A number of measures have been taken for mitigating the effects of the COVID-19 pandemic not only for the institute but also for the entire country with the full utilization of resources and best of its capabilities. Though the institute had to quarantine a number of staff when a foreign-returned doctor was detected with COVID-19 much before the nationwide lockdown, SCTIMST rose up to the occasion to bring out several technologies, products, patient management guidelines etc. that could be crucial to combat the disease not only for the institute, but for the state and entire country. Furthermore, SCTIMST has evolved a fast-track method to come out with the biomedical devices, technologies and guidelines useful for the management of COVID-19 in the country, in addition to streamlining the management of patients with cardiac and neuro illnesses in the hospital wing.

BIOMEDICAL TECHNOLOGY WING

The BMT wing stood out with its research, technologies and innovations to meet the need of the hour in India's fight against COVID-19. Around 30 patents have been filed for these technologies. Under the leadership of the Director of the institute, it evolved a fast-track method coordinating the all-round efforts of scientists, engineers and doctors on to developing the following technologies:

1. Chitra Magna RNA Isolation Kit;
2. Chitra Rapid Antibody Test Kit;
3. Chitra LAMP-N COVID test kit;
4. Chitra Embed Nylon Flocked Swab;
5. Chitra ENMesh Swabs and VTM Kit;
6. Automated AMBU ventilator/respirator;
7. MediCAB deployable isolation wards, hospitals, ICUs;
8. Chitra Isolation Pods;
9. Chitra Clinical Examination Booth;

10. Chitra Single Chamber Swab Collection Booth;
11. UV-based face mask disinfection bin;
12. UV-based multipurpose disinfector;
13. Chitra Disinfection Gateway; and
14. AcryloSorb Advanced super absorbent.

COVID-19 MANGEMENT – INCUBATION ACTIVITIES (SCTIMST TIMed)

SCTIMST-TIMed is a Technology Business Incubator for Medical Devices and Biomaterials funded by the DST, Govt. Of India. In the COVID-19 crisis situation, TIMed has been working on fast-track mode to reach out to the innovators or companies and to support them. Brainstorming sessions were held with existing start-ups and Prayasees of TIMed to come up with quick-to-market interventions that could be manufactured even in the lockdown situation.

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES (AMCHSS)

The Achutha Menon Centre at the Institute is actively involved in supporting the Hospital Wing and the State in the containment of COVID-19 through the COVID Cell constituted by the Director at the Institute. Further, it is helping the State Health Department also by preparing a number of new initiatives and proposals.

Comfortable face mask designed by CeNS could encourage public to use it for long hours

A team of researchers at Centre for Nano and Soft Matter Sciences (CeNS), Bangalore, an autonomous institute of the DST, have developed a cup-shaped design (patent filed) of the mask that helps to create enough space in front of the mouth while speaking. It has been transferred to a Bengaluru-based company for mass production.

This snug fit mask causes no speech distortion, no fogging on glasses, and indeed packs well all around, leaving practically no room for leakage while breathing. Another important advantage is its high breathability allowing one to wear it without any discomfort. Further, the researchers have chosen the fabric layers such that there is a possibility of deactivating pathogens sheerly by the electric charges that may prevail under mild friction due to the triboelectric nature of the fabric.

SCIENCE & SOCIETY

As the community was highly distressed due to prevailed situation, DST took initiatives and issued advisory to its S&T-based Voluntary Organizations spread across the country for COVID-19 awareness, activities towards the production and supply of affordable, locally made Personal Protection Equipment (PPE) like face masks, hand sanitizers, hand wash, gloves etc. by mobilizing communities and engaging Self Help Groups (SHGs), people institutions, rural youth with possible technical know-how from nearby institutions.

Several S&T-based voluntary organizations working with SEED Division, across the country including those through grant-in aid long-term core support towards addressing livelihood challenges have come forward to contribute towards this national crisis. They started responding on day-to-day basis with their community-based management plan to adopt the basic preventive measure (human-to-human transmission), production and distribution of health and hygiene-related products such as hand sanitizers (alcohol-based), homemade mask (2-3 layer), hand wash, face shields, and liquid disinfectant etc. as per prevailing standards. These basic actions not only ensure livelihoods security but also take care of the healthcare needs of the community in inclusive manner. Besides, these people-centric organizations are also making efforts to address urgent requirements of food, nutrition, livelihood, and animal care, which needs to be assured in time of lockdown, when supply from outside is cut off due to limited transport and communication facilities. In such an endeavour, these S&T-led voluntary organizations delivered immediately the following interventions.

FlyBase, an enterprise Incubated at the Bhau Institute's Incubation Centre, Government College of Engineering, Pune, Technology Business Incubator (TBI), under a DST NIDHI TBI Scheme is offering a digital platform that can monitor ground level situations by using drones. The platform called FlytNow allows drones that are increasingly being used for aerial monitoring, emergency response, or urgent delivery of blood samples, medicines as well as lockdown surveillance. Via FlytNow, police authorities are now carrying out live, remote drone operations to monitor the overall social situation through an operator-friendly dashboard and take measures to monitor crowds and maintain public safety.

Society for Economic & Social Studies (SESS), Delhi currently is engaged in sanitizer manufacturing in compliance with World Health Organization (WHO) standards. SESS will make and supply about 10,000 bottles (100 ml each) of sanitizer by engaging rural artisans in its field station located at Sahaspur, Dehrdaun. SESS has developed a Sanitization Chamber/ Booth to disinfect one person from head to foot using Hydrogen Peroxide spray while entering or exiting hospitals and/or any other health, quarantine facility. Prototype has already been developed/field tested and plans for commercial production as micro enterprise are underway. SESS has also undertaken home-scale or small-group production of simple 2- or 3-ply masks with quality control by engaging SHGs following the protocol recommended by Principal Scientific Advisor (PSA).

These SHGs have prepared 10,000 masks and efforts are underway to develop linkages with State Rural Livelihood Mission, National Bank for Agriculture and Rural Development (NABARD), Uttarakhand State Council for S&T (UCOST) and other State Government agencies to explore possibility of procurement from SHGs promoted by SESS. A target of 10,000-50,000 masks is being proposed depending on the extent to which the above linkages fructify. SESS is already manufacturing 100% natural Liquid Hand-wash (USFDA specifications) with anti-viral properties using local Ritha (*Sapindus Mukorossi*), a technology developed under Core Support programme of SEED, DST. Natural liquid Hand-wash packed in 500 ml bottle is now being promoted for use at the community level in leading to alternative source of livelihoods for SHGs and health benefits to people at large.

Barefoot College, Tilonia, Rajasthan immediately initiated making facemasks for the locals using double layered cotton cloth material and distributed to nearby villages of Tilonia as Rajasthan was at high risk due to large number of COVID-19 cases reported. It plans to prepare 200,000 masks for use by frontline health workers and at community level. The College used technology intervention in their Fab Lab for making 3D-printed masks for mass production. So far, 50 pieces of 3D masks have been designed, and efforts are also being made to make and supply alcohol-based hand sanitizer (150 ml bottle) for community use.

In order to take care of the immediate food and health care requirement of a basic kit containing food grains, facemask, hand sanitizer and basic awareness information in their local language, was distributed for 1000 underprivileged families in and around Tilonia.

Two-ply mask by Barefoot College

The 3D mask by Barefoot

Sai Institute of Rural Development, Varanasi is working with Zardozi Cluster and has taken initiative by involving women beneficiaries to manufacture and distribute face mask, hand gloves, and to make available sanitizer/hand wash and food packets to community including migrant labours, bus drivers, policeman, and women in rural areas. SIRD has manufactured 2000 three-layer cotton mask (from Khadi cloth) and 2000 standard gloves as per WHO guideline through its trained women beneficiaries.

Society for Technology & Development (STD), Mandi, HP is mobilizing/helping the women SHGs, Kisan clubs and local voluntary organizations in making reusable 3-layer cotton masks through videos as per guidelines. It is also creating awareness among community by disseminating method/Standard Operating Procedures (SOPs) for sterilization of reusable cotton masks for safe use. Initially 2000 masks have been produced by 7 SHGs from Nagwain, Panchayat, Sadar Block, Mandi HP. STD is also in process to conduct training/production on preparation of liquid hand wash from local materials having anti-microbial properties such as Soap nut extract and Aloe vera in consultation with NBRI, Lucknow/IHBT, Palampur.

Himalayan Research Group (HRG), Shimla is preparing 5000 face masks by the local women groups for distribution to selected Panchayats namely Kamrunag, Kandhi and Jahal of Gohar Block in District Mandi H.P. through active involvement of Panchayat Raj Institutions (PRIs) and distributing 1000 sanitizer bottles (100 ml) as well. HRG is mobilizing mountain community and generating awareness across the selected mountain areas about social distancing, use of masks and Ayush formulations to enhance immunity at the household level with rejuvenation of traditional food and nutritional systems. Promotion of local traditional crops like buckwheat, amaranth, red rice, barley, kidney beans, apricot and herbs like Chirayita (*Swertia cordata*) in mountains will not only ensure food nutrition and health but will also help in many therapeutic as well as livelihood needs of the community.

Vivekananda Institute of Biotechnology (VIB), Nimpith is serving people in ecologically fragile and climatically vulnerable area of Sunderban in West Bengal. They are working in close collaboration with the concerned block level officials in 11 districts. They have taken initiative towards development of face shields as per the guidelines of knowledge institutions and working towards installation of disinfection chamber in its campus. If successful then it will be up scaled at different field locations/service points in South 24 Parganas, Kolkata and Nadia districts. College students are also being involved in healthcare measures such as

spreading awareness at local level through print media, demonstrating the use Arogya Setu App.

During the health emergency declared due to COVID-19 by Kerala Government, Community Agro-Biodiversity Centre (CAbC), **M.S. Swaminathan Research Foundation (MSSRF) Wayanad, Kerala** demonstrated preparation of hand sanitizer (as per the WHO guidelines) to various departments viz., District Administration (District Collectorate), Excise Department and District Medical Authority (DMO) for its bulk production. In addition, MSSRF also supplied ready-to-use hand sanitizer (20 L) prepared in the laboratory by using the available Isopropyl Alcohol to the District Administration and the Assistant District Magistrate (ADM) upon their request. Sanitizer was also supplied to the local Youth Clubs and Grocery shops and the public (15 L). MSSRF has also joined hands with the State level campaigns for spreading awareness on the importance of personal hygiene and social distancing to combat COVID-19 infection via social media.

These organizations stood out because of their commitment towards community and served the immediate need with their knowledge and limited resources available at that point of time. There were several constraints like license and relevant permissions to operate during lockdown but they served as per their capacities. **Sardar Patel Renewable Energy Research Institute (SPRERI), Anand**, **Gujarat** though constrained due to license-related issues has plans to produce hand sanitizer around 3500 bottles of 100 ml capacity for rural healthcare centres and Asha workers in rural and tribal areas of Anand and Chota Udepur District, Gujarat.

https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf
http://164.100.117.97/WriteReadData/userfiles/FINAL%20MASK%20MANUAL.pdf

A. Face Shields by Vigyan Ashram

Maharashtra had reported highest number of COVID-19 cases in India with more than 3500 confirmed cases. Fab Lab of **Vigyan Ashram (VA), Pune** acted immediately**,** prepared more than 2500 face shields with the help of Design students, and supplied to local Kendur and Mahalunge Padwal healthcare centres, ASHA workers, Dairy workers and Latur Police Department. Currently, it is engaged in manufacturing 400 shields per day under lockdown constraint following social distancing norms to cater the local need.

Specification of the Face Shield:
Optically clear anti-fog face shield that protects face and mask from direct spatter, verified by doctors.
Thickness: 178 micron
Height: 21-40 cm
Width: 18-20 cm
Weight: 10-15 gm
Material: Cellulose acetate & foam board
Usage: Multiuse
Latex free: Yes

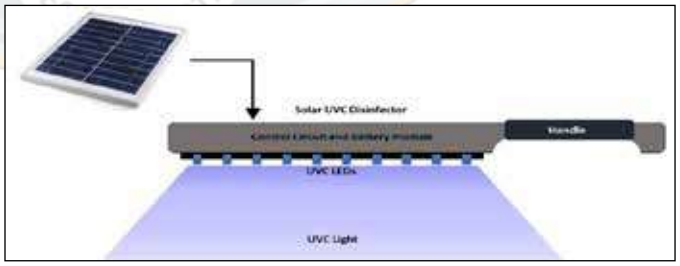

Vigyan Ashram provided face shields to Latur Police Department and to Kendur and Mahalunge Padwal healthcare centers

B. Pedal-operated, bamboo-based hand washing device developed by NB Institute of Rural Technology (NBIRT)

NBIRT, Tripura developed a pedal-operated, bamboo-based handwashing device costing around Rs.180 which will also be helpful in reducing the wastage of water during its operation. NBIRT installed this device in front of Banks, Ration shops, medicine shops, markets and in village communities in Tripura. This simple device could easily be fabricated by rural artisans using four bamboo pieces, plastic jar (used/new) of 2-3 litre capacity with a hole on its top and is hanged with a nylon rope between the structures. More than 100 women and unemployed youth have been trained in manufacturing of this device and developed business model.


Handwash device developed by NBIRT, Tripura

In addition to these technology, NBIRT is developing UV-C-based Disinfector, powered by Solar Energy. UV-C provides rapid, effective deactivation of microorganisms through a physical process. When bacteria, viruses and protozoa are exposed to the germicidal wavelength of UV light (UV-C), they are rendered incapable of reproducing and infecting. UV-C light has demonstrated efficacy against pathogen organisms including bacteria, viruses and parasites. Two devices will be developed and field tested by NBIRT shortly as a handheld device and a standalone device for disinfection.



Design of handheld disinfectant device

New livelihood opportunities in Rural Areas

Due to disruption of livelihood by the pandemic situation, several women SHGs are finding tailoring as their main source of income and are diverting their activities towards facemask production units within the villages. The new opportunities for livelihoods at village level are:

- Production of herbal sanitizers;
- Liquid hand soaps;
- PPE for community health workers;
- Value added products from local resources (Immunity booster); and
- Nutritional Supplement.

Soaps and detergent making units formed under SHGs are actively involved in producing cleaning agents and soaps. By such initiative, many of the villages have become self-sustainable to meet the immediate need of cleaning materials and soaps.

India being an agrarian economy we must focus upon our resources at village level and strengthen the ecosystem of farming with central harvesting, grading, sorting and processing units. Village-level food processing centres operational with support from SEED division of DST can be scaled of to cater the need of nearby villages.

Accordingly, SESS is procuring and processing 2 ton of Millets benefiting around 20-25 farmers for producing nutritionally value-added products like Cookies, Snacks etc.

HOSPITAL WING of AMCHSS

The faculty of hospital wing and AMCHSS under the leadership of the Director swung into action mode needed for patient and staff protection as soon as the crisis of COVID-19 set in with the diagnosis of the disease in a member of the faculty. The communications between the staff was done mainly via digital conferencing since a sizeable number of the personnel in different departments were sent to home quarantine. The remaining non-quarantined staffs were in duty duly following the guidelines regularly updated by the government and the COVID cell headed by the Director.

Measures and Safety Precautions in the OPD

- Queuing at entrance area is discouraged and token numbers are issued to patients by security personnel. They are advised to be seated at the waiting areas maintaining social distancing until their turn comes.

Social distancing by patients

- Entry of the patients is regularized and a staggered system is followed.
- Facilities for hand washing with soap and hand sanitizers are provided at the entrance to the OPD.
- Patients and bystanders are advised to wash their hands and wear facemask properly before entering the hospital. Masks are provided if required.

