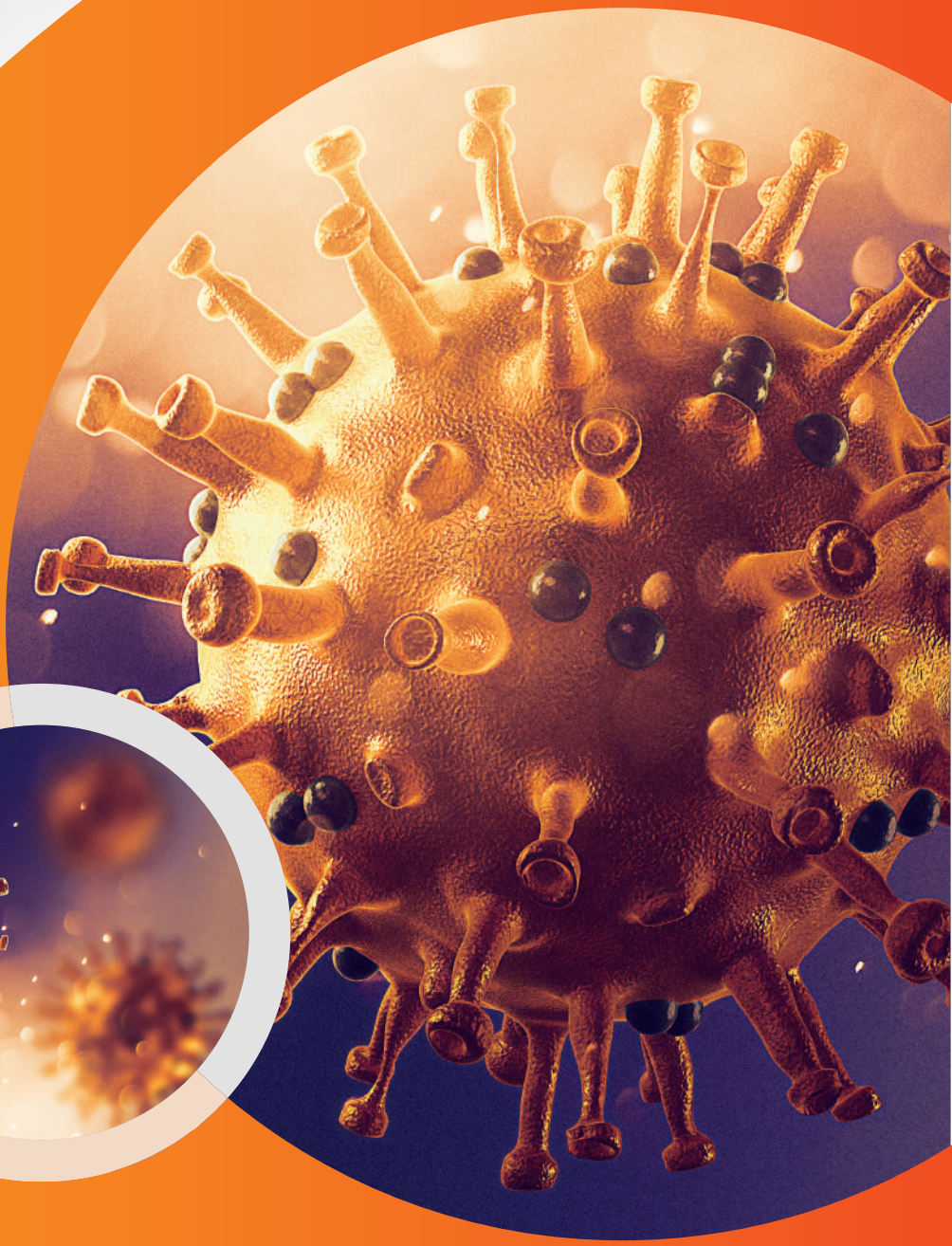
SCIENCE & TECHNOLOGY EFFORTS IN INDIA ON COVID-19

UPDATED FORTNIGHTLY

31st August 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

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 COVID-19 pandemic has posed one of the biggest challenges to the entire humanity. In the wake of its outbreak, our lives have changed in ways we had never imagined before. 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 publication of Independence Day Special Edition-II of the e-Newsletter 'S&T Efforts in India on COVID-19' is envisaged as producing an information product related to initiatives implemented towards getting us 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 by the academic institutions across the country. In Independence Day Special Edition-I, we had 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.

Vigyan Prasar
New Delhi

Dr Harsh Vardhan launches interactive game and IEC content to promote COVID Appropriate Behaviours "The Corona Fighters"

20 August, 2020

Dr Harsh Vardhan, Union Minister for Health & Family Welfare launched an interactive first-of-its-kind game on COVID-19, The Corona Fighters (www.thecoronafighters.in), and two new videos urging adherence to key COVID Appropriate Behaviours, in the presence of Sh. Ashwini Kumar Choubey, Minister of State for Health & Family Welfare.

Expressing his pleasure at the launch of the uniquely designed game, Dr Harsh Vardhan said that the game "presents a new and extremely creative way to teach people the right tools and behaviours to fight the COVID-19 pandemic." He stated that the game was designed to "influence the players' actions in the real world, reminding them to take the right precautions and escape infection." He further added that this along with two promotional videos "is a simply designed and enjoyable medium to get a serious message across to the wider public."

Dr Harsh Vardhan also recollected his experience with the Polio Abhiyaan which was transformed into a social movement through Jan Bhagidari (people's participation) and support and contribution of many film industry professionals. He said, "The Pulse Polio programme, through its targeted and engaging IEC and outreach campaigns, encouraged the last mile mothers to get their children immunized. The same effort can contain COVID by publicizing COVID appropriate behaviour through caller tunes and other mediums throughout the lockdown and thereafter during the phases of unlocking." Till we get a vaccine for fighting COVID-19, the COVID appropriate behaviours will serve as a potent social vaccine and keep us protected and safe, he stated.

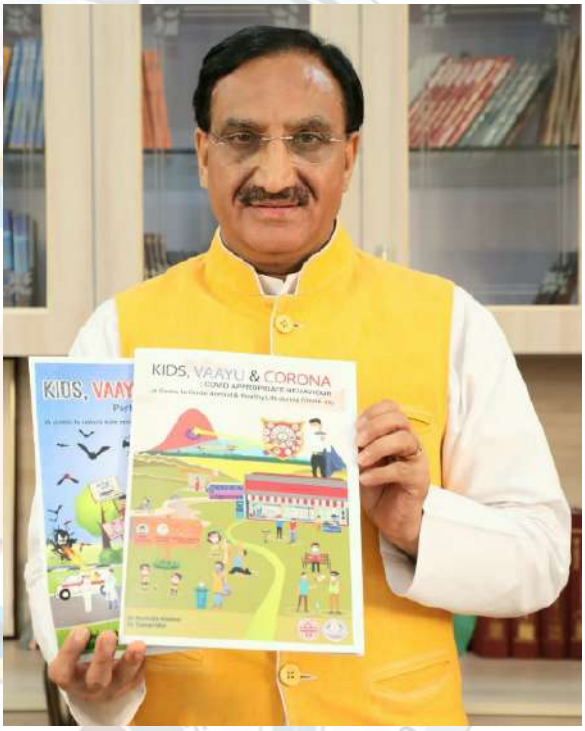
Congratulating the makers of the game and promotional videos, Shri Ashwini K. Choubey said, "Communication is the key in today's world. It has played a great part in the fight against COVID during the lockdown when the trajectory of the disease and its containment strategy could be effectively communicated to the last man." The IEC videos and game launched today will influence children, and through them the elders in the community, and spread the message and importance of COVID appropriate behaviour," he added.

DrV K Paul, Member (Health), NITI Aayog; Shri Rajesh Bhushan, Secretary for Health and Family Welfare; Shri Parmeswaran Iyer, Secretary, Department of Drinking Water and Sanitationin; and senior officials of the Health Ministry were also present at the occasion.

Website link:
https://www.pib.gov.in/PressReleasePage.aspx?PRID=1647406

‘KIDS, VAAYU & CORONA: COVID APPROPRIATE BEHAVIOUR’ RELEASED BY DR RAMESH POKHRIYAL NISHANK, UNION MINISTER FOR EDUCATION

23rd August 2020



Dr Ramesh Pokhriyal Nishank, Union Minister for Education (MHRD) released the fourth comic ‘KIDs, VAAYU & CORONA: COVID Appropriate Behaviour’ on 23rd August 2020 to guide children a normal and healthy life during COVID-19 pandemic. The series ‘Kids, Vaayu & Corona’ is the result of an innovative idea of Dr Ravindra Khaiwal, Department of Community Medicine and School of Public Health, PGIMER, Chandigarh, and Dr Suman Mor, Department of Environment Studies, Panjab University.

Dr Pokhriyal Nishank, during the release of the comic, highlighted the role of teachers and educators as they are actively creating awareness to minimize the spread of COVID19. He added that the comic booklet will be useful not only for the children but for others and will guide for COVID-appropriate behaviour in everyday life as we are heading towards unlocking 4. He also appreciated the efforts of Panjab University, Chandigarh and Post Graduate Institute of Medical Education and Research to minimize the impact of COVID-19 diseases as they are actively engaged in creating awareness and educating the public about the new normal.

Dr Suman Mor, Chairperson, Department of Environment Studies, Panjab University mentioned that the comic ‘KIDs, VAAYU & CORONA: COVID Appropriate Behaviour’ beautifully depicts the measures to be taken while dealing with the new challenges in everyday life. She added that the comic book is based on the current knowledge, including the guidelines issued by the Government of India and other agencies to ensure the safety of all and to restrict the spread of COVID-19 disease.

Dr Ravindra Khaiwal, Additional Professor, Department of Community Medicine and School of Public Health, PGIMER, Chandigarh mentioned that as we are allowing more and more social and economic activities, there is a need to follow COVID-appropriate behaviour at all times to diminish the risk of COVID-19 contagion. He highlighted that the comic 'KIDs, VAAYU & CORONA: COVID Appropriate Behaviour' is designed to educate and motivate children to quickly adopt new norms of COVID-appropriate behaviour and be a hero of prevention.

The comic book focuses on the precautions while travelling, driving, or going to crowded places like schools, offices, restaurants, salons, shopping malls as well as areas of worship. It also guides about the precautions to be taken by street vendors, domestic helps, etc. The comic explicitly stresses on the reduction of digital addiction, helping elderly and honouring corona warriors, including healthy practices, while staying indoors. After reading this exciting comic, kids can even guide their parents and family about the simple preventive step to be taken at the workplace, ATM, or while driving their car or travelling.

The digital book is available online at PGIMER and Panjab University website and other platforms such as https://www.care4cleanair.com/ to motivate students and guide them on how to look ahead to reopening positively.

Prof. Jagat Ram, Director, PGIMER, and Prof. Raj Kumar, Vice-Chancellor, Panjab University, congratulated the authors. They mentioned that as highlighted in the comic, the COVID-19 pandemic teaches us to live in harmony with nature, having in mind the concept of Vasudhaiva Kutumbakam (World as One Family) and we need to ensure sustainability to live a happy and healthy life.