Hand washing facilities with soap and hand sanitizers at hospital entrance

- All staffs at OPD area are required to wear preventive equipments like mask, gloves and also to use hand sanitizers or wash with soap frequently. In addition, facial visors are used by doctors and nurses during patient interactions.
- Security personnel conduct temperature screening, with thermal scanner, at the entrance. All patients, bystanders, visitors to various departments and staff members are screened.
- Next level of screening is done using a proforma for COVID-19 screening by the Medical Social worker in the Patient Management Services.
- If any of the checklist questions is positive, the patient is directed to triage area and will be communicated to concerned OPD. The concerned doctor will examine the patient at triage area with all preventive precautions like PPE. Hotspot notifications in the intranet were reviewed on a daily basis and the patients from these areas were also triaged.


Triage area

- Structural modification has been done at Information Centres and OPD Nursing station by fixing glass partitions.
- Chairs are rearranged near OPD and outside waiting areas to ensure social distancing.

Measures and safety precautions in the Inpatient Department

Separate areas have been demarcated in all inpatient areas for COVID-suspected patients in all admitting departments. Furthermore, special COVID Isolation facilities have been created in one block of the hospital to take care of critically ill COVID-19 patients:

- The existing Neuro-medical Ward has been converted to COVID-19 Isolation ward by providing additional medical gas outlets including oxygen, air and vacuum ports. Electrical work has been done for accommodating additional patient monitors, ventilators, etc. The entire area has been air-conditioned and exhaust outlet has been provided for increasing the air changes to reduce the risk of COVID-19 spread through aerosols by the Division of Clinical Engineering.
- The Neuro Medical ICU has been converted into a negative pressure isolation ICU by re-designing and installing suitable exhaust blowers with filters.
- Separate entrance/exit and areas were made for donning and doffing of PPE for managing sick COVID-19 patients.

- Congenital Heart ICU has been converted into a negative pressure isolation room by re-designing and installing suitable exhaust blowers with filters.
- Additional options were installed in selected Adult Cardiac surgical and Neuro surgical OTs for switching between positive and negative pressure to meet the infection control requirements to reduce the impact of aerosol-generating procedures-induced COVID transmission.
- Most of the critical equipments were serviced and repaired to meet the COVD-19 emergencies. Extra preventive maintenance was done for making the equipment ready to meet the emergencies, since most of the equipment were idle during the lockdown period.
- Critical Air Handling Units rooms and CT room were installed with UVC germicidal UV tubes for reducing the aerosol infections.

CT room with installed UV lights

- Disinfectant, face mask, N 95 masks, COVID guard face shield, gloves, and PPE kits were made available for all staff according to guidelines.
- Standard operating procedures (SOPs) were placed in SCTIMST intranet after approval by COVID cell for everybody's information.
- New protocols for periodic checking of critical care equipment during lockdown period were developed by the Division of Clinical Engineering.
- Procurement of essential spares and consumables were done in order to manage the epidemic/pandemic outbreaks and lockdown conditions.

Furthermore, we formulated focussed guidelines and protocols for the safety of our staff and patients undergoing diagnostic procedures such as echo, ultrasound, CT, X-ray, DSA, MRI, ECG, EEG, EMG etc. For example, Echo was modified in two ways:

i) Plastic sheet screens were kept between patient and operator with transparent plastic covers. Holes in the proper places ensured access to patient with probe.

ii) Sono Box: Developed by the Department of Clinical Engineering of the Hospital Block it is an enclosure inside air-conditioned echo rooms to prevent aerosols. It has UV sterilisation which is done after attending each patient. It is equipped with HEPA filter with negative suction which will prevent aerosol spread.


Modification in echo lab


Sono Box

Successes, Best practices

- All the departments started working during lockdown to manage the emergencies initially and then the elective work also started.
- Tele-consultation services and counselling over phone was offered during this period to reduce the stress and strain of the patients and to prevent travel.
- In quick time, two ICMR-approved COVID-19 test laboratories have been set up to test people or patients suspected to have contracted the infection. This facility was mainly used by the state government.
- The departments has succeeded in keeping down the stress and anxiety levels of all staff, students and patients to a minimum during the COVID-19 period by counselling and regular training classes.
- Nursing department has been actively involved with the establishment of the COVID-19 testing lab at the institute. Further, it gave training to all the staff in donning and doffing of PPE, management of COVID-19 patients on ventilators and cleaning and waste management.
- Relatives of the patients were made aware on hand washing and use of face masks by the nursing department.
- Four-hourly cleaning of all units and 2-hourly surface cleaning for frequently touched areas such as OPDs were ensured.
- Regular rounds by infection control team and nursing officers were conducted.
- Accommodation was arranged for staff in nursing hostels and a nearby hotel during the lockdown period.
- The morale among staff and students remained high.
- Online teaching was ensured to the Resident who was on quarantine due to the stipulated regulation.
- A patient from adjacent medical college COVID-19 ward was transported by the red protocol recommended by the ICT of medical college Trivandrum and SCTIMST and the necessary interventional procedure was performed on 19th May 2020 which highlights the coordination with other departments in other institutions.

S&T-led Voluntary Organizations

Government of India is taking all necessary steps to ensure that the community is prepared well to face the challenges and threat posed by the growing pandemic of COVID-19. Field agencies and volunteers are supporting government actively towards containment of this disease. The most important factor in preventing the spread of the virus locally is to empower the citizens with reliable trustworthy information and taking precautions as per the advisories issued by Ministry of Health & Family Welfare time to time. S&T-led Voluntary Organizations played their role efficiently towards this goal using conventional and innovative methods of awareness creation using various platforms such WhatsApp, emails and Community Radio. Some noteworthy activities of these Groups in last 15 days in this direction are as follows:


कोरोना से बचाव के लिए पोस्टर के माध्यम से किया जागरूक

News Coverage: Jansandesh TimesBadhohi edition, dated 10.04.2020

Gorakhpur Environmental Action Group (GEAG), Gorakhpur, UP started working immediately before the lockdown, when news of COVID-19 started pouring in with a specific strategy

to tackle it in rural areas at the community level in Gorakhpur, Mahoba, Bhadohi districts in Uttar Pradesh and Supaul and West Champaran in Bihar. The organization responded with three-level strategy:

a) **Awareness Generation at Community Level:** In regular project meetings and activities, community members were briefed on preventive measures about COVID-19 as per the prescribed guidelines of Central and UP Governments.

b) **SMS-based Advisories:** GEAG works with large network of small and marginal farmers linked with GEAG's weather-agro advisories, received on their mobile phones. GEAG made opportunistic use of this facility and developed an SMS-based advisory on preventive measures for current harvesting season keeping in mind the COVID-19 outbreak. The advisory included the information related to personal hygiene, handwashing, use of masks and social distancing norms to be followed during harvesting of crops. The advisory is being sent regularly at an interval of 5 days to about 1887 farmers.

c) **Community Volunteers as 'Corona Warriors'** Frontline workers such as ASHA, Anganwadi Workers, Village Pradhan, Teachers and Volunteers have an important role to play in sensitizing the communities and guiding them. These frontline workers were sensitized about the severity of COVID-19 pandemic and they were encouraged to disseminate the necessary information to the communities to protect against the spread of Coronavirus.

d) **Helping underprivileged farmers and families:** GEAG also supported needy and poor farmers through Self Help Groups (SHGs) and Krishi Seva Kendra at the village level. Following support is being provided to the farmers and vulnerable groups:

i) Technical support is provided to the farmers on phone regarding cultivating vegetables with appropriate precautionary measures.

ii) Information related to availability of small equipment and organic inputs like neem cake, bone meal, Trichoderma etc. and vegetable seeds at Agro Service Centres free of cost to the needy farmers were made available.

iii) Community level Grain Banks were used to provide wheat and rice to agriculture labourer families stranded due to lockdown.

iv) Cooked food was provided to some poor families in the villages

v) The 3 SHG groups of Gorakhpur and members of Village Disaster Management Committee of Laxmipur Rampurwa of Bagha block West Champaran constituted under the project (Supported by Lutheran World Relief) have come forward to support their fellow community members and frontline workers by developing clean cloth masks and distributing them in the village. GEAG distributed 220 masks in Gorakhpur and West Champaran districts to the vulnerable households especially in Harijan Tola.

In Central India, Madhya Pradesh reported third highest cases of COVID-19 with Indore district emerging as the hotspot. Daily earner groups like hawkers, labourers, rag pickers, vegetable sellers, beggars, workers working in unorganized sectors etc. are highly vulnerable groups facing severe challenges such as lack of food, medicines, medical facility (inaccessible due to lockdown). DST-supported group **Madhya Pradesh Vigyan Sabha (MPVS)** ensured the availability of foods/Ration kit, medicines, and medical facility and also created awareness among such highly vulnerable groups. It reached out to network partners like Bharat Gyan Vigyan Samiti (BGVS), Peoples Science Movement (PSM), Democratic Women Organisation (JMS) and Jan Swasthya Abhiyan (JSA). MP Chapter in 11 Districts of MP (Bhopal, Indore, Chhindwada, Hoshangabad, Katni, Sheopur, Morena, Sehore, Bhind, Jhabua and Badwani) created a group of 60 volunteers. These volunteers are working on awareness generation activities related to COVID-19 in communities through WhatsApp, emails. They also addressed challenges pertaining to wellbeing of elderly through psychological counselling, lack of food and medicines, rescue of migrant people in 25 districts of Madhya Pradesh and intensively in Bhopal. MPVS is working towards the nutritional food requirement of distressed people through 11 Community Kitchens.

Table: Activities by MPVS, Bhopal : Response to COVID-19

SN	Activities	No
1.	Cooked food packet supplied through 4 Community Kitchens in Bhopal	7500
2.	Dry food packets Distributed	3000
3.	No. of persons rescued	150
4.	Masks distributed in Tamia, Katni, Sheopur and Bhopal	2000
5.	Medical facility provided through Doctor's Group	185
6.	Counselling done through Counsellor's Group	115

Awareness Campaign by MPVS at Village level, Sehore District, MP

Peermade Development Society (PDS), Idukki, Kerala participated in **"Break the Chain"** initiative by Government of Kerala, through circulation of posters and brochures about WHO-recommended hand washing protocol to self-help groups and families using social media and digital platforms. PDS also organized telephonic emergency management guidance programme to 60 village-level animators coordinating such healthcare initiatives in each village. A video-based training support was provided to village animators and SHG members regarding the making of facemasks in rural households. The focus is to promote participation of rural people in the awareness and training programmes organised by Government of Kerala in various sectors. A training video was created for village animators and SHG members about making facemasks in rural households.

It also counselled people in distress through its family counselling centre located in Kattappana, through telephonic and online counselling support system by a team of two experienced and professionally qualified counsellors.

FEEDS, Manipur prepared a short informative video in Manipuri, Hindi, Nepali and Naga dialect highlighting COVID-19 disease, its symptoms, importance of mask usage, sanitization, social distancing, and importance of installing Aarogya Setu. The video also provides important toll free numbers in Manipur for assistance. The video was circulated across seven districts covering 200 villages including chiefs of the villages (more than 2500 people) through WhatsApp. Community Radio Station (91.2 MHz) at FEEDS campus is also playing crucial role in creating awareness by broadcasting relevant information thrice daily. It also created a three-minute video in Manipuri, Nepali, Hindi and Naga dialect on making of face masks at household level using used washed household material such as T-shirt.

Volunteers from **Society for Energy, Environment & Development (SEED), Hyderabad** interacted with people in the community through WhatsApp or other social media during the lockdown. The organization has distributed self-explanatory pamphlets on precautions as issued by Govt. of India/State Govt. or WHO for wide circulation to volunteers and is devising various strategies to train (Train-the-Trainer) the SEED volunteers in the 'Know How' and 'Do How' of basic practices of hygiene-based and social distance-based preventive measures.

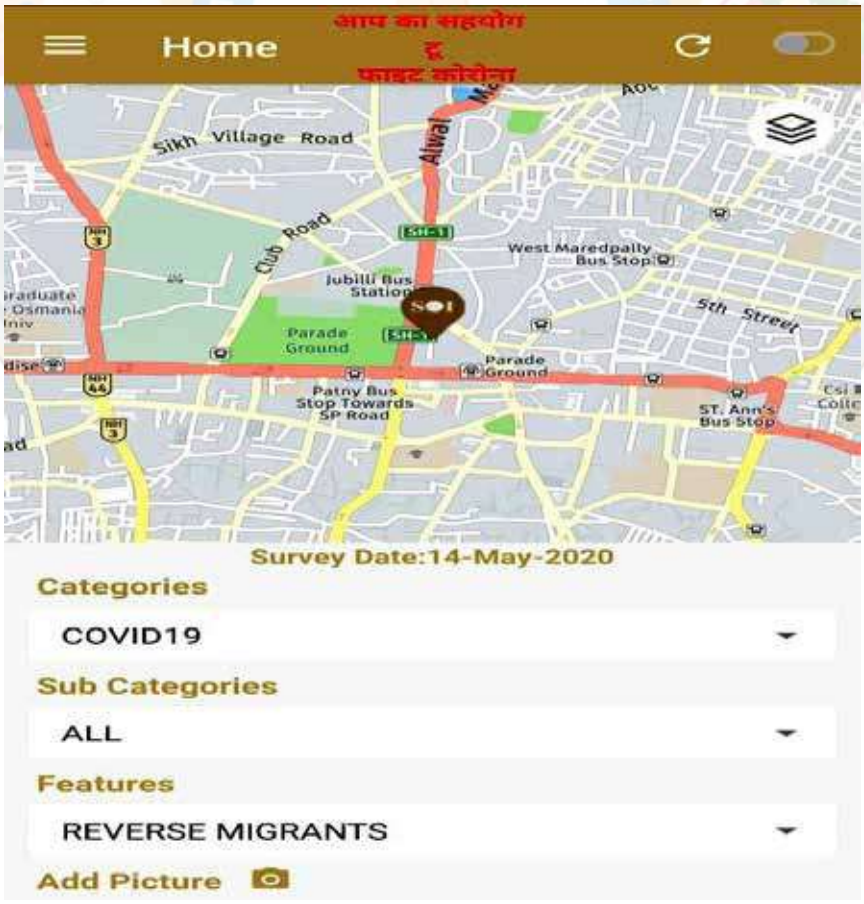
Village-level volunteers, especially SHG members, are being trained through WhatsApp video-messaging, leaflets etc. as well regarding collaboration with governmental/PRI village-level workers such as ANMs, Asha workers, Anganwadi workers, Gram Sevaks, Gram Pradhans etc. on social distancing, hygiene practices, symptoms and spread of disease by SESS, Delhi near Dehradun, Uttarakhand.

India is surely fighting against Corona with NGOs playing extremely important role in reaching out to people living in villages in different states. These NGOs are also working in tandem with State Government in State level campaigns to combat COVID-19 via social media, awareness through pamphlets, multimedia e-content containing information of precaution and healthy food, home exercise to the general population for the COVID-19 or flu-like symptoms and track them for the same. These organizations also ensured awareness regarding safety management, nutrition care, and immune booster food to fight against infections. Such community-based awareness programmes are relevant to ensure better healthcare and social security during lockdown and post-lockdown period.

Initiatives of NRDMS Division: Geospatial-based solutions to address the challenges in COVID-19 crisis

In a response to combat COVID-19 pandemic-related challenges, National Geospatial Programme Division (erstwhile NRDMS) of the DST, Government of India (GoI), has made efforts to integrate available geospatial datasets, standards-based services, products, applications; and analytic tools from its attached offices and programme divisions. The attached offices, such as, Survey of India (SoI), National Atlas & Thematic Mapping Organisation (NATMO), and the DST's programme division, National Spatial Data Infrastructure (NSDI), have pulled together their resources to provide the integrated geospatial platform for not only addressing the present geospatial needs of the decision-makers but also devising area-specific strategies for socio-economic development in the post-COVID-19 mitigation scenarios.