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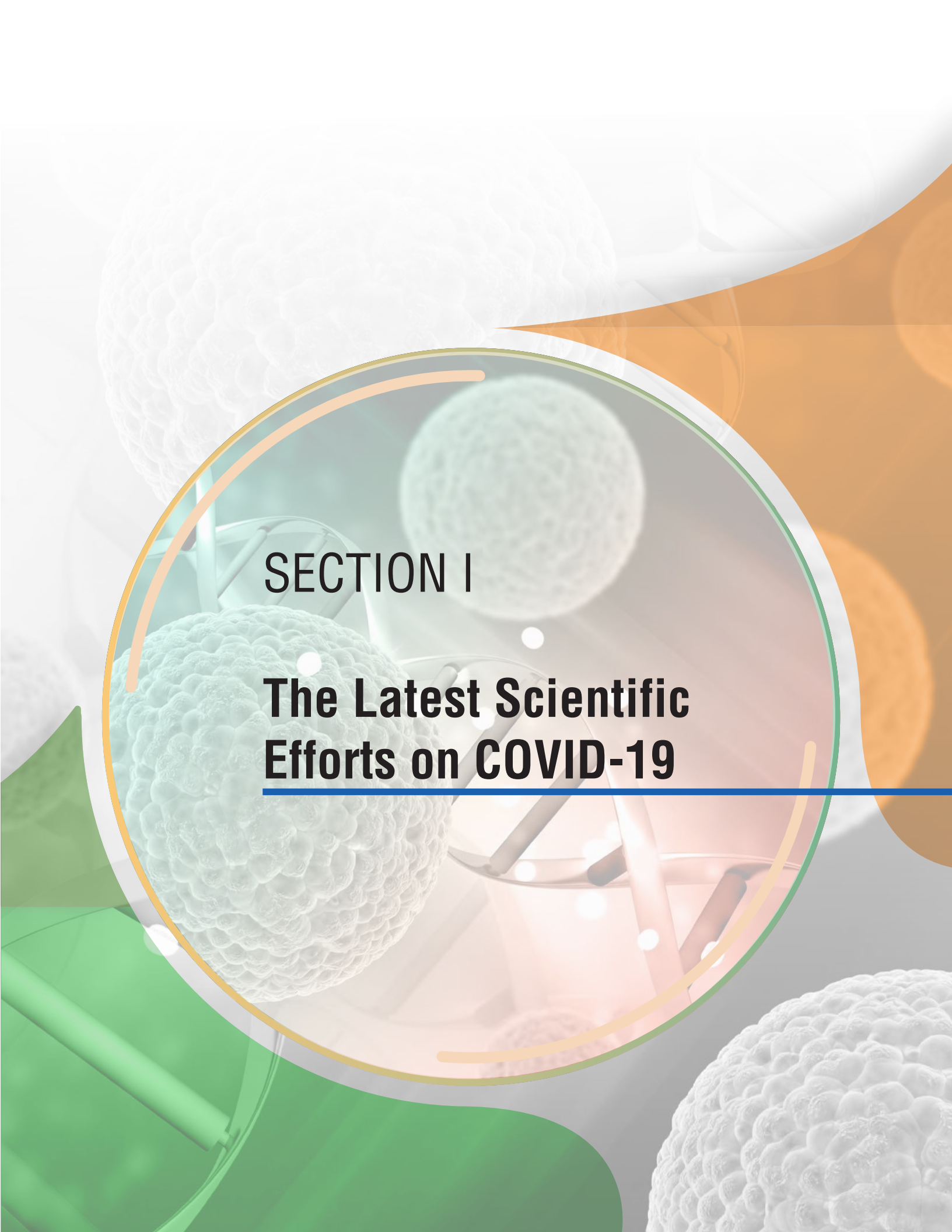
The Independence Day Special Edition consists of the compilation of the developments during the last fortnight and the synopsis of all the S&T initiatives taken up after the outbreak of the pandemic.

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



SECTION I

The Latest Scientific Efforts on COVID-19

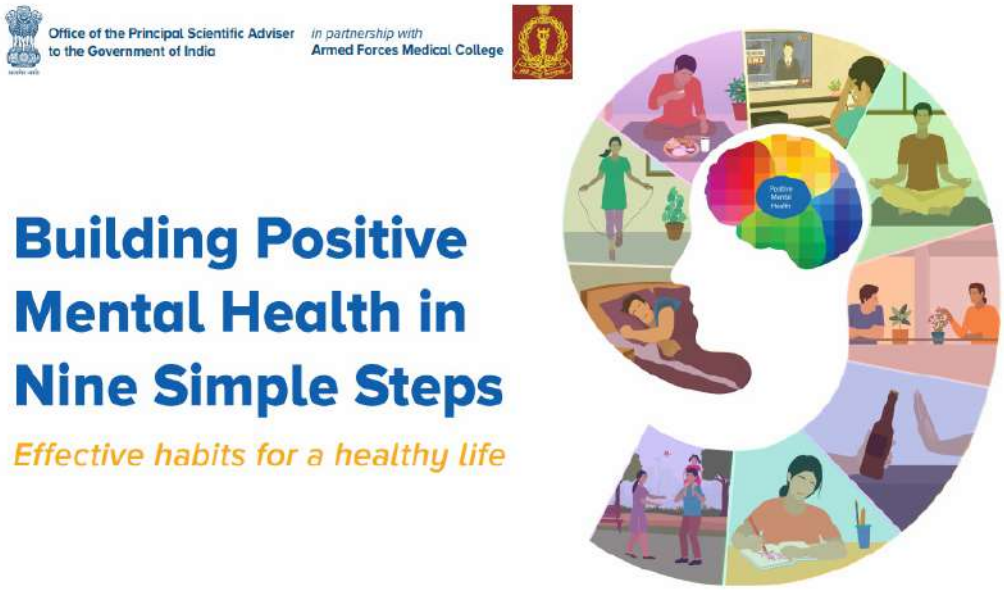
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19
BY

OFFICE OF THE PRINCIPAL SCIENTIFIC ADVISER (PSA)

Office of PSA releases simple guide to building positive mental health

As news about SARS-CoV-2 (COVID-19) dominates the headlines and public concern is on the rise, taking care of mental health is as important as looking after the physical health. Good mental health and positive wellbeing can help individuals better cope with the COVID-19 threat and the uncertainty it is creating. Resilience is the process of finding healthy ways to adapt and cope with adversity and distress. Building resilience can be the key to helping the individuals get through the COVID-19 pandemic crisis and its aftermath. It can help protect one from various mental health symptoms, such as depression, anxiety and traumatic stress. It can also help those who already have mental health conditions cope better. Prior tragedies have shown the power of resilience. Knowing this and how to build resilience can be a source of great hope for many people. In fact, people can even experience emotional growth after a tragedy.

In association with Armed Force Medical College (AFMC) Pune, Office of the Principal Scientific Adviser brings forth a guideline book to build positive mental health. This e-book is published in Hindi as well as English to reach out to the larger audience.



Website Link:
http://psa.gov.in/information-related-covid-19/mental_health_guide
http://psa.gov.in/sites/default/files/PSA_AFMC_Mental%20Health/MentalHealthGuide_English.pdf

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

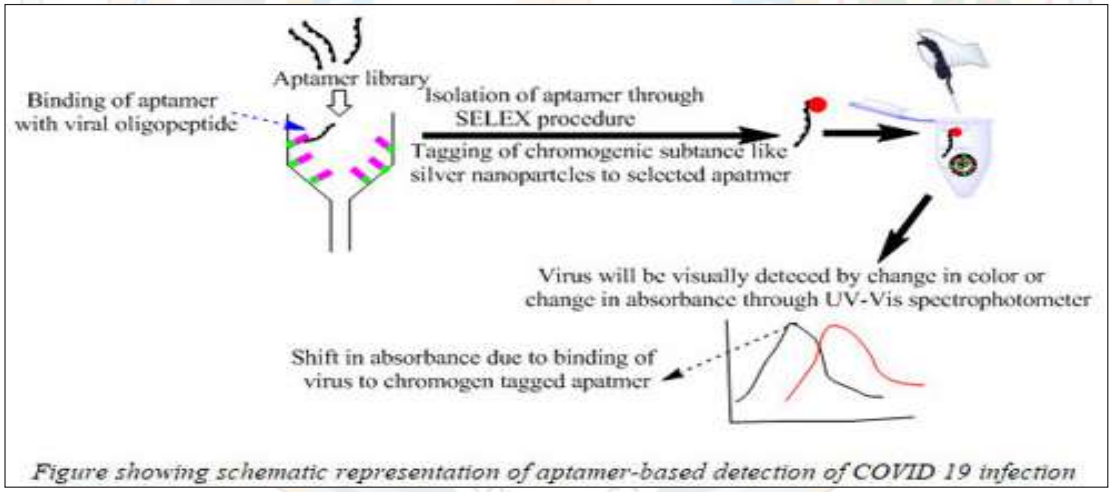
BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

Study initiated for low cost COVID-19 detection kit suitable for storage in less stringent conditions in rural areas

The COVID-19 pandemic has thrown up the novel challenge of setting up rapid diagnostic facilities in remote areas which do not have adequate infrastructure. This calls for low cost devices that do not require very stringent storage facilities. Scientists have put in a research plan to meet this urgent requirement.

With support from the Science and Engineering Research Board (SERB), a statutory body under the DST, Birla Institute of Technology, Mesra, Ranchi, has initiated a research with the detection of a target protein using bioinformatics tool against which the diagnostic kit has to be developed. This study has taken the special domain of spike protein in consideration for the development of the diagnostic kit.



Schematic representation of aptamer-based detection of COVID-19 infection

Website link:
https://dst.gov.in/study-initiated-low-cost-covid-19-detection-kit-suitable-storage-less-stringent-conditions-rural

SCTIMST & IIT Madras start-up set up portable hospital infrastructure for COVID-19

The COVID-19 pandemic has highlighted the need to set up systems to improve health infrastructure, particularly in rural areas. Portable hospitals for detecting, screening, identifying, isolating, and treating COVID-19 patients in local communities could soon be a solution to tackle the increasing demands for health infrastructure.

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), an autonomous institute under the DST, Govt. of India in collaboration with 'Modulus Housing', a start-up incubated by IIT Madras, has come up with a solution using decentralised approach to detect, manage and treat COVID-19 patients in local communities through portable microstructures.

Website link:
https://dst.gov.in/sctimst-iit-madras-start-set-portable-hospital-infrastructure-covid-19

Millennium Alliance Round 6 & COVID-19 Innovation Challenge-Awards for 49 innovations in 5 focus areas

The Millennium Alliance Round 6 & COVID-19 Innovation Challenge-Award Ceremony, which recognized 49 innovative solutions in 5 focus sectors of India, highlighted the necessity of building a highly distributed innovation ecosystem.

Announcing that DST will be soon launching a new program to have highly distributed innovation ecosystem, DST Secretary, Professor Ashutosh Sharma said that to have a start-up doing innovation it is important to have networking, support, seed money, and prototyping facility, and all of these facilities could be provided outside the physical space of incubators.

Website link:
https://dst.gov.in/49-innovations-5-focus-areas-receive-millennium-alliance-round-6-covid19-innovation-challenge-awards

Awards announced for Indo-US Virtual Networks for COVID-19

Eight bi-national teams consisting of researchers from India and the US have received awards to pursue cutting-edge research in pathogenesis and disease management of COVID-19 through Indo-US virtual networks. The areas of research they will pursue include antiviral coatings, immune modulation, tracking SARS-CoV-2 in wastewater, disease detection mechanisms, reverse genetics strategies, and drug repurposing.