Survey of India (SOI) portal www.indiamaps.gov.in/soiapp/ is available as the core of the integrated geospatial platform to address COVID-19 outbreak and its socioeconomic impact. For required data collection pertinent to COVID-19 emergency management, the Sahyog mobile App of SOI has been customized. The App contains interface in local language viz. Hindi to capture data on the problems of reversed migrants. The collected data is hosted on the above platform and for that an POI (point of interest) has been also created.



Screenshot of Sahyog mobile App of Survey of India depicting the added feature of reversed migrants.

Under NSDI, many State Spatial Data Infrastructure (SSDI) teams have utilized the Sahyog mobile App of SoI for collecting data for COVID-19. In Karnataka, 100 sample points for testing/training on Sahyog app from all 30 districts have been uploaded to the SoI Geoportal. Similarly, the GIS cells in all 13 districts of Uttarakhand are sensitized for using Sahyog app. In Uttarakhand, geotagging of dedicated COVID-19 Centres/isolated COVID Centres, and institutional quarantine centres with their attributes has been done. Data of the reversed migrants such as travel history of reversed migrants, place of migration, cause of migration, education level, technical skill, marital status, income at migrated place, income at home, what they want to do now, expectation from government etc. have also been collected in the State.

The functioning of NGOs of Science for Equity, Empowerment & Development (*SEED*) *division of DST has been* strengthened with basic geospatial tools and techniques so the outputs could be scaled up as per the current needs of the stakeholders in the COVID-19 scenario.

NATMO is in the process of launching a web-based thematic map service by combining its authoritative and reliable Atlas-based boundary data sets from its geoportal (http://geoportal.natmo.gov.in) with the health-related data sets from the Central and State level health authorities. The thematic maps provided at different levels of the governmental hierarchy (National, State, and District levels) will help provide the details of the unfolding geospatial patterns of COVID-19 occurrence.

In order to strengthen the geospatial analytics capabilities of the integrated platform, a Call for proposals (short-term) to address the COVID-19 crisis has been initiated in collaboration with AGNIi (Accelerating Growth of New India's Innovations) initiative of office of the Principal Scientific Adviser to the Government of India. Spatial analytics will be used to address issues pertinent to migratory workers viz. employment generation, strengthening of livelihood, community resilience etc.

These key geospatial inputs with integrated geospatial information content are expected to be useful for the decision makers and local authorities in preparing operational strategies in the present and future outbreak scenarios.

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF BIOTECHNOLOGY (DBT)

DBT-RCB signs MoAs for antiviral activity testing against SARS-CoV-2

The DBT's Regional Centre for Biotechnology (DBT-RCB) has signed memoranda of agreements (MoAs) with Zealous Health Pvt. Ltd., Hyderabad and Government Medical College, Thrissur, Kerala, to identify scope of services for antiviral activity testing against SARS-CoV-2.

Under the MoAs, DBT-RCB will provide antiviral activity testing against SARS-CoV-2 in cell culture models at a non-cytotoxic concentration of the test substance to meet the growing need for in vitro antiviral assays for the new drug candidate/test substances. Zealous Health Pvt. Ltd. Hyderabad and Government Medical College Thrissur, Kerala shall reimburse the cost of services. Earlier, a similar MoA was signed with Satej Global Science, Ahmedabad.

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DBT–IBSD provides surface disinfectant to Meghalaya Government

The DBT's Institute of Bioresources and Sustainable Development (DBT-IBSD), Shillong, Meghalaya, distributed surface disinfectant made in the Institute to the Veterinary Department of the State Government of Meghalaya in the presence of Dr A.K.N. Lamare, Assistant Director, Indo Danish Project, and his

INSTITUTE OF BIORESOURCES & SUSTAINABLE DEVELOPMENT (IBSD), MEGHALAYA

team, on 20 August, 2020 for disinfection of the cow shed areas and other milk processing units at Upper Shillong.

The initiative was taken up under the guidance of the Director, IBSD, Prof. Pulok K. Mukherjee with an aim to protect COVID-19 frontline workers. It may be noted here that DBT-IBSD Centres in different parts of North East India are actively participating and serving the society during COVID-19 pandemic through distribution of Institute made sanitizer, disinfectant and facemask. The Institute will continue its distribution to the city's numerous front-liners.

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DBT-InStem Sundowner Session on 'Research Funding'

The DBT's Institute for Stem Cell Science and Regenerative Medicine (DBT-InStem) is one of the founding partners of COVID Gyan, a pan-institutional website that has been proactive in COVID-19 outreach efforts. The website has been conducting Sundowner sessions in collaboration with Bangalore Life Science Cluster (BLiSc) every week for the benefit of the scientific community. The sessions focus on various topics relevant to the COVID-19 crisis.

The Sundowner Session on August 21 focused on 'Research Funding', a topic that is relevant to the entire research community. In recent times, the issue of funding has become a cause of concern for researchers. The session was hosted by Dr Vineetha Raghavan, Grants Manager at BLiSc.

The discussion panel included Dr Meenakshi Munshi of Department of Biotechnology; Dr Ajay Pillai, Head of the Project Cell, NCCS-Pune; Dr. Anirban Chakraborty, Director, Research & Development at Ashoka University; Vidhya Krishnamoorthy, Grants Coordinator at THSTI-Faridabad; Dr Vivek Dham, Advisor, Research & Innovation Delegation of the European Union to India; and Dr Srini Kaveri, Director, CNRS Office in India. Apart from funding agencies, the session was attended by research managers/administrators, students, postdoc fellows, faculties and scientists from early and senior career stages from various research organisations.

The thrust of the discussion was on how the current pandemic has impacted funding agencies and thus the availability of funds to researchers. The discussion highlighted that existing funding from DBT, DST, EU and CNRS has not abated and, instead, more COVID-specific avenues have opened up on fast-track mode.

DBT fellowships have been extended to reduce the impact on graduate students and postdoc fellows, especially those in the last phase of their work completion and program tenures. Research in foreign universities, new EU and French funding opportunities, and visa-related concerns were also discussed in the 100-minute session.

Scientists from organizations like CCMB, Hyderabad; IISER, Pune; and NCBS, Bangalore acknowledged that researchers with fellowships have not been financially impacted, but those on PI funding have been. Also, the COVID-19 crisis has brought to the fore issues that have simmered in the background for years, such as the need for childcare, incentives and career development support for early career researchers. How these six to eight months of lockdown and its aftermath will be assessed on job and fellowship applications remains unclear though. A video of the session is available on the COVID Gyan YouTube channel. DBT-InStem also did live tweets during the session.

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Drug screening for SARS-CoV-2 at DBT-ILS, Bhubaneswar

A research group headed by Dr Anshuman Dixit at the DBT's Institute of Life Sciences (DBT-ILS), Bhubaneswar has used state-of-the-art bioinformatics techniques to screen FDA-approved drugs against thirteen SARS-CoV-2 proteins in order to identify drugs for quick repurposing.

The strategy was to identify potential drugs that can target multiple viral proteins simultaneously and originates from the fact that individual viral proteins play specific roles in multiple aspects of viral life cycle such as attachment, entry, replication, morphogenesis and egress, and targeting them simultaneously will have a better inhibitory effect.

Furthermore, Dr Dixit and his team have analyzed that if the identified molecules can also affect the host proteins whose expression is differentially modulated during SARS-CoV-2 infection. The differentially expressed genes were identified using the analysis of NCBI-GEO data (GEO-ID: GSE-147507). A pathway and protein-protein interaction network analysis of the identified differentially expressed genes led to the identification of network hubs that may play important roles in SARS-CoV-2 infection. Therefore, targeting such genes may also be a beneficial strategy to curb disease manifestation. The group has successfully identified molecules that can bind to various SARS-CoV-2 and human host proteins. This study will help researchers in the identification and repurposing of multipotent drugs for the treatment of COVID-19.

The SARS-CoV-2 is a highly contagious pathogen that causes COVID-19. Unfortunately, there is no standard cure for the disease, although some drugs are under clinical trials. There is an urgent need for drugs for the treatment of COVID-19 and a lot of efforts are being directed towards the identification of molecules that can be helpful in its management.

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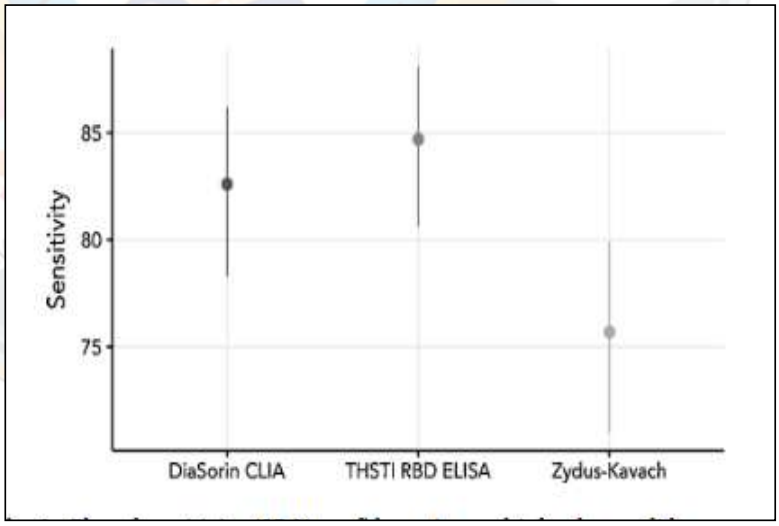
https://chemrxiv.org/
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02BB_31Aug2020.pdf

DBT-THSTI'S RBD-ELISA assay used for Pune COVID-19 serosurveillance study



Blood samples from 1664 consenting individuals, chosen as per the study design, were collected from 20th July to 5th August and processed to detect the presence of IgG antibodies against the receptor-binding domain (RBD) of the viral spike protein using the highly specific (100%) and sensitive (84.7%) RBD-ELISA assay of the DBT's Translational Health Science and Technology Institute (DBT-THSTI). This assay has been extensively characterized and compared with other commercially available tests for SARS-CoV-2 IgG at DBT-THSTI.

The other participating organizations were Christian Medical College (CMC), Vellore and the Pune Municipal Corporation (PMC). The survey specifically targeted selected high-incidence *prabhags* of Pune city. The study is supported by the Persistent Foundation.

The preliminary technical report and summary of the initial findings are available on IISER Pune's website. Detailed analysis and modelling of the data along with characterisation of the underlying immune response is ongoing and will be periodically updated.

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Werbsite link:
https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01BB_31Aug2020.pdf
https://science.thewire.in/the-sciences/antibody-test-kits-independent-verification-icmr-zydus-kavach-sensitivity/
https://reader.elsevier.com/reader/sd/pii/S138665322030351 6?token=D160E9453296CB1CB5E99AF45708C447161FD459A383DCE61591E51821ADAAD59A4A991889B6BB3A71FBBD7DA32A7D65

DBT-IBSD'S COVID-19 testing laboratory completes its first 1,000 tests

The COVID-19 testing laboratory set up by the DBT's Institute of Bioresources and Sustainable Development (DBT-IBSD) at Imphal, Manipur in collaboration with Jawaharlal Nehru Institute of Medical Sciences (JNIMS) has crossed an important milestone, with the testing of 1,000 samples.

The Indian Council of Medical research (ICMR), New Delhi had given its approval to the DBT-IBSD-JNIMS laboratory on 11th July 2020 for testing COVID samples.

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DBT–IBSD distributes surface disinfectant in Meghalaya and Sikkim

The DBT's Institute of Bioresources and Sustainable Development (DBT-IBSD) has distributed the Institute-made surface disinfectant to the State Bank of India and its ATM booth at 3rd Mile, Upper Shillong, Meghalaya and to the students of Human Development Foundation of Sikkim (HDFS) Boys Hostel at Chongay Tar in East Sikkim.

The distribution at the SBI branch in Upper Shillong was made in the presence of Ms. A. P. Sooting, Branch Manager, and her team. The HDFS boys hostel in East Sikkim provides education to underprivileged children. The initiative of distribution was taken up under the guidance of the Director, IBSD, Prof. Pulok K. Mukherjee with an aim to protect COVID-19 frontline workers and others.

DBT-IBSD has its head office in Imphal, Manipur and has centres in Shillong, Gangtok, and Aizawl. It has been taking steps to help boost the capacity of the various States in the north eastern region of the country to meet the challenges posed by the COVID-19 pandemic that is sweeping across the world.

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https://meghalaya.gov.in/press/content/37780

http://ibsd.gov.in

https://spnewsagency.com/the-ibsd-shillong-distributed-disinfectant-and-hand-sanitizer-to-sbi-bank-upper-shillong/

https://www.indigenousherald.com/TripuraNews/dbt-ibsd-distributes-disinfectant-and-hand-sanitizer-14013.html

https://theshillongtimes.com/2020/08/28/disinfectants-sanitisers-distributed/

http://www.meghalayamediaprovider.com/2020/08/27/6520/

COVID-19 Outreach Effort Web Gyan Session on 'Contact Tracing and Aarogya Setu'

Institute for Stem Cell Science & Regenerative Medicine (inStem), Bengaluru is one of the founding partners of an initiative named COVID Gyan that has been proactive in COVID-19 outreach efforts. Among other things, webinars are organised on topics of relevance to the ongoing pandemic.

In the seventh webinar session under the programme, Prof. V. Kamakoti of Department of Computer Science and Engineering, IIT Madras, spoke about 'Contact Tracing and Aarogya Setu'.

Aarogya Setu, a cell phone application, was developed in response to the need for contact tracing and generating data on infection during the COVID-19 pandemic. It is an open-source 'contact-tracing, syndromic mapping and self-assessment' digital service, developed by National Informatics Centre under the Ministry of Electronics and Information Technology (MeitY). The app was installed by more than 100 million in just 1.5 months of its launch. The source code was made public on May 26, 2020 amid growing privacy and security concerns.

In his talk, Prof. Kamakoti discussed the motivation, novelty and process which kick-started this effort. Highlighting the challenges, he stated that this kind of large-scale data-driven system needed a lot of interdisciplinary efforts and experts from computer scientists, epidemiologists, and social scientists to people for legal advice on data privacy. As one of the core members involved in developing this app, he also spoke about what they have learned from this effort, and how he sees the future of such data-driven interventions in healthcare and other sectors in India. He concluded his talk with how the individual user on one end and healthcare users on the other need to be using the app/its data responsibly for it to be effective in contact tracing and modelling.

The session was moderated by Prof. Rajesh Gopakumar, ICTS-Bangalore, Dr Prahladh Harsha, TIFR-Mumbai and Dr Uma Ramakrishnan, NCBS. This 90-minutes session was LIVE streamed on COVID Gyan YouTube channel. It was recorded on August 27, 2020 and can be watched here.

Contact info: Amrita Tripathy (tripathya@instem.res.in)

Website Link:
https://www.youtube.com/watch?v=Qvzciz1BfCk

DBT-THSTI partners National Medicinal Plants Board to evaluate plant-based formulations against coronavirus

Translational Health Science and Technology Institute (THSTI), Faridabad has entered into an agreement with National Medicinal Plants Board for pre-clinical and pharacokinetic evaluation of select AYUSH herbal extracts/formulations for mitigating SARS-CoV-2-associated pathologies. The principal investigator of the project is Dr Madhu Dikshit, National Chair, THSTI and former Director of CSIR's Central Drug Research Institute.

The National Medicinal Plants Board (NMPB) was established by Government of India to coordinate all matters relating to medicinal plants and support policies and programmes for growth of trade, export, conservation and cultivation. The board is part of Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homeopathy (AYUSH).