The Indo-US Science and Technology Forum (IUSSTF) announced the awards to eight bi-national teams, consisting of leading researchers from India and US for COVID-19 Indo-US Virtual Networks in support of the efforts of the medical and scientific community to find solutions to the COVID-19 pandemic and emerging global challenges. The IUSSTF is an autonomous bilateral organization jointly funded by the Governments of India and the US that promotes Science, Technology, Engineering and Innovation through substantive interaction among government, academia, and industry. The Department of Science & Technology, Governments of India and the US Department of States are respective nodal departments.

Website link:
https://dst.gov.in/awards-announced-indo-us-virtual-networks-covid-19

DST Secretary highlights digital transformation opportunities that emerged from COVID-19 disruptions

Secretary, DST, Professor Ashutosh Sharma, emphasised that the future is all about convergence of digital technologies and that COVID-19 virus has provided the country opportunity to be part of the change rather than resisting it, at webinar on Digital Transformation in COVID-19.

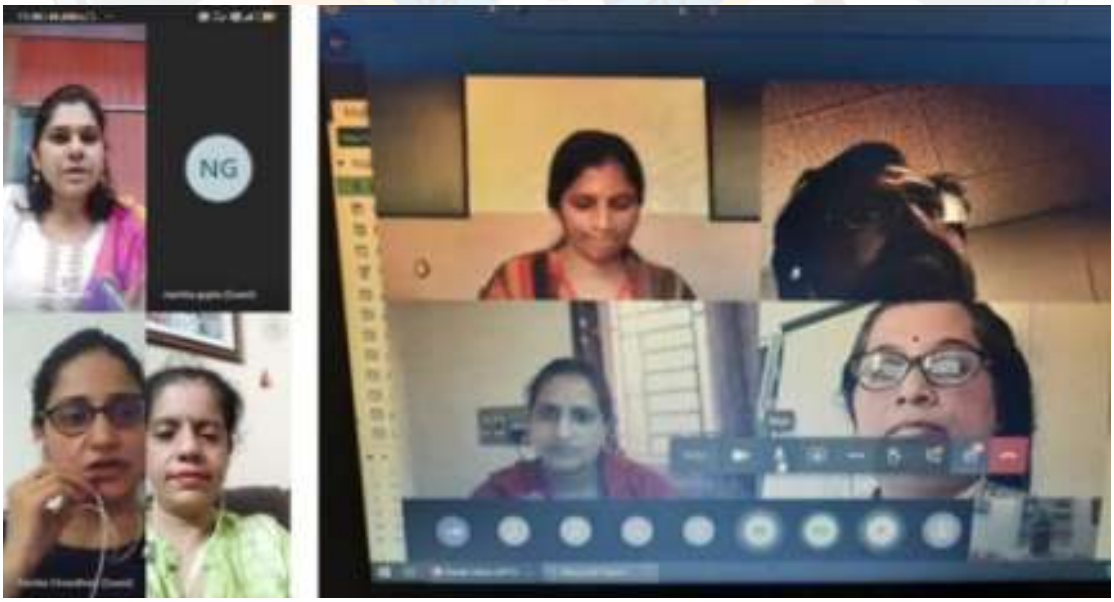
"Use of digital technologies and machines can take the country to new heights and fulfil the dream of our Prime Minister of 'Atmanirbhar Bharat'," Professor Sharma pointed out. He added that data is the new water, and we must value data to use it for our progress at the webinar organised by the Standing Conference of Public Enterprises (SCOPE).

Professor Sharma explained that future has been coming to us at a fast pace even before the COVID-19, but the virus has changed everything. It has disrupted every sector and every life beyond imagination. Its impact is on all aspects-- whether it is availability of labour, supply chains, or logistics. However, the more disruptive the challenge, the bigger will be the achievement, and this is a very good time to think where we are and where we want to be.

Website link:
https://dst.gov.in/dst-secretary-highlights-digital-transformation-opportunities-emerged-covid-19-disruptions

DST reaches out to women scientists facing challenges during COVID-19

The pandemic and associated lockdown has affected people in different ways. Due to closure of institutions, woman scientists, especially those working on projects to address societal challenges through S&T solutions, have been facing several challenges in carrying out fieldwork, data collection, surveys required in their projects, and other administrative issues such as timely documentation, the release of fellowships and so on. Keeping their needs in mind, KIRAN (Knowledge Involvement in Research Advancement through Nurturing), a division of the DST held an online interaction meeting with these women scientists to help them overcome the challenges.



Website link:
https://dst.gov.in/dst-reaches-out-women-scientists-facing-challenges-during-covid-19

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF BIOTECHNOLOGY (DBT)

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

(Representative picture of lab testing)

The DBT's New Delhi-based Regional Centre for Biotechnology (DBT-RCB) has signed a memorandum of agreement (MoA) with Satej Global Science, Ahmedabad to identify scope of services for antiviral activity testing against SARS-CoV-2.

Under the MoA, DBT-RCB is providing testing for antiviral activity 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 new drug candidate/test substances. Satej Global Science shall reimburse the cost of services.

Contact Info: Dr Deepika Bhaskar (deepika.bhaskar@rcb.res.in)

Website link:
https://www.rcb.res.in/

DBT-THSTI's researchers win grant for discovering drugs for COVID-19

Drs Amit Awasthi and Sweety Samal of the DBT's Translational Health Science and Technology Institute (DBT-THSTI), Faridabad have been awarded the Intensification of Research in High Priority Area (IRHPA)-SERB grants funded by Department of Science and Technology to support COVID-19 antiviral research.

The project will be implemented in partnership with the International Centre for Genetic Engineering and Biotechnology (ICGEB) and Madurai Kamaraj University, Madurai. THSTI will support in conducting animal studies in mice and hamsters for screening and identification of

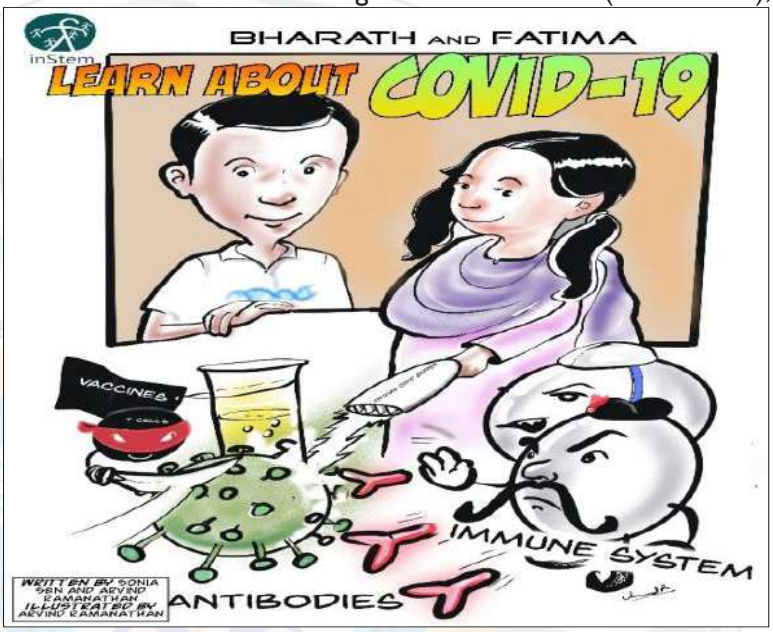
promising COVID-19 antiviral drugs. The project has been awarded for three years till 2023. This project is a part of DBT-THSTI's COVID-19 efforts in the field of animal studies for screening COVID-19 drugs.

Contact Info: Dr Siuli Mitra (smitra@thsti.res.in); Dr Nidhi Sharma (nidhi.sharma@rcb.res.in)

Website link:
https://thsti.res.in/news.php

DBT-InStem comes up with a graphic novel for COVID awareness

A faculty member at DBT's Institute of Stem Cell and Regenerative Medicine (DBT-InStem), Bengaluru has created an informative comic novel to create awareness about COVID-19, busting myths and highlighting ongoing research across the country.



Cover page of the novel 'Bharath and Fatima learn about COVID-19'

Graphical narration has a rich history in Indian culture, with series such as Amar Chitra Katha demonstrating the trans-generational power of this medium. The author, Arvind, has deep interests in cartooning and graphical narration and has sought to employ it to create awareness among non-specialists, especially children about COVID-19.

The novel is woven around two curious children Bharath and Fatima who learn about COVID-19, immune system and vaccines from their fictional uncle. The initiative, with anticipated translations into local languages, is hoped to serve as a platform for science education and communication. DBT-inStem along with the Bangalore Life Science Cluster (BLiSc) plans to launch this as an awareness campaign on social media very soon.

InStem is one of the founding partners of COVID Gyan, a pan-institutional website that has been proactive in COVID-19 outreach efforts. The constant effort of COVID Gyan since its launch has been to create necessary awareness with proper scientific backing about COVID-19 across the country.

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

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https://instem.res.in/

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

CSIR-IICT collaborates with Cipla Foundation for a project on face-masks

Cipla Foundation has come forward to support a CSR project under the name SAANS for production of 1 lakh non-medical masks based on CSIR-IICT technology for the benefit of the rural population in districts of Telangana State. The Indian Institute of Chemical Technology (CSIR-IICT) is collaborating with the Cipla Foundation for a project on facemasks in the wake of COVID-19. The project, "Affordable, multi-layered, hydrophobic facemasks with anti-microbial properties entitled "SAANS", is for production of one lakh high quality masks for distribution in identified *mandals* of rural Telangana. According to D. Shailaja, Chief Scientist & Chair Business Development, CSIR-IICT plans were underway making it a pan-India project. The project envisages multiple beneficiaries such as enhancing the income of the entrepreneur (start-ups or MSMEs), generating employment to SHGs and improving the quality of hygienic life in rural areas for mitigation of COVID-19.

Contact info: Dr M. Chandrasekharam (csmalapaka@iict.res.in); Dr D. Shailaja (headbdrm@iict.res.in)

Website Link:
https://www.csir.res.in/sites/default/files/1%20to%205%20August%202020%20News%20Bulletin.pdf

New project to expand portfolio of CSIR-technologies for pharmaceuticals

A new mission project entitled "Development of Processes for Active Pharmaceutical Ingredients towards COVID-19" is initiated by CSIR. Nine Institutes of CSIR are participating in the Mission programme, with CSIR-IICT as the Nodal Laboratory for the project. This project is intended to expand the portfolio of CSIR-technologies for pharmaceuticals, such as saquinavir, dalargin, dapagliflozin, ribavirin, barcitinib, EIDD 2801, galidesvir and few others.

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

CSIR-IITR has tested over 50,000 samples for COVID-19

CSIR-IITR is ICMR and State-approved COVID-19 Testing Facility since 4th May 2020. The Institute has accomplished a landmark of testing over 50,000 samples for COVID-19 using Real-Time-PCR-based quantitative assay in the last 16 weeks. It is receiving samples from different districts of Uttar Pradesh.