Contact info: Dr Siuli Mitra, (smitra@thsti.res.in)

Websie Link:
https://www.nmpb.nic.in/

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

IIIM devises novel COVID test kit for rapid diagnosis of infection, seeks ICMR nod for it

Jammu-based Indian Institute of Integrative Medicine (CSIR-IIIM) has devised a novel, simpler and cost-effective diagnostic kit for rapid testing of large numbers of suspected Coronavirus-infected people and has approached ICMR for its evaluation and approval, Dr D. Srinivasa Reddy, Director, IIIM informed. The new Reverse Transcriptase-Loop Mediated Isothermal Amplification (RT-LAMP) assay-based COVID-19 diagnostic kit has been developed as an alternative to the standard quantitative PCR (qPCR) after reverse transcription (RT) method, which is very sensitive but requires expensive instrumentation, Dr Reddy told PTI.

The new RT-LAMP assay-based kit has been developed by CSIR-IIM in partnership with Reliance Industries. Dr Reddy also informed that the novel kit has been submitted to ICMR and is presently under evaluation.

Giving further details, Dr Reddy said that the RT-LAMP assay does not require sophisticated and expensive equipment like a real-time PCR machine, required for RT-PCR test kits. "It does not need a PCR machine. So it will be a cheaper and faster kit (for testing). They will have to approve it. We are awaiting approval to go to market," he said.

Explaining the significance of the novel RT-LAMP assay-based diagnostic kit, an IIIM official said that amid the existing wave of infection, large-scale diagnostic methods are needed to determine the spread of the virus in populations quickly, comprehensively and sensitively for the rapid isolation of infected persons.

Additionally, continuous and repeated testing of large groups within a population may also be required as a long-term strategy to contain new outbreaks while keeping societies and economies functional until effective vaccines become available, he added.

In the given circumstances, the novel RT-LAMP assay-based diagnostic kit may prove to be an indispensable asset in the fight against the COVID-19, he said, adding the RT-LAMP test is rapid, accurate and cost-effective that can be done with indigenous components and set up with minimal expertise and instrumentation. Although the cost of the kit is yet to be decided, it will be much cheaper than the existing RT-PCR machines' cost, he said.

Website Link:
https://www.csir.res.in/slider/iiim-devises-novel-covid-test-kit-rapid-diagnosis-infection-seeks-icmr-nod-it

Antibodies against coronavirus stay in body for at least 60-80 days, study reveals

A sero survey conducted at a leading hospital in New Delhi over five months has found that the prevalence of antibodies, in a person who has recovered from coronavirus infection, persists for 60-80 days. The survey found that antibodies persisted in the recovered patient's body for at least 60 days, depending on when the participant was infected or came in contact with the infected person.

The participants of the sero survey, jointly done by the Max Hospital and Institute of Genomics and Integrative Biology, under the CSIR, will again be tested to assess how long the antibodies last in the person who contracted COVID-19, said Shantanu Sengupta, the IGIB scientist who conducted the study.

A total of 780 samples were used for the serological testing which include hospital workers and individuals who visited the hospital during the pandemic.

"Our study results confirm that anti SARS-CoV-2 antibodies could remain for more than 60 days in the body. This is a step forward towards better understanding of the infection recovery and re-infection pattern. There is a need for larger follow-up studies to further assess how long the antibodies remain stabilised in the body," Sengupta said.

Website Link:
https://www.csir.res.in/slider/antibodies-against-coronavirus-stay-body-least-60-80-days-study-reveals

Initiatives of CSIR Laboratories towards combating COVID-19, subsequent to COVID-19 emergence

RESEARCH AND DEVELOPMENT

The COVID-19 pandemic is currently causing chaos worldwide by infecting millions of people and claiming the lives of around a million. The world has come to a standstill because of this viral infection mainly due to non-availability of any effective vaccines or other treatment options. The immediate action that is being taken during the pandemic is repurposing of existing drugs or those in clinical trials. CSIR's strategic group initiative to develop new therapies includes repurposing existing drugs and developing new drugs for COVID-19.

In the present scenario, there is a huge demand for setting up testing and calibration facilities for Personal Protection Equipment (Masks, Gloves, Gowns, etc.), Ventilators and IR Thermal Scanner, as per National/International Standards. The existing testing infrastructure of the country is not adequate to cater the rising demand for testing of these items. As a responsibility of being the custodian of national standards of measurements, CSIR proposes to establish the testing facilities of these items so that the large numbers of vendors who are manufacturing and importing these items can get calibration and testing services from CSIR in order to ensure the quality of their manufactured and imported products. This would strengthen the infrastructure and would help to ensure the safety of common people, medical and paramedical staffs, security personnel, etc. Here is the list of various projects being implemented by different laboratories of CSIR.

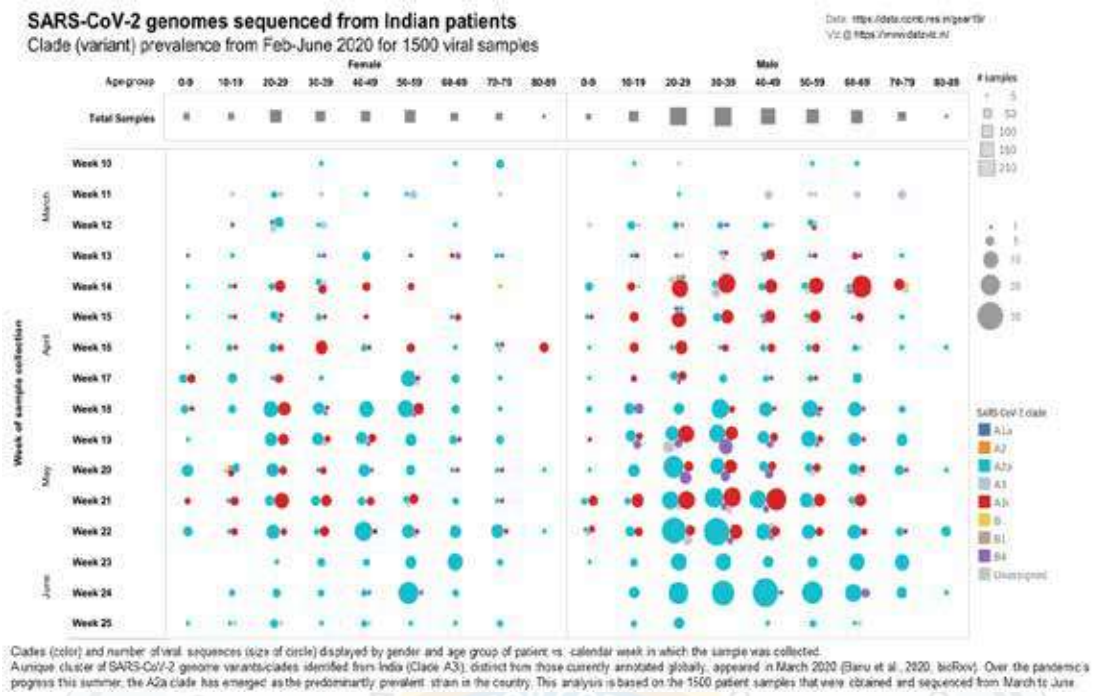
Title of the research project	Implementing Agency
Development of Ultrasensitive, Rapid and Portable system for COVID-19 Screening using Label-free Raman Fingerprinting and AI Contact info: ajay@ceeri.res.in	Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani
Facility creation for COVID-19 testing in CSIR-IIP, Dehradun Contact info: dcpandey@iip.res.in	Indian Institute is Petroleum (CSIR-IIP), Dehradun
Combined Digital Surveillance and Effective COVID-19 Testing Frameworks and Tools Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi
Augmenting immunogenic response to COVID-19 with recombinant BCG (AIRCOVR-BCG) Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi
Integrative Genomics of COVID-19 (INGEN-CoV2) Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi
CLINIC EYE for Rapid COVID Detection Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi

Development of Processes for Active Pharmaceutical Ingredients towards COVID-19 Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Process for Favipiravir, antiviral drug Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Development of Antiviral coatings on fabrics with nanomaterials for producing clinical masks Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
SAANS project for upscaling of non-medical masks Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Affordable RT-PCR diagnostic kit Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Setting up of Testing Facility at CSIR-NPL for Personal Protection Equipments (Masks, Gloves, Gowns), Ventilators and IR Thermal Scanner as per National/ International Standards Contact info: syadav@nplindia.org	National Physical Laboratory (CSIR-NPL), New Delhi
Genome analysis of coronavirus and its hosts Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
Waste water-based SARS-CoV-2 epidemiology studies Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
COVID-19 testing lab Contact info: sharad@nbri.res.in	National Botanical Research Institute (CSIR-NBRI), Lucknow
Withania somnifera (Ashwagandha) for the prophylaxis against SARS-CoV-2 infection: A randomized Hydrochloroquine-controlled clinical trial in Health care providers Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
A randomized, open label, parallel efficacy, active control, Multi-centric exploratrory Drug trial to evaluate efficacy, safety of an ayurvedic formulations as adjunct treatment to standard of care for the management of Mild to Moderate COVID-19 Patients (IMD: 1. *Tinosporacordifolia*+ *Piper longum* 2. *Glycyrhizaglabra*) Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
Evaluating the safety and efficacy of Mycobacterium W in critically ill, hospitalized and high risk patients Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu

Repurposing of colchicine for management of COVID-19 patients Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
Surveillance of pathogenic viruses by screening of sewage Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Design, development and demonstration of hands free hand washing and hand sanitization system Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Development of decentralized waste incinerator for combating COVID-19 spread Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Bench scale air purification scrubber (BAPS) facility for COVID-19 impacted area Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Technologies and products for management of COVID-19 pandemic Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Development of Ultrasensitive , rapid and portable system for COVID-19 screening using label-free Raman Fingerprinting and AI Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Multiplexed lateral flow devices for detection of COVID-19 Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Development of processes for active pharmaceutical ingredients towards COVID-19 Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Development of hydrophobic cum antibacterial/ antimicrobial coatings on cotton and plastic fabrics for making personnel protective equipment kits of healthcare professionals Contact info: sitendum@cgcri.res.in	Central Glass & Ceramic Research Institute (CSIR-CGCRI), Kolkata
Development of antimicrobial coatings on glass surface as disinfecting layer Contact info: sitendum@cgcri.res.in	Central Glass & Ceramic Research Institute (CSIR-CGCRI), Kolkata
Respiration Assistance Intervention Device A portable Ventilator (Respi-AID) Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh

Multiplexed lateral-flow device(s) for detection of COVID-19 Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Single Lead Photoplethysmography (PPG) Sensor for Real-Time Body Hemodynamic Parameters Monitoring in COVID-19 Patients at ICU Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Multipurpose Electrostatic Disinfection Machine for Coronavirus (e-DIMCOV20) Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Design and development of Ultraviolet Germicidal Irradiation System for disinfection of objects and rooms from microbes and viruses Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Rapid and semi-quantitative diagnosis of COVID-19 through nucleic acid amplification testing (NAAT) Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
iThermScan: Automated thermal imaging-based skin temperature measurement for non-contact screening of persons with elevated body temperature Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Design and development of an Attachable air disinfectant exhaust for Coronavirus isolation unit Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Development of Robotic Nurse for COVID-19 Medical Wards in the Hospital Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Application of Novel Fumigants Against COVID-19 Sterilization In Public Places Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Biorepository of COVID-19 samples	Institute of Microbial Technology (CSIR-IMTech), Chandigarh
Novel coronavirus genome sequencing	Institute of Microbial Technology (CSIR-IMTech), Chandigarh

Portable system for COVID-19 Screening using Label-free Raman Fingerprinting and AI by CSIR-NIIST, Thiruvananthapuram



Genome analysis of coronavirus and its hosts by CSIR-CCMB, Hyderabad

INNOVATION & TECHNOLOGY

CSIR has advantageously positioned itself to pursue the focused R&D to develop, integrate, scaleup, and deploy necessary technological interventions for combating coronavirus pandemic in the country. Considering the multifarious problems created by coronavirus which require interventions in several areas and multi-pronged strategy, CSIR has set up five technology verticals for addressing the pandemic. These verticals have been covered elaborately in earlier editions of this newsletter.

These verticals are need-based and span multiple research labs and disciplines and draw upon the strength of scientists, students and harness it for the fight against COVID-19. In addition, CSIR is also working on promoting rural employment and providing ready-to-eat food to the needy migrants. CSIR has developed several COVID-19-focused technologies and products ranging from sanitizers & masks to improved tests and diagnostics and ventilators, buildings and structures. The technologies, products and processes are listed here along with the contact information for easy access to the technology.

Title of the Technology and innovation	Developing Agency
Foot-operated hand washing system (Hasta-Suraksha) Contact info:unicus.eng@gmail.com; skpandey@immt.res.in; blueeyeindustries@yahoo.com; sudhaindustry2017@gmail.com; amit@parasdefence.com; satheesh@sankar.com; threesixtynetworks@gmail.com	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar

Disinfectant Spray (JeevNasI) Contact info: abhaiya@sharpcontrol.in; skpandey@immt.res.in; business@supplyzone.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
UV disinfectant Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Herbal disinfectant Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Touch less hand sanitizer Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Incubation Hood Contact info:accounts@gitanjaliawards.com; skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Insulated Coffin Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Hand Sanitizer, Liquid soap & Soap bar, Liquid Hand Wash, Gel Sanitizer Contact info: ranjan.swain@jigsan.com; samyak.mohanti@gmail.com; skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Hands Free Hand Sanitization system Contact info: threesixtynetworks@gmail.com; skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
3-D Printed Face Mask Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Sanitizing Bin (UV based) Contact info: skpandey@immt.res.in	Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar
Protective face shield Contact info: ankkurgoel@csmcri.res.in	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar
Decontamination Chamber Contact info: ankkurgoel@csmcri.res.in	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar
Alcohol-free water-based hand sanitizer Contact info: ankkurgoel@csmcri.res.in	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar
Synthesis of Camostat Mesylate Contact info: ankkurgoel@csmcri.res.in	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar
Reusable Facemasks as Barrier for SARS-CoV-2 Virus and Air-Born Bacteria Contact info: ankkurgoel@csmcri.res.in	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar

Multi-Wavelength UV Source for killing Pathogens in Real Time Contact info: ajay@ceeri.res.in	Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani
Micro PCR Disposable Chip for DNA sequence amplification Contact info: ajay@ceeri.res.in	Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani
UV-C-based Sanitizer System Contact info: ajay@ceeri.res.in	Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani
Lightweight and Prefabricated Structure for Quarantine Hospitals (Pre-Tal) Contact info: rdskumar@serc.res.in	Structural Engineering research Centre (CSIR-SERC), Chennai
Portable and lightweight transit hospital structure (Poli-Tal-1) Contact info: rdskumar@serc.res.in	Structural Engineering research Centre (CSIR-SERC), Chennai
Portable and Lightweight Modular Structure for Makeshift Hospital (Poli-Tal-M) Contact info: rdskumar@serc.res.in	Structural Engineering research Centre (CSIR-SERC), Chennai
PPE Coverall Suit Contact info: hairish@nal.res.in; rvenkatesh@nal.res.in	National Aerospace Laboratories (CSIR-NAL), Bengaluru
Bi level Positive Airway Pressure (BiPAP) System Portable Ventilator Contact info: Ananda_cm@nal.res.in ; rvenkatesh@nal.res.in	National Aerospace Laboratories (CSIR-NAL), Bengaluru
Rapid Deployable COVID-19 Tests Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi
Swasthvayu, a BiPAP device for airway support Contact info: chetana@igib.in	Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi
Generic version of Favipiravir drug transferred to CIPLA and the drug is in the market known as CIPLENZA Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Developed the process for the key intermediates of Remdesivir with improved the reactions process for Indian Pharmaceutical companies. Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Backward integration of the Hydroxychloroquine (HCQ) using the reagents and starting materials that are easily manufactured in our country. Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
CSIR-IICT has transferred the process technology for the preparation of Hand Sanitizing gel to a Rajasthan based MSME (M/s Sante Triumph LLP, E-274, MIA, Phase-II, Basni, Jodhpur, Rajasthan 342005) on 19th of March on non-exclusive basis. Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad

Affordable Multi-layered Washable non-clinical Facemasks with Antimicrobial Properties (CSR Funds from Cipla for mass production) Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Ultrapure Water of Medical Grade for Hand Sanitizers Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Atmospheric Water Generator, Meghdoot for Providing Clean Drinking Water to COVID Warriors, Migrant Labourers and the Common Public Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Affordable Face Shields for Extra Protection Against COVID-19 Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Collaborated with Genomix Biotech to indigenously produce an affordable RT-PCR kit to match the regulatory requirements Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
Two alternate formulations for Viral Transport Medium (VTM) and supplied to Gandhi Hospital, Hyderabad. Contact info: csmalapaka@iict.res.in	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad
An Experimental Design Setup for Testing of Half-Face Mask Contact info: syadav@nplindia.org	National Physical Laboratory (CSIR-NPL), New Delhi
One-step RT-PCR COVID-19 testing Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
NGS-based COVID-19 testing Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
Detection of antibodies against SARS-CoV-2 using biolayer interferometry Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
Rapid antigen tests to detect SARS-CoV-2 Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
Inactivated virus as vaccine Contact info: somdattakarak@ccmb.res.in	Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad
Solar-based Intelligent Mask Automated Dispensing Unit cum Thermal Scanner (IntelliMAST) Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
360 degree Car Flusher Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur

Dry Fogging Shoe Disinfector (DFSD) Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Hospital Waste Management Facility Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Mechanical Ventilator Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Touch less Faucet (TouF) Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Portable Touch-free Soap-cum-Water Dispensing System-Compact version Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Battery-powered Disinfectant Sprayer (BPDS) Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Pneumatically-operated Mobile Indoor Disinfection (POMID) Contact info: ajoy.roy@cmeri.res.in	Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur
Biopolymer Nanocoated Medical Grade Mask Contact info: n.yadav@ncl.res.in	National Chemical Laboratory (CSIR-NCL), Pune
Nasopharyngeal Swabs Contact info: n.yadav@ncl.res.in	National Chemical Laboratory (CSIR-NCL), Pune
Oxygen Enrichment Unit Contact info: n.yadav@ncl.res.in	National Chemical Laboratory (CSIR-NCL), Pune
Non-contact digital thermometer Contact info: n.yadav@ncl.res.in	National Chemical Laboratory (CSIR-NCL), Pune
Zincona-C: Zinc gluconate-natural vitamin C based nutraceutical formulation Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
Development of RT-LAMP assay for Molecular Diagnosis of COVID-19 Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
Dye-based Reverse Transcription Real-Time PCR Assay for Molecular Diagnosis Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
Process know-how for Favipiravir Contact info: dpmindala@iiim.res.in; arahim@iiim.res.in	Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu
GIS-based COVID-19 maps for various states and union territories Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur

GIS-based COVID-19 maps of Maharashtra Contact info: ps_kumbhare@neeri.res.in	National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur
Hands free sanitizer dispensing units Contact info: headilt.crri@gmail.com; farhatazad786@gmail.com	Central Road Research Institute (CSIR-CRRI), New Delhi
Wall-mounted Hands free soap dispensing units Contact info: headilt.crri@gmail.com; farhatazad786@gmail.com	Central Road Research Institute (CSIR-CRRI), New Delhi
Kisan Sabha App to Connect Farmers to Supply Chain Contact info: headilt.crri@gmail.com; farhatazad786@gmail.com	Central Road Research Institute (CSIR-CRRI), New Delhi
Air sanitizer Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Sustained-release Long Acting Steam Inhalation Drops (NiiSTEAM) Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Efficient Antimicrobial Materials, Formulations and Coatings, Cotton Fabrics for Reusable PPE (Masks/ Gowns) Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Reusable Stopgap Face Mask Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Flocculant-based Gelation, Solidification, Disinfection System for Medical Waste Disposal Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
UV-Clean Disinfecting Unit (λ-FLASHBOX) Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
CLEANiiST: Alcohol-based herbal gel hand sanitizer has been formulated as a gel. Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Trikatu Syrup - Immunomodulator and digestion enhancer Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram

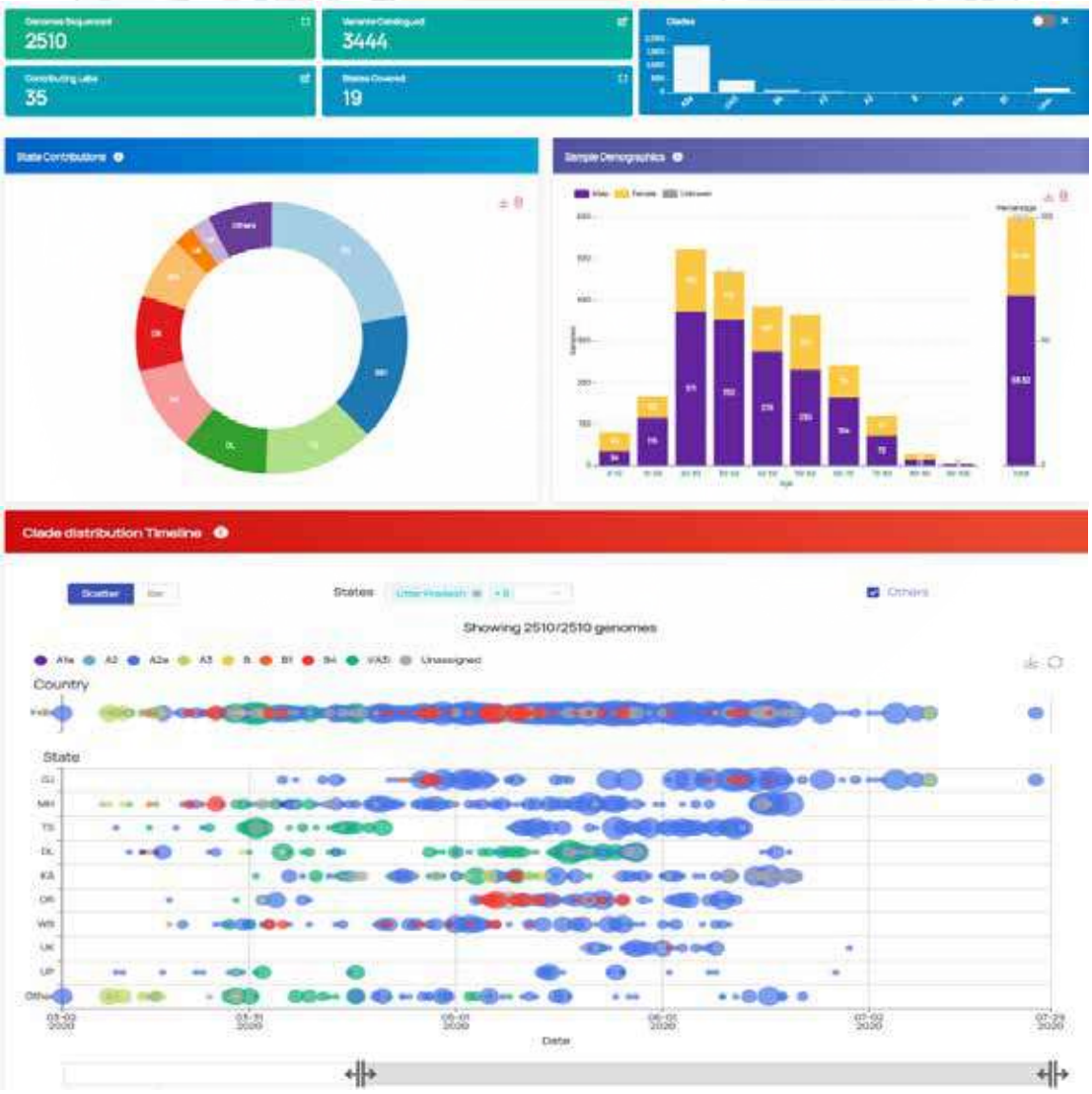
Smart Touch-Free (Palm Safe) -Automatic Hand Sanitizer Dispenser (Indoor & Outdoor) Contact info: nishy@niist.res.in	National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram
Programmable UV-C sterilization unit Contact info: sitendum@cgcri.res.in	Central Glass & Ceramic Research Institute (CSIR-CGCRI), Kolkata
Electrostatic Disinfection Machine Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Non-Contact IR Thermometer Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Aerosol Canopy for Dental Procedures Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Foot-operated Sanitizer Dispensing Station Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Modular Foot-operated Sanitizer Dispensing Station Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Respiration Assistive Intervention Device - Respi AID Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Air-Pressure Electric Switch Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
UV-based Disinfection Systems/Chamber Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Safety Goggles - the protective eyewear Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Contactless Automated Hand Sanitizer Dispenser Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh
Mobile Controlled Wireless Cart for Material Delivery Contact info: sssaini@csio.res.in	Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh

The functional form and the sequence of unfolding of PoliTal (M) for ready-to-use hospital

Stages of Construction: 10-Bed Makeshift Hospital at NDRF, Arakkonam

COVID-19 genome sequencing analyses generated by CSIR-CCMB

Centre for Cellular & Molecular Biology (CSIR-CCMB) strove to stay a transparent and credible source of information in the unprecedented COVID-19 crisis. As the science around the virus evolved every day, the CCMB leadership communicated it to the journalists. Genome Evolution Analysis Resource (GEAR-19) is a resource to track the genomic evolution of SARS-CoV-2, the virus which is responsible for the current worldwide pandemic of COVID-19. Sequencing of viral genomes can provide insights of the spread, changes in the sequence over time and demographic associations. This information is useful in viral surveillance and can be used to monitor the spread across states in India. As sequenced viral genomes are rapidly deposited on public repositories like GISAID, it is the need of the hour for even quicker analysis and interpretations. We hope to make this an exhaustive resource for COVID-19 genomic data analysis powered by our in-house as well as publicly deposited data from India.



Website link:
https://data.ccmb.res.in/gear19/

CSIR-CCMB released a response book on COVID-19

COVID-19 response book was prepared by Centre for Cellular & Molecular Biology (CSIR-CCMB) to bring news on S&T Development, articles, news stories, features, blogs and event reports. The book gives snapshot of the science and technology in CCMB with focus on the activities and events. Through this effort, CCMB tried to bring to the table its efforts delegated towards research, technology and innovation that one would be interested to know and eventually update on the road to recovery and winning the combat.

Contact info: Dr Somdatta Karak (somdattakarak@ccmb.res.in)

Website link:
http://e-portal.ccmb.res.in/app_space/covid_book/

Hand sanitizer being handed over to Gujarat State Transport (Bhavnagar) officials

CSIR-CSMCRI prepared and distributed sanitizer and facemask in and around Bhavnagar

Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI) prepared Isopropyl alcohol-based hand sanitizers (1,000 L) prepared as per WHO guidelines and distributed among institute staff, Gujarat State Transport–Bhavnagar, Bhavnagar Medical College & Hospital.

About 25000 masks were distributed to Police Department (Bhavnagar, Ahmedabad, and Palitana Town), District Collector Office, Bhavnagar, Bhavnagar Municipality, different local Schools, Indian Red Cross Society, CSC Office Vadodara, Bhavnagar Medical College, and local doctors of Bhavnagar.

Contact info: Mr Ankkur Goel, ankkurgoel@csmcri.res.in

Initiatives by CSIR-CEERI, Pilani for society to combat COVID-19 crisis

- Distribution of masks and sanitizers to employees, contractual staff, shopkeepers, bank customers, local police station and health workers etc.
- Distribution of food packets and other essential commodities to nearby needy and BPL category residents
- Institute developed in-house Sanitizer Dispenser Systems that are installed at various points of the Institute as well as Colony premises.

Contact info: Dr Ajay Agarwal, ajay@ceeri.res.in

CSIR-IGIB facilitated performing RT-PCR testing and trained clinicians how to tackle COVID-19 sample

CSIR-IGIB has performed over 5000 RT-PCR-based tests for Delhi Government Hospitals and NCDC as part of the national COVID-19 surveillance programme. CSIR-IGIB has also trained clinicians from Hospitals in Noida and Delhi for COVID-19 sample handling and RT-PCR testing. CSIR-IGIB also provided RT PCR machines and reagents to GIMS Hospital, Noida for enabling their in-house testing.

Contact info: Dr Chetana Sachidanandan, chetana@igib.in

CSIR-IICT developed and distributed masks and sanitizer in and around Hyderabad

CSIR-IICT distributed 3000 face Shields and 1000 multilayered to various sections of frontline workers and needy people. It has been planned to distribute a pack of two masks to 50,000 people for personal protection from COVID-19 up to 2 months with convenience of washings.

CSIR-IICT has standardized the process for preparation of alcohol-based hand sanitizing gel (HSG). So far, it has prepared 2200 L of HSG in the laboratory with a batch capacity of 100 L per day. The HSG was used by its own lab and sister labs and distributed to Telangana Police, GHMC workers and other organizations.

Contact info: Dr M. Chandrasekharam, csmalapaka@iict.res.in

Initiatives by CSIR-CCMB towards society to combat COVID-19 crisis

CSIR-CCMB trained medical doctors, staff and students in COVID-19 testing. It was important because most of the healthcare workers had not worked with RT-PCR, the gold standard of COVID-19 testing. It also trained research scholars from other research institutes and universities in COVID-19 testing. It has trained close to 200 people so far, half of them are from other organizations.

In its own testing facility, it has tested a sixth of COVID-19 patients in Telangana. It recommended the state government to reduce the volume of Viral Transport Medium (VTM) while transporting the nasopharyngeal swab samples to testing centres. Since VTM is often an imported, and hence, a scarce reagent in the current times, reducing its volume cut down on cost too. It also helped prevent leakage of the medium from the sample tubes, contaminating other tubes in the package. It also helped concentrate the sample, and give a better yield.

CSIR-CCMB has been validating the newer COVID-19 kits and testing reagents. It provides coronavirus cultures to companies and academic/research institutes to test and develop drugs and therapeutics.

Contact info: Dr Somdatta Karak, somdattakarak@ccmb.res.in

Efforts of URDIP-Pune for society on combating COVID-19 pandemic

CSIR has a specialized service unit for Research and Development of Information Products (URDIP), Pune which is involved in the pre-research and pre-development phase of the research projects, by providing intellectual property and techno-commercial information services.

Under the CSIR-Supply Chain Management vertical, CSIR-URDIP is coordinating the channel on pre-emptive identification of supply chain issues in new launches of CSIR products and services for COVID-19 management. The work involves constant coordination with project coordinators and project leaders from other labs to identify issues in the launch of products in various areas of therapeutics, diagnostics, hospital-assisted devices and PPEs.

CSIR-URDIP has performed the two prior state-of-the-art searches, that is, CSIR-CMERI's Mobile Pneumatically Variant Indoor Disinfection Unit and a Portable UV Disinfection device to sanitize public transport.

CSIR-URDIP has provided Patentability Search Reports on CSIR-NEERI's Hands Free Hand Washing System (NEERWASH) and CEERI's Automatic sanitizer dispenser. CSIR-URDIP has conducted Freedom to Operate (FTO) Search Studies on the following:

i) **CSIR-NAL** designed single limb BiPAP ventilator which is primarily intended to augment patient ventilation by supplying pressurized air through a patient circuit.
ii) **GMR Sensor** which is a multi-layered sensor with configuration of GMR elements in the form of single Wheatstone bridge to generate a differential output voltage with respect to magnetic field gradient along the sensor's sensitive direction.
iii) Study on amino acid sequences of three enzymes provided by **CSIR-IICT** was performed to safeguard CSIR's position before making a decision to enter in to commercial partnership with a biotech company.

CSIR-URDIP is providing the complete clinical trial data information with respect to the drugs that are currently being repositioned for COVID-19 along with the required patent/FTO-related information for the molecules/drugs of interest. The required details are being updated by URDIP-TEAM twice a week or as per the requirement of the researcher as well as the CSIR-Strategic Group.

CSIR in collaboration with Ministry of AYUSH is looking for herbal/natural products for the prevention/treatment of COVID-19. At present, compilation of clinical studies published in patent and non-patent scientific literature on 67 medicinal plants used in Traditional Indian Medicine is underway at CSIR-URDIP.

Contact info: R. JANSI, jansi@urdip.res.in

Initiatives of CSIR-NBRI, Lucknow towards society to combat COVID-19 crisis

Herbal hand sanitizer production and distribution by CSIR-NBRI

Another gel-based sanitizer is also developed by the team of Dr BN Singh, Senior Scientist, and the technology was transferred to M/S Satguru Herbal Pvt Ltd. which also reached the market.






CSIR-NBRI products available in the market:

- **Herbal mask stress reducer:** Mask stress reducer is a blend of three essential oils and a base oil prepared to combat the congestion problems due to the incessant use of mask. It is purely a herbal product that helps in immediate relief after

spraying and inhailing a single shot on the mask. The product is different from the marketed one in a sense that it can be used anytime, anywhere and by everyone without a rebound effect.

- While distributing the mask stress reducer to frontline warriors in the city of Lucknow, questionnaire was also given alongwith to record the public response and that was exceptionally praising.

- **Traditional Kadha:** CSIR-NBRI has stepped up in developing a traditional *kadha* as preventive measure to check the initial symptoms of sore throat, coughing and sneezing by preparing a polyherbal product based on the guidelines of AYUSH. It is a potent formulation based on Indian traditional medicine to keep the body detoxified, healthy and fresh. The product is easy to use just by adding 1-2 drops in a cup of milk/tea/lukewarm water. This is also continuously under distribution to various sectors of warrior of the city with a positive feedback of its effectiveness. Scientific validation as per AYUSH guidelines has been completed for this product and soon the technology will be negotiated with the related companies.

Contact info: Dr Sharad Srivastava, sharad@nbri.res.in

CSIR-CMERI developed and distributed masks and sanitizer in and around Durgapur

Facemask: CSIR-CMERI has scientifically developed UV treated low-cost facemasks and distributed almost 1 lakh facemasks to Banks, Public Sector Units, Hospitals and other Public Organizations. Over 200 local economically marginalized people were engaged in the manufacturing of the masks to help Rural and Local Entrepreneurship during this dire economic situation.

Alcohol-Based Hand Sanitizer: The presence of excessive Methyl content in hand sanitizers has radically affected the Health profile of many. CSIR-CMERI prepared hand sanitizers in strict adherence to WHO guidelines.

Contcat info: Dr Ajoy Kumar Roy, ajoy.roy@cmeri.res.in

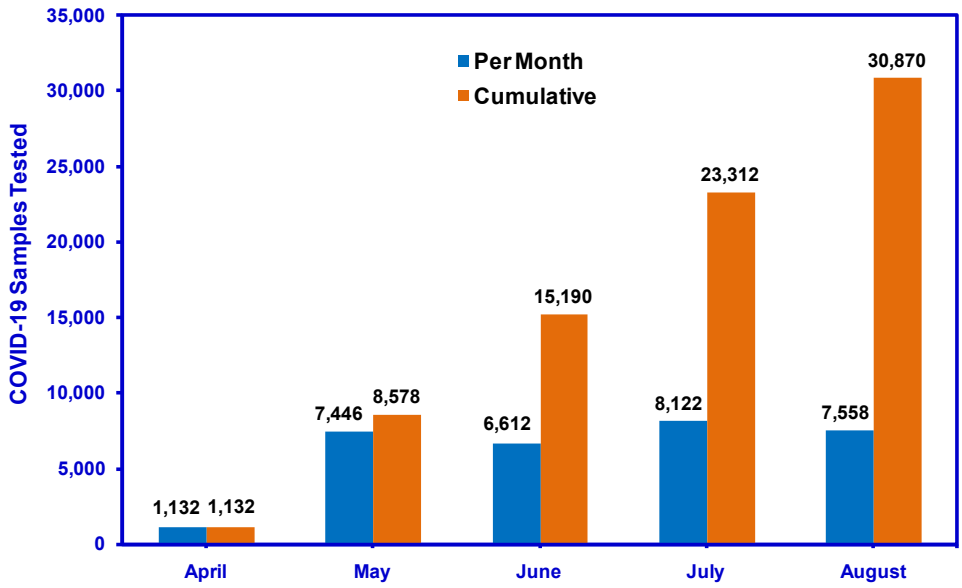
For mitigating CORONA pandemic CSIR-NCL, Pune distributed masks, sanitizer and set up COVID-19 testing facility

- CSIR-NCL has licensed the biopolymer Nano-technology for making face mask to Pune-based MSME SETLAB INDIA and also in the first phase masks were distributed to staff/ students, officials of PCMC Sangvi and nearby post office.
- CSIR-NCL distributed lab-made hand sanitizer solution to all staff/students and also to nearby Government bodies for personal health and hygiene.
- COVID-19 sample testing facility being setup at CSIR-NCL, Pune.
- Testing of numerous samples for cleaning liquids and disinfectants for outside parties on behalf of ICMR during the COVID-19 pandemic.

For more info: Dr Nikhlesh Yadav, n.yadav@ncl.res.in

Ongoing COVID-19 Testing in CSIR-IIIM, Jammu

In response to the COVID-19 pandemic, CSIR-IIIM, Jammu has built the COVID-19 testing facility. Since May, 2020, it has become an independent facility of ICMR for COVID-19 testing and 30,870 samples have been tested till date (19th August, 2020).



Number of COVID-19 samples tested by CSIR-IIIM, Jammu till 19th August, 2020

Contact info: Dr Durga Prasad Mindala, dpmindala@iiim.res.in and Dr Abdul Rahim, arahim@iiim.res.in

CSIR-NEERI, Nagpur tested COVID-19 samples and distributed PPE kits to combat COVID-19 crisis

CSIR-NEERI tested over 10000 COVID-19 samples: The COVID-19 testing facility has become operational at CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) from April 2020. So far, more than 10000 samples have been tested for COVID-19. With testing capacity of 50 samples per day, CSIR-NEERI has the requisite infrastructure to test COVID-19 samples and take all appropriate bio-safety and bio-security precautions before testing.

Identifying COVID-19: A look at the CSIR-NEERI Virology Lab that tests for the virus

CSIR-NEERI Virology Lab team engaged in COVID-19 testing

Distribution of PPEs: CSIR-NEERI distributed Personal Protective Equipments (PPE) including gloves, hand sanitizers, masks, etc. to the corporators, NGOs, other Institutions and CSIR-NEERI staff, who are involved in helping the needy people. CSIR-NEERI prepared more than 1000 L of sanitizer according to the WHO-recommended formulations and reusable masks from cloth according to the WHO guidelines, with the help of several self-help groups and entrepreneurs.

Corporators and NGOs receiving the PPEs

CSIR-NEERI, NGO, locals worked together for betterment of homeless and migrant labourers: In order to prevent these labourers from slipping into a state of depression and ensure psychological comfort, CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), NGOs and locals worked together, in support of the initiative taken by Nagpur Municipal Corporation, to engage the labourers in creative and constructive activities. Accordingly, the CSIR-NEERI scientists, in association with NGOs and locals, organised various awareness programmes on maintaining social distancing, hygiene, environment, cleanliness, interactive discussions, counselling and other activities at the shelter homes. CSIR-NEERI also joined hands with NGOs to impart short-term training programmes on water and soil conservation for the migrant labourers staying in the shelter homes.

Contact info: Dr Prakash Kumbhare, ps_kumbhare@neeri.res.in

CSIR-NGRI, Hyderabad produced and distributed handsanitizer to combat COVID-19 crisis

CSIR-NGRI is a research Institute involved in the studies related to Earthquakes, Geodynamics of Mother Earth, Exploration for Natural Resources etc. CSIR-NGRI successfully prepared about 1500 L of hand sanitizer, following the procedure prescribed by WHO, for internal consumption as well as distribution among the frontline COVID Warriors like the Police and GHMC personnel.

Contact info: Dr Rajeev Menon, rajeev896@gmail.com

CSIR-CGCRI produced and distributed sanitizers in and around Kolkata

Hand sanitizer in bulk for all Divisions and Sections of CSIR-CGCRI and CSIR guest house Kolkata was prepared at Water Technology Division under the guidance of Dr Swachchha Majumdar, Senior Principal Scientist and Head, Water Technoligy Division, CSIR-CGCRI which is still catering the need of essential and emergent staffs attending CSIR CGCRI. As there was shortage of commercial hand sanitizer at that point of time, this was a significant support to the staffs of CSIR-CGCRI, Kolkata.

Contact info: Dr Sitendu Mandal, sitendum@cgcri.res.in

COVID-19 testing in CSIR-IMTECH, Chandigarh

In a major boost to increase testing among suspected coronavirus patients, the Institute of Microbial Technology (IMTECH) plans to take up testing of COVID-19 sample. The institute is receiving samples from all COVID-19 designated hospitals in Chandigarh and several districts of Punjab & Haryana to cater to the increasing needs from such hospitals to provide test results of samples.

Website Link:
https://www.imtech.res.in/news/institute-of-microbial-technology-to-take-up-covid-19-testing

COVID-19 testing in CSIR-IHBT, Palampur

CSIR-Institute of Himalayan Bio-resource Technology (IHBT), Palampur has been declared as a COVID-19 testing centre. The Institute has designated staff with appropriate training to follow prescribed strict procedure and safety protocols. Additional Chief Secretary (Health) of the Government of Himachal Pradesh has notified this facility for undertaking COVID-19 tests by an office order on 22 April 2020.

Website Link:
https://vigyanprasar.gov.in/isw/Himachal-Govt-notifies-CSIR-IHBT-as-a-COVID-19-testing-centre.html

CSIR-Central Road Research Institute (CRRI), New Delhi released guidelines on commuting in urban area during COVID-19 pandemic by maintaining social distancing

Public transport which includes buses and metro plays major role in people's mobility in urban and rural areas of India. Currently, there are 13 operational Metro Systems in India with a total length of 678.52 km and 540 stations (as of August 2019), 639 Trains (more than 3200 coaches) and a ridership of 4.4 million/day. Out of 1.6 million registered buses, public bus

sector operates 170,000 buses carrying about 70 million people per day. However, only about 30,000 buses serving the city areas and 8 metropolitan cities has fleet of over 24,000 with ridership of about 50 millions/day. During the present COVID-19 pandemic situation, there may be high risk for commuters travelling by metro and bus and chances of spreading of virus are also very high. The World Health Organization (WHO) and Government Health Ministries has recommended maintaining social distance of 6 feet to control the spread of the virus through person to person. It is always been a challenge to manage the gap between demand and supply of commuting and this gap is going to be further widened due to COVID-19 pandemic requiring the social distancing practices.

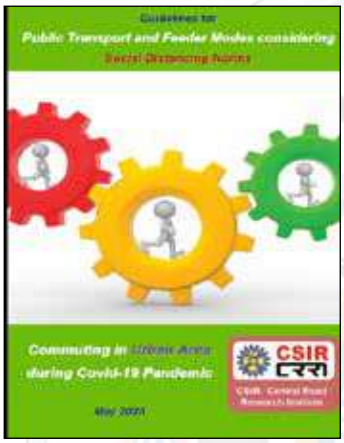
In view of this, CSIR-CRRI, New Delhi has come out with a document on "*Guidelines for Public Transport and Feeder Modes considering Social Distancing Norms*" subsequently released by Hon'ble Minister Dr Harsh Vardhan, MoHFW along with Dr Sekhar C Mande, DG, CSIR and Prof. Satish Chandra, Director, CSIR-CRRI on May 04, 2020. The document mentions a systematic and strategic approach to be adopted to move ahead during the COVID-19 pandemic. Multi dimensional approach is recommended at every stage of public transport commuting like walking from home to bus stop/metro station; using feeder modes like cycle rickshaw, electric rickshaw, shared auto rickshaw etc.; area of bus stop and metro stations; and while travelling inside the bus and metro to reach destination. Taking into the account of total leg of the trip from origin to destination, following two approaches are suggested for possible implementation considering social distancing:

Redesigning the facilities suiting to social distancing;

- *Pedestrians:* Markings on foot paths and widened Zebra crossings at intersections
- *Metro, Metro Station and Surrounding Area:* Boarding/alighting times, Feeder bus services, Subway/Lift/Escalator, Double the dwell times, Information on vacant Seats in a coach, Queuing by commuters on platform and ticket counters, Baggage Scanner/ Security Checkup, Card scanning, Markings/ procedure to follow from entry gate to platform, inside the train and before alighting, Online ticketing and use of Arogya Setu
- *Bus and Bus Stop:* Rear door boarding and alighting, Increasing of Dwell Time, Staggered bus seating arrangements, Limiting Access to Bus Drivers Area, Limiting seating at Bus Stops/Stations, Cleaning of Common Areas and Automated Fare Collection System
- *E-Rickshaws, Autos and Taxis:* One Commuter, Usage of Apps for booking and payment in digital mode, Partition between driver and commuter as well as within commuters, Parking places, Self driving car rentals

Reducing the demand and Capacity Enhancement

- *Demand Reduction:* Encourage Short length trips by intermediate public transport modes (rickshaws, autos, etc.), Easy access for IPT vehicles near entry gates of metro and bus stops, Dedicated path/lane to IPT and PT, Staggered days and/or hours for offices/schools/ markets/ shopping area can be adopted.
- Capacity Enhancement and Management: Changes in Timetable, Providing dedicated services to healthcare personnel, patients and any other category of the work force falling under essential services, Readjust routes and frequencies, Policy towards different time schedule of economic and social activities, Attractive or targeted offers to encourage the use of public transport, Induction of school buses, charted buses, tourist buses, other mini tourist buses/vans in case of increased demands, exceptional measures, prioritize political and financial support from Government.



Contact info: Dr Neelam J Gupta, headilt.crri@gmail.com

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_19082020.pdf
https://www.icmr.gov.in/tender.html

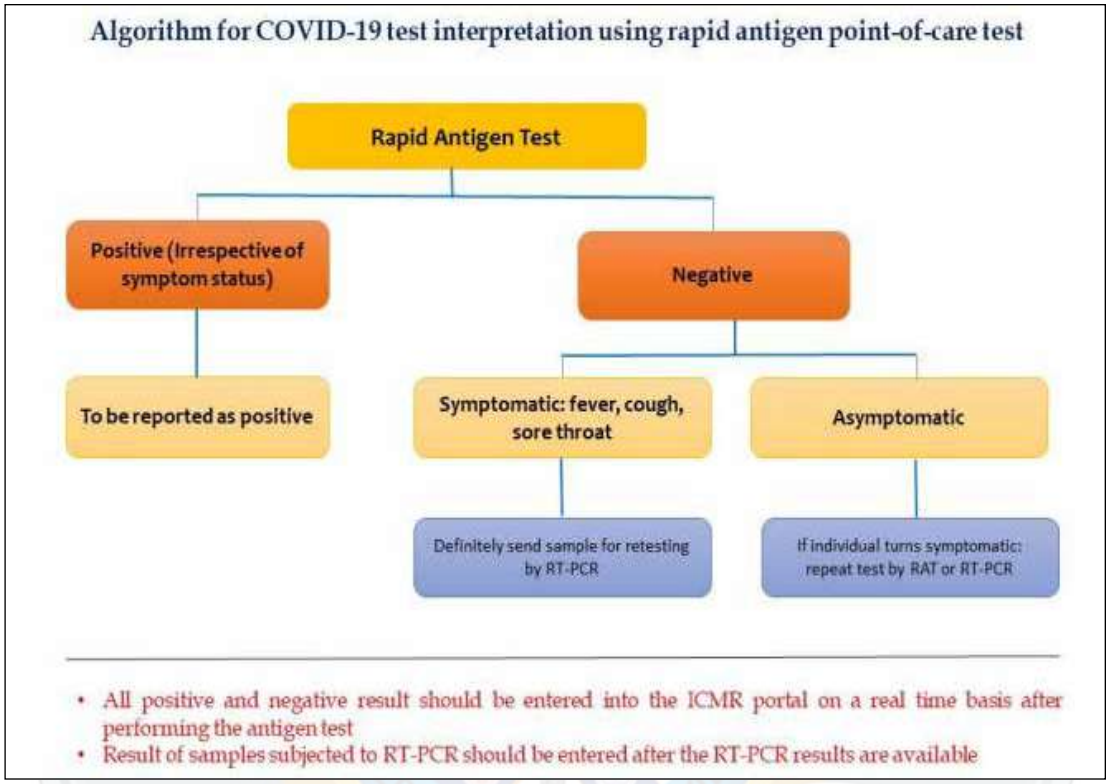
ICMR invites letter of intent for participation in National Clinical Registry of COVID-19

There is a pressing need for collection of systematic data on clinical signs and symptoms, laboratory investigations, management protocols, clinical course of COVID-19 disease, disease spectrum and outcomes of patients. Such data will serve as an invaluable tool for formulating appropriate patient management strategies, predicting disease severity, patient outcomes etc. In view of this, Ministry of Health & Family Welfare (MoHFW), ICMR, New Delhi and All India Institute of Medical Sciences (AIIMS), New Delhi has proposed to launch a National Clinical Registry for COVID-19 (NCRC). The NCRC aims to collect good quality real-time clinical data to inform evidence-based clinical practice, research, formulating guidelines and policy making. In view of this, ICMR invites a letter of intent from institutions and hospitals identified as dedicated COVID Hospitals or dedicated COVID Health Centres under the project to establish National Clinical Registry of COVID-19.