While the COVID-19 cases were shooting to an alarming stage during the 2nd phase of lockdown, as an emergency response, CSIR-IITR created state-of-the-art facility for COVID-19

testing as per national norms. In a meeting held with Chief Secretary, Government of Uttar Pradesh as well as the Hon'ble Minister of Medical Education, Shri Suresh Khanna, Professor Alok Dhawan, Director, CSIR-IITR apprised of full preparedness for testing and assured support to the State to enhance the testing capacity for COVID-19. The cell-culture facility of the Institute was repurposed to BSL2+ laboratory to serve as COVID-19 testing facility. The Institute also formulated standard operating procedure (SOP) and obtained approval from CSIR, ICMR and state authorities. A team of about 10 personnel had been imparted training by Department of Microbiology, King George's Medical University (KGMU) on biosafety measures, sample receiving, real-time PCR-based testing, data analysis and data reporting. They in turn trained the other staff of CSIR-IITR involved in institutional COVID-19 testing facility. Procurement of consumables such as testing kits, PPE, plasticware were made at rapid pace.

The scientists of CSIR-IITR standardized procedures, performed mock testing and initiated sample testing by themselves. Later, the institute hired dedicated manpower to run the facility funded by CSIR. The UP Government provided full support by deputing a medical microbiologist and two technicians at the Institute's COVID-19 testing facility.

Initially the Institute had testing capacity of 50 samples per day which is now ramped up to 1200 samples per day. In a short span of less than 4 months, CSIR-IITR reached a major landmark by finishing over 50000 tests. CSIR-IITR is the first CSIR laboratory to reach this milestone. This was made possible only by the untiring and persistent effort of numerous scientists, technical and various other staff, who have been working continuously for seven days a week. CSIR-IITR is also contributing in capacity building. It is providing training on various aspects of COVID-19 testing to staff of other CSIR labs and state medical colleges. The Institute is committed to serve at its best capability during this crucial time of national crisis.

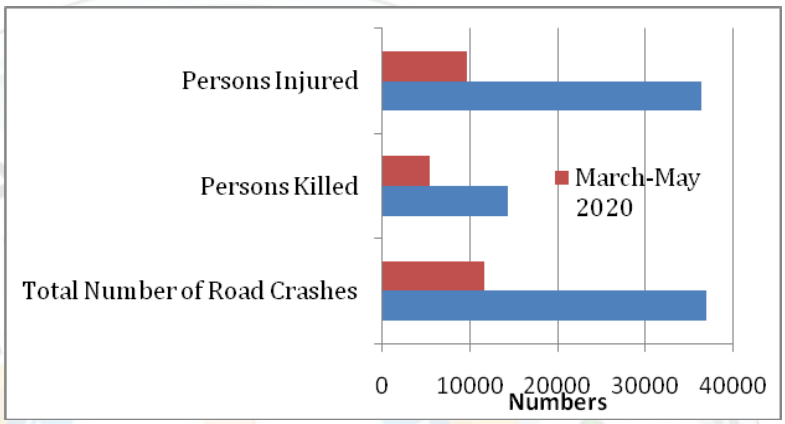
Contact info: Dr KC Khulbe (rpbd@iitrindia.org)

Website Link:
https://twitter.com/Alok_Dhawan/status/1298118370680639496

Report on impacts of COVID-19 on the transport sector

A request came from the Chair of WCTRS (World Conference on Transport Research Society) COVID-19 Taskforce Prof. Y. Hayashi to Dr S. Velmurugan, Chief Scientist to serve as WCTR Taskforce Coordinator for India. After obtaining due consent from Prof. Satish Chandra, Director, CSIR- Central Road Research Institute (CSIR–CRRI), an interim report has been submitted titled, 'Impacts of COVID-19 on the transport sector and measures as well as recommendations of policies and future research: Report on India' on 20th August, 2020 the Chair and Co-Chair of WCTRS COVID-19 Taskforce by CSIR-CRRI. Dr S. Velmurugan served as WCTR Taskforce Coordinator for India along with Dr Mukti Advani and Dr S. Padma serving as Taskforce Members in preparing this interim report.

This report broadly highlights the COVID-19 situation in India since March 2020 primarily from the transport perspective. It starts with providing basic information regarding trend of COVID-19 pandemic in India by presenting the status as on 19th August 2020 across the country. Further, this report briefly highlights the features of each phase of lockdown and unlocking periods which were in force in India as per the Government of India and state government norms.



Source: Supreme Court Committee on Road Safety

This report also includes impact of COVID-19 on transport sector including air, rail and bus transport (covering inter-state and intra-state travel). Impact on road safety has been included by comparing the number of road crashes since lockdown and for the same period of previous year. The report also discusses about the game-changing plans proposed by CSIR-CRRI and other organizations which to be in place for providing enhanced mobility post COVID-19 which comprised of immediate and long-term plans.

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CSIR-NPL supports testing of personal protective equipments (PPEs)

The COVID-19 outbreak has thrown an unprecedented and humongous challenge resulting into nationwide health hazards and precious loss of lives. Due to this the demand of PPE devices has increased by manifolds. In order to support the MSME industries, hospitals, biomedical laboratories in their endeavour to manufacturing and testing of PPE like Masks, Hand Gloves, Hand Ventilators and IR thermometers and scanners, CSIR-NPL has taken up a project entitled, *"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)'* under facility creation programme.

The CSIR-NPL has made concentrated efforts and has now made some headways and achieved good progress. The following is the update on the works carried out related to above project:

Surgical gown and gloves

The accurate, precise and reliable measurement of the properties of the PPE is necessary for its development with desired quality. Therefore, there is need to establish testing facility for testing of various essential properties of the PPE as per relevant standards. CSIR-NPL initiated the development of state-of-the-art facility with highest level of traceability for various parameters. This would help healthcare industries immensely in developing high quality product which will not only support their in-house use but also let them export these PPEs. Further, this will also help the government to set essential policies for these important PPE testing. As per the standards, there are 13 tests required to evaluate the performance of the gown and gloves, namely, Tensile strength (dry and wet), Bursting strength (dry and wet), Seam strength (dry and wet), Tear Strength, Blood resistance, Hydrostatic resistance, Impact Penetration, Particle Release, Moisture vapour transmission rate, Materials, the Cuff, Dimensions, Thickness, Air tight test for gloves, Accelerated aging for gloves and Sterility test for gloves.

Out of these, the feasibility of 6 test facilities (first six stated earlier) has already been achieved after preliminary establishment and others are under process of development. Most of the tests have been designed and developed indigenously and will be further upgraded and improved after procurement of some essential instruments mentioned in the project document along with instruments for rests of the tests.

Further, the resistance offered by PPE to synthetic blood is considered as an important test for their utility in pandemic situations like the worldwide spread of COVID-19, which is a viral transmission. The prime requirement of blood penetration tests is synthetic blood with physical properties similar to human blood. CSIR-NPL has taken the lead in developing the reference standard for synthetics blood (BND 9001).

For water vapour transmission rate measurement as per ASTM D 6701-16 the system had some error in the equation. Therefore, equation is modified and accordingly modified system as per ASTM D6701-16 is developed in-house. The developed system has yielded good results and is now working fully functional.

Testing Facilities for all Types of Masks

Facemask is an important safeguard especially for medical doctors, nurses, and other health workers, and now in current situation to public also. Therefore, there are stringent guidelines for their manufacturing followed by testing for compliance to the standards. However, in India their testing facility is limited only to a few labs and also to a very few test parameters. Therefore, this proposal is to setup a facility for half face mask testing for sub-micron particle filtration efficiency, Bacterial filtration efficiency, Differential pressure (pressure drop) across mask, Inward leakage in context of integrity of the seal of the face mask to the wearer's face using an automated instrument to determine total inward leakage and Carbon dioxide content in dead space air.

For current status, state-of-the-art primary facility to calibrate particle counters, size, particle air monitoring instruments is already available for Particle filtration efficiency test set up, which can determine efficiency with 0.3% measurement uncertainty. This means the capability using this system is that we can report an efficiency up to 99.7% of a mask with SI traceability in particle size and flow which a unique feature and as per our knowledge nobody in India has such capability for this test.

Similarly, for Differential Pressure and Carbon dioxide content, State-of-the-art primary facilities for calibration of flow meter, pressure gauge at low pressure ranges and CO_2 gas and other gas standard preparation and measurement facility are available. For Bacterial Filtration Efficiency

(BFE) test, the experimental setup is identified as per ASTM F2101-19 standard. In this, very important and critical device is 6-stage sampler (Andersen). The Institute has designed this 6-stage viable sampler and in process to patent it followed by technology transfer to MSMEs. Rest of the systems are to be procured under the project. For Inward Leakage testing, facility will be developed in due course of time.

Testing of Ventilators, IR Thermometers and Scanners

State-of-the-art facilities are available for testing of flow, volume, and pressure parameters of the ventilators. At present, traceability to ventilator testers only for these parameters is available. However, for the full ventilators testing, necessary equipment has been projected.

The measurement of body temperature is a basic parameter and vital sign of the human body health. For clinical IR thermometers, the laboratory accuracy level of ± 0.3°C is allowable in the temperature range from 35 °C to 42 °C, as per the IS/ISO IS/ISO 80601-2-56 : 2017.

In order to gain credibility and confidence in the usage of IR Forehead/Ear thermometers, a standard blackbody source (BBS) with a calibration traceable to ITS-90 (± 0.07 °C) is needed. The Institute has in-house designed and developed a copper blackbody cavity coated with diffused black paint to give the emissivity of 0.998 and placed in a high stability (± 0.003 °C) water bath. The temperature of bath and hence IR cavity temperatures were measured by standard platinum resistance thermometer (SPRT) calibrated (± 0.006 °C) on ITS-90 fixed points. Various experimental parameters such as bath stability, uniformity, emissivity variation, temperature difference in cavity, size-of-source and distance effect are measured and optimized to get the overall temperature source uncertainty of ± 0.051 °C. The measurement performed with this set-up on reference IR Forehead thermometer in the range from 35 °C to 42 °C are within uncertainty of ± 0.1 °C.

During and after the COVID-19 outbreak CSIR-NPL has supported several Indian firms for the testing of various models of IR Forehead thermometers imported and Made-in-India for contact less measurement of the febrile body temperature and thermal screening. About 44 samples of IR Forehead Thermometers for model approval have been received that are to be used for the febrile body temperature and thermal screening. Out of these, 28 certificates have already been issued.

CSIR-NPL is also in the process to develop the testing facility for the IR Thermal Imagers/ Scanners by establishing large aperture blackbody as per the IEC 80601-2-59 : 2017 standard and with the financial support from CSIR.

CSIR-NPL has developed an equipment, "A microbial disinfection casket" in collaboration with Motras Scientific Instruments, Gurugram for the low-level surface disinfection of non-porous equipment surfaces after manual cleaning by dose-controlled UV irradiation.

In addition to above, efforts are being made to develop facilities for testing of Face-shield and Blood pressure measuring instruments. A good progress is made in the development of testing facilities for BP measuring instruments.

Initiative has been taken for the design and development of Oxygen Concentrator based on Pressure Swing Adsorption (PSA) Technology upon the expression of interest by Industry. In this context, an initiative has been taken to develop a 5L/min flowrate and more than 90% purity oxygen delivering capability portable oxygen concentrator, by designing of Zeolite packed column, electronic drive circuit, filtration system and assembling of other components including the medical use compressor, electronically regulated solenoid valve assembly, cooling

and heat dissipation system, pressure transducers, oxygen sensor, flowmeter and other components. Further, the activity for design and development of Ventilators is under progress in association with Industrial Partner M/s 3D Paradise.

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Sero-surveillance at CSIR-NEERI

CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), in collaboration with CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB), initiated sero-surveillance at CSIR-NEERI in order to know antibody levels against COVID-19 and measure immunity in individuals.

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Website