Website Link:
https://www.icmr.gov.in/pdf/covid/techdoc/Letter_of_Intent_National_Clinical_Regsitry_of_COVID19_v1.pdf
https://www.icmr.gov.in/tender.html

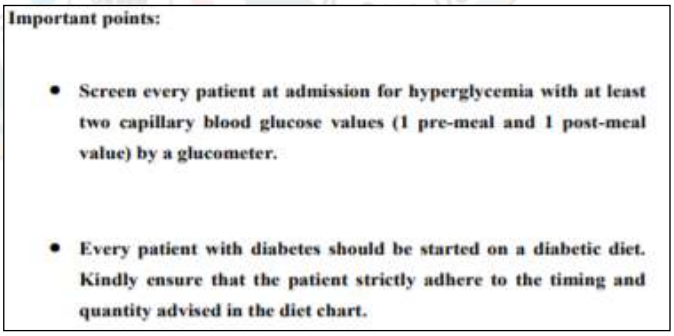
ICMR releases revised advisory on strategy for COVID-19 testing in India

ICMR on 4th Sep 2020 released revised version of its strategy on COVID-19 testing in India. The strategies include the recommendations from the national taskforce on COVID-19. It also says that ICMR's advisory is generic in nature and may be modified as per discretion of the state health authorities.



Website Link:
https://www.icmr.gov.in/pdf/covid/strategy/Testing_Strategy_v6_04092020.pdf

MoHFW releases clinical guidance on Diabetes Management at COVID-19 Patient Management Facility


Important points:

- **Screen every patient at admission for hyperglycemia with at least two capillary blood glucose values (1 pre-meal and 1 post-meal value) by a glucometer.**
- **Every patient with diabetes should be started on a diabetic diet. Kindly ensure that the patient strictly adhere to the timing and quantity advised in the diet chart.**

Ministry of Health and Family Welfare (MoHFW) issues guidelines on Diabetes Management at COVID-19 Patient Management Facility. The guidelines are for healthcare sector treating hyperglycemia patient. It is said that the hospital should screen every patient at admission for hyperglycemia with at least two capillary blood glucose values (1 pre-meal and 1 post-meal value) by a glucometer and every patient with diabetes should be started on a diabetic diet. It should also be ensured that the patient strictly adhere to the timing and quantity advised in the diet chart.

Website Link:
https://www.mohfw.gov.in/pdf/ClinicalGuidanceonDiabetesManagementatCOVID19PatientManagementFacility.pdf

MoHFW releases guidance note on bi-directional TB-COVID screening

Ministry of Health and Family Welfare (MoHFW) has issued a guidance note on bi-directional TB-COVID screening. Tuberculosis and COVID-19 are infectious diseases that primarily attack the lungs. They present with similar symptoms of cough, fever, and difficulty in breathing, although TB has a longer incubation period and a slower onset of disease. The prevalence of TB among COVID-19 patients has been found to be 0.37-4.47% in different studies. There has been an overall decline in TB notification by 26% from January to June 2020 as compared to the previous year, due to the COVID-19 pandemic.

Studies have shown that a history of active as well as latent TB is an important risk factor for SARS-CoV-2 infection. This not only results in increased susceptibility but also rapid and severe symptom development and disease progression with poor outcomes. Tuberculosis is associated with a 2.1-fold increased risk of severe COVID-19 disease. In addition, TB patients also tend to have co-morbid or living conditions (malnutrition, diabetes, smoking, HIV, etc.) that increase their vulnerability.

Website Link:
https://www.mohfw.gov.in/pdf/1TBCOVIDscreeningguidancenote.pdf

MoHFW releases SOP on preventive measures to be followed while conducting examinations to contain spread of COVID-19

Ministry of Health and Family Welfare (MoHFW) released an SOP on 2nd September 2020 on preventive measures to be followed while conducting examinations to contain spread of COVID-19. Examination centres are frequented by large number of students (as well as their parents) and staff till the entire duration of the exam and therefore it is vital to plan and conduct these examinations, while following specific preventive measures.

The generic measures include simple public health measures that are to be followed to reduce the risk of COVID-19. These measures need to be observed by all (staff, students and parents) in these places at all times.

Website Link:
https://www.mohfw.gov.in/pdf/SOPonpreventivemeasurestobefollowedwhileconductingexaminationstocontainspreadofCOVID19.pdf

Containment and Surveillance Manual for supervisors in containment zones released by MoHFW

Ministry of Health and Family Welfare (MoHFW) has released a containment and surveillance manual for supervisors in containment zones. A supervisor is an intermediary between the field level surveillance teams and the medical officer. The supervisor has a technical and managerial role and is responsible for overseeing the execution of the containment

plan, within his area of jurisdiction. The supervisor is selected from locally available resources. This could be Lady Health Visitors (LHV), booth level officials, AYUSH students, teachers, sanitary inspectors, male health workers, etc. trained as supervisors for containment operations. This document contains managerial and technical roles of supervisors along with basic COVID-19 information.

Website Link:
https://www.mohfw.gov.in/pdf/ContainmentandSurveillanceManualforSupervisorsincontainmentzones.pdf

Manual for Surveillance Teams for containment zones

Ministry of Health and Family Welfare (MoHFW) has released manual for Surveillance Teams in containment zones. This manual consists of information in the form of four chapters for Surveillance Teams who visit home to identify suspect case and contacts in containment zones, which is given below:

i. Role of Surveillance Team in Containment Zone;
ii. Community Surveillance (House-to-House search for suspect cases) and contact tracing;
iii. Preventive and Control Measures for Families & Communities; and
iv. Personal Safety.

This manual is a complete guide for Supervisors in containment zones to create awareness in communities for COVID Response, which will help in defeating the infection of COVID safely.

Website Link:
https://www.mohfw.gov.in/pdf/ManualforSurveillanceTeamsforcontainmentzones.pdf

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

SCIENTIFIC AND ACADEMIC INSTITUTIONS

AIIMS Jodhpur develops protective gears for health workers in frontline management of COVID-19

COVID-19 pandemic has become a global health crisis and one of the greatest challenges which India is facing now. Healthcare workers being in the frontline in this war are facing the occupational hazard of acquiring the infection especially during procedures with high potential for aerosol generation such as intubation, tracheostomy, bronchoscopy etc.

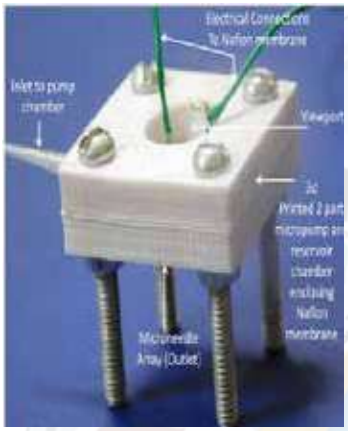
A team lead by Prof. Sanjeev Misra, Director and CEO, AIIMS Jodhpur conceptualized and designed a protection box 'Abhedya' which provides enhanced protection to healthcare workers. This box is different from the conventional boxes currently available, as it is sealed from all ends and has self-sealable hand ports. The rounded smooth edges aid in effective cleaning and disinfection. A negative pressure environment can be created inside the box, which helps to dispose the aerosols contained within the box. The box is made up of transparent acrylic material with slanting roof assuring appropriate vision for the healthcare worker. The open front end and base are completely sealable with sheets. This box can be removed easily at the time of emergency, if needed. The best part is that the box can be kept over the patient's head area for the entire duration of surgery except Head & Neck Surgeries, and intubation and extubation, both can be performed effectively with the aid of this. This device is in the process of validation and is currently in use at AIIMS Jodhpur.

Website Link:
http://www.aiimsjodhpur.edu.in/covid19/

IIT Kharagpur develops painless drug delivery and vaccination device

Department of Electronics & Electrical Communication Engineering at IIT Kharagpur has developed a transdermal drug delivery and vaccination device capable of administering large

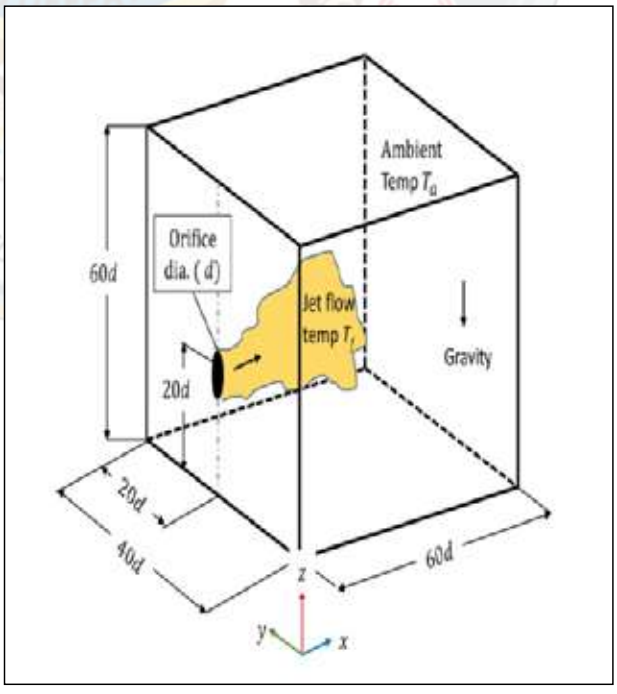
and viscous drug molecules in a painless way. The innovation by IIT Kharagpur has reduced the diameter size of the microneedles and increased the strength to withstand the skin resistive forces. The device would find extensive use in any form of transdermal medication. The micropump fabrication and design further enables increased flow rate of the drug molecules in a controlled and precise manner. Typical use could be achieved in insulin delivery or medication for diseases of the lymphatic system, skin, including some forms of cancer, or even COVID-19 vaccine said research lead Prof. Tarun Kanti Bhattacharyya. The drug delivery device has been successfully tested with animals as per medical protocol. The researchers have also filed for a patent in India and published the research in IEEE and Nature journals. The research for this innovation was funded by the Ministry of Electronics and Information Technology and Dept. of Science of Technology, Govt. of India.



Website Link:
https://kgpchronicle.iitkgp.ac.in/iit-kharagpur-researchers-develop-microneedles-for-painless-drug-delivery-and-vaccination/

IISc develops technique for direct numerical simulation of "cough/sneeze flows" to understand transmission dynamics of COVID-19 infections

The transmission dynamics of highly-contagious respiratory diseases like COVID-19 (through coughing/ sneezing) is an open problem in the epidemiological studies of such diseases. The primary cause of COVID-19 infections is believed to be droplet transmission from an infected person to a susceptible neighbour. WHO has recommended maintaining a distance of 1-2 m from an infected person to minimize transmission to a neighbour. However, recent studies suggest that this could be an under-estimate and that the pathogen is likely to get transported over much longer distances, especially through sneezing. Thus, a better understanding of the transmission dynamics of the COVID-19 infection is the need of the hour.



There is a strong similarity between the dynamics of cough/sneeze flows and that of atmospheric clouds (especially cumulus clouds), both involving turbulent jet/plume, suspended droplets and their complex interaction including phase change and gravitational settling. IISc scientists have extensive experience in studying cumulus-cloud flows (involving experiments, theory and computation). Therefore, they are in a position to leverage their expertise in cumulus-cloud computation towards investigating cough/sneeze flows through a direct numerical simulation (DNS). For this purpose, they plan to use the existing DNS code called "MEGHA-5" (developed by S. Ravichandran and others to study cumulus clouds), with suitable modifications to include dynamics of liquid droplets of various sizes.

Contact info: Sourabh S. Diwan; sdiwan@iisc.ac.in

Website Link:
https://covid19.iisc.ac.in/direct-numerical-simulation-of-cough-sneeze-flows-to-understand-transmission-dynamics-of-covid-19-infections/

A PCR-free SARS-CoV-2 RNA detection test

Currently, the most effective method available to diagnose COVID-19 is the reverse transcriptase-polymerase chain reaction (RT-PCR), which directly detects the viral RNA. Although RT-PCR testing has been scaled up appreciably over the past few months, testing is still limited to designated central laboratories having expensive thermal cyclers. On the other hand, rapid antigen and antibody tests have been developed that enable testing for the virus at the point-of-care, but their accuracy does not match that of RNA-based tests.

Indian Institute of Science (IISc) is developing an RNA-based test for COVID-19 that does not rely on PCR, thus obviating the need for expensive thermal cyclers. Instead, they are developing a test that relies on isothermal nucleic acid amplification of nucleic acids, which can be conducted at a constant temperature in very low-cost heating instruments. The result of the test is readable by naked eye. The envisioned accuracy (sensitivity and specificity) of this test will match that of RT-PCR and the test may be conducted at various points-of-entries, e.g., airports, check posts etc.

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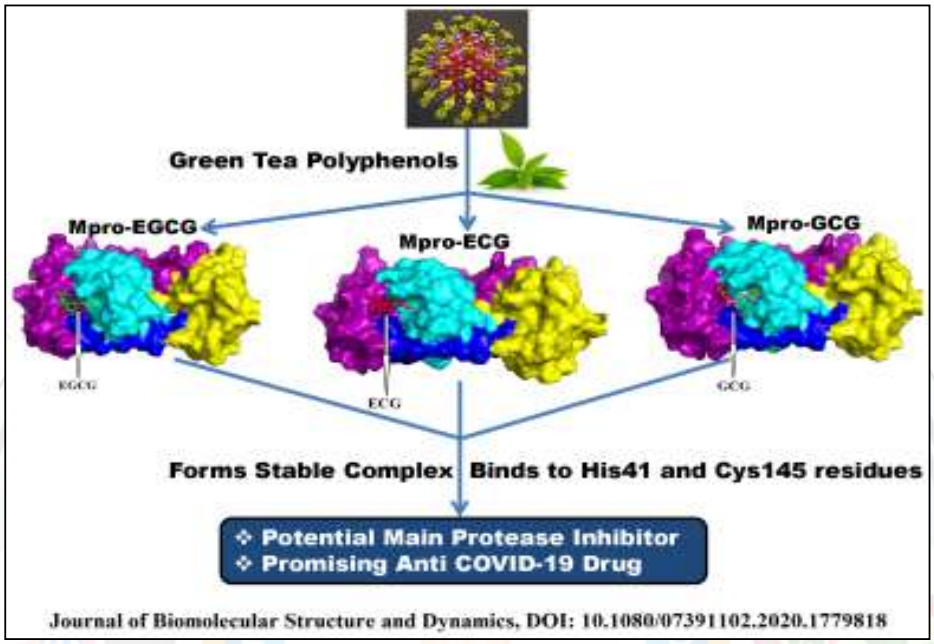
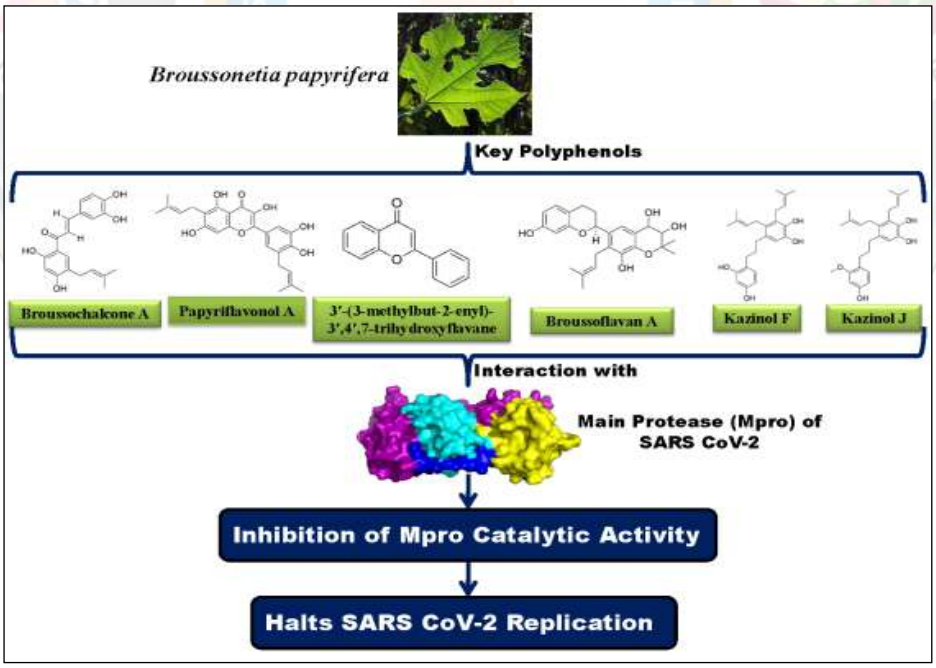
Website Link:
https://covid19.iisc.ac.in/a-pcr-free-sars-cov-2-rna-detection-test/

IIT Bhubaneswar study identifies herbal phytochemicals and repurposed drugs that may act as potential inhibitors of SARS-CoV-2 for the effective treatment of COVID-19

Green tea (*Camellia sinensis*) and tunte tree (*Broussonetia papyrifera*) contain various polyphenols which are proven to be beneficial for human health. Early studies indicate that green tea polyphenols exhibit anti-viral activity against a wide range of viral infections such as influenza, hepatitis B, hepatitis C, herpes simplex virus and HIV. Moreover, green tea polyphenols are even active against dengue virus (DENV), Chikungunya virus (CHIKV) and Zika virus (ZIKV). In addition, tunte polyphenols are already known to show antiviral activity against SARS-CoV-1 and MERS.

Research scholars Rajesh Ghosh and Ayon Chakraborty working along with Dr Ashis Biswas and Dr Snehasis Chowdhuri from IIT Bhubaneswar have shown a way to combat COVID-19. They adopted various computational approaches and have demonstrated that three green tea polyphenols (epigallocatechin gallate, epicatechingallate and gallocatechin-3-gallate) and six tunte polyphenols [broussochalcone A, papyriflavonol A, 3'-(3-methylbut-2-enyl)-3',4',7-trihydroxyflavane, broussoflavan A, kazinol F and kazinol J] may serve as potential inhibitors of the main protease from SARS-CoV-2.





Both of the studies are part of a sanctioned project on COVID-19 research (Funding agency: HPC, IIT Delhi) and has recently been accepted in Journal of Biomolecular Structure and Dynamics.

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SCIENCE OUTREACH & POPULARISATION EFFORTS

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 this science outreach and popularisation efforts, a number of knowledge and information products have been generated and released.

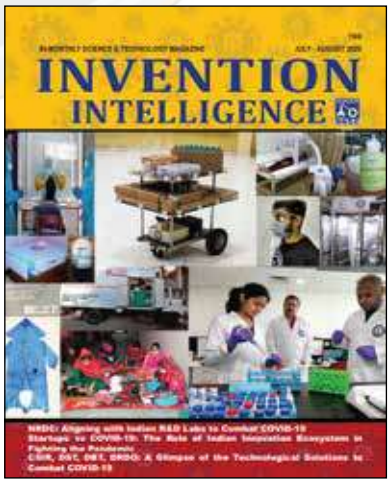
Efforts from Ministries, Departments & Scientific Organisations

CSIR-Samachar August 2020 edition spells out CSIR initiatives to combat COVID-19

CSIR-Samachar is a monthly Newsletter published by National Institute of Science Communication and Information resources (CSIR-NISCAIR). The newsletter consists of various contemporary activities, currently related to COVID-19 and reports of the CSIR, such as R&D programmes, achievements, new facilities, foundation day celebration, symposia, conferences, seminars, workshops, lectures, exhibitions, demonstrations, training programmes, honours and awards, visits and appointments. A cover story related to launch of compendium on CSIR technologies for COVID-19 mitigation has been published in the edition.

Website link:
https://www.niscair.res.in/includes/images/csirsamachar/csir-samachar-august20.pdf

NRDC publishes special edition of 'Invention Intelligence' on COVID-19



National Research Development Corporation (NRDC) has published a special issue of its bi-monthly S&T magazine Invention Intelligence highlighting the various indigenous technological solutions to combat COVID-19 pandemic provided by NITI Aayog; CSIR; DST; DBT; DRDO; leading Indian academic institutions; and the efforts of NRDC, which has aligned with Indian R&D labs to combat COVID-19.

Website link:
http://nrdcindia.com/assets/vendor/filemanager/userfiles/Invention_Intellegence/NRDC_Invention_Intelligence_Jul-Aug_2020.pdf

Drug Discovery Hackathon 2020 launched for drug discovery against COVID-19

Drug Discovery Hackathon 2020 (DDH2020) platform welcomes all those who wish to join the open-source drug discovery Hackathon against COVID-19. DDH2020 is a joint initiative of All India Council for Technical Education (AICTE) and Council of Scientific and Industrial Research (CSIR) and supported by Office of the Principal Scientific Adviser (PSA), Government of India, National Informatics Centre (NIC) and MyGov India.

The vision and mission of DDH2020 is to establish 'Open innovation Model' for *in silico* drug discovery against COVID-19 virus and will cover the various processes in drug discovery, including but not limited to, *in silico* screening of molecules, lead optimization and identification of drug-able non-toxic targets. The targets/tools/lead molecules identified through the process of DDH2020 will be further taken forward for synthesis followed by subsequent steps in routine drug discovery programme.

Objective of the Hackathon is to identify drug candidates that are effective against coronavirus SARS-CoV-2 by employing a hackathon for *in-silico* drug discovery, followed up by chemical synthesis and biological testing.

The Hackathon consists of two major tracks:

Track-1will primarily deal with drug design for anti-COVID-19 hit/lead molecule generation using tools such as molecular modelling, pharmacophore optimization, molecular docking, hit/lead optimization, etc.

Track-2 will deal with designing/optimizing new tools and algorithms which will have an immense impact on expediting the process of in silico drug discovery. Novel or refined tools/algorithms from Track-2 will help develop better models for predicting ADMET in silico, thus improving screening efficiency.

Last date of submission for Phase-I: 30th September 2020

Website link:
https://innovateindia.mygov.in/ddh2020/

Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19. The bulletin contains press releases concerning COVID-19, issued in last 24 hours, inputs from PIB field offices and fact checks undertaken by PIB. The last release is dated 9th September 2020.

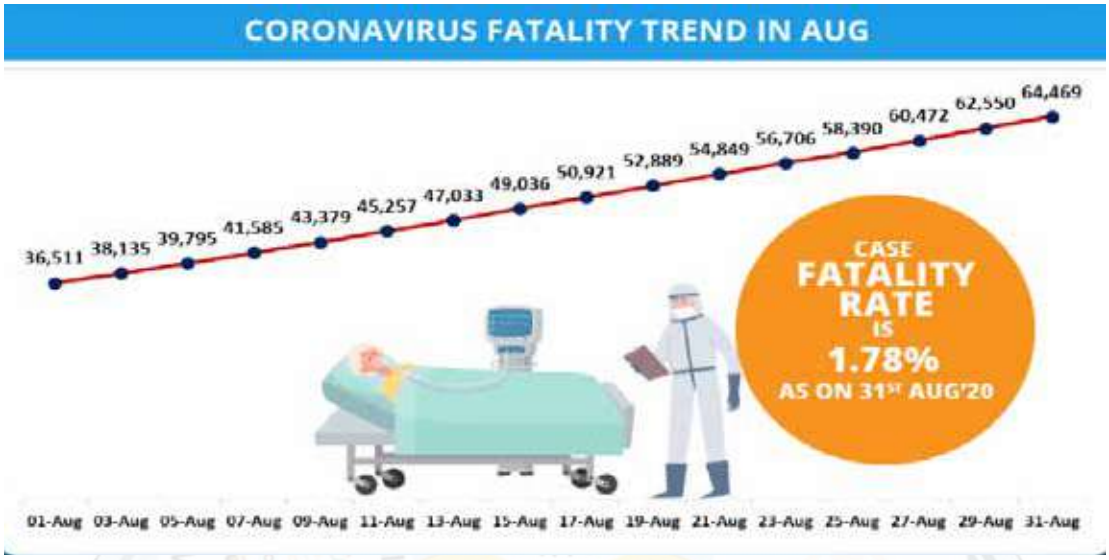
Website Link:
https://pib.gov.in/PressReleasePage.aspx?PRID=1652706

Government of India presents regular COVID-19 India factsheet

India's coronavirus cases have crossed 36-lakhs mark and as on 31st August 2020, 8:00 AM, stands at 36,21,245 cases out of which 27,74,801 have recovered. The recovery rate stands at 76.62% while the case fatality rate stands at 1.78%, one of the lowest in the world. 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.

The 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-31st-aug-2020-800-am/

IIT Delhi brings out newsletter enumerating initiatives taken towards combating COVID-19

The newsletter released by Indian Institute of Technology Delhi (IITD) covers research and development activities of the institutions which are aimed at innovation and technology development through interaction with universities, governments and industries to meet the needs of the society as well as industries. The Institution's latest issue of newsletter is dedicated to the research and innovation initiatives taken towards the technological interventions in fighting against the COVID-19 pandemic.

Website link:
https://home.iitd.ac.in/uploads/august2020.pdf

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

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is bringing out a weekly newsletter dedicated to the COVID-19 outbreak. The newsletter covers stories and information on various aspects, like research, technology and innovation efforts to fight the pandemic out and related awareness and sensitisation information. The last edition has been published 1st September 2020.

Website Link:
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 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 of the information products produced by India Science.

Weekly COVID-19 video bulletin: Produced in both Hindi and English language on weekly basis from 7 July 2020, COVID-19 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 produced daily COVID-19 Bulletin from 11th April to 06 July 2020. Thereafter, a weekly bulletin is being produced which provides the most important S&T updates for the country related toCOVID-19.

COVID-19 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.

Facebook live sessions on interviews of various stakeholders and media with DST Secretary. Facebook and India Science live sessions on interviews of various resources person on COVID-19.

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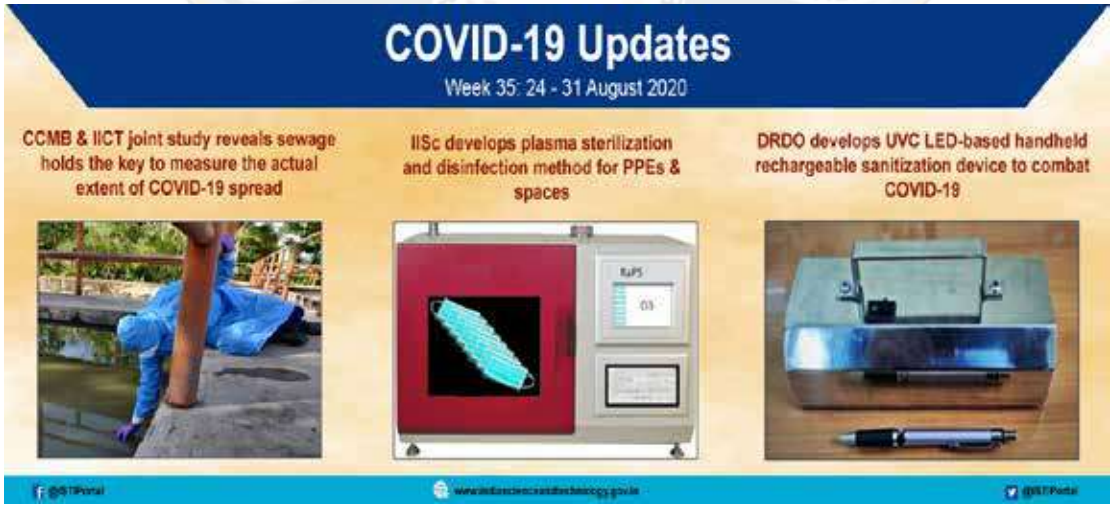
Website link:
https://www.indiascience.in/

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 and 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 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.



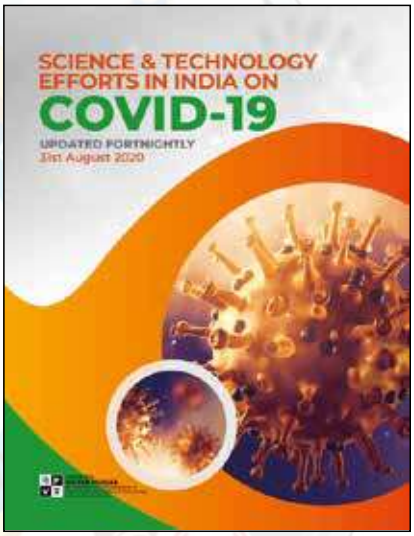
The web portal provides all information related to COVID-19, its presentation of symptoms, transmission modes and mechanisms, and various models of protection of individuals, healthcare professionals and prevention from spreading to the community. The reasons, usefulness, and impact of social distancing 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.

Contact Info: kdgm@vigyanprasar.gov.in

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

Fortnightly Publication of e-Newsletter on COVID-19



For the benefit of its stakeholders and target audience, Vigyan Prasar is bringing out a fortnightly 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 to combat the outburst of the pandemic.

The publication of Independence Day Special Edition-II of the e-Newsletter is conceived as producing an information product related to initiatives implemented towards getting people the freedom from COVID-19 disease and its transmission. The edition consists of the compilation of the developments during the last fortnight as well as the synopsis of all the initiatives taken after the outbreak of the pandemic.

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. The edition consists of the compilation of the developments during the last fortnight as well as the synopsis of all the initiatives taken after the outbreak of the pandemic by the academic institutions across the country. The Independence Day Special Edition-I, dated 15th Aug 2020, covered the synopsis of initiatives taken up by main and line ministries working assiduously in fighting the pandemic out. With more than 600 ongoing research projects enlisted, innumerable efforts made towards society, and tireless efforts contributed to reach out to general public, Vigyan Prasar takes the privilege in attributing this special edition to all the corona warriors helping the humankind.

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Website link:
https://vigyanprasar.gov.in/covid19-newsletters/
http://www.indiascienceandtechnology.gov.in/covid-19-the-pandemic/newsletter-archive

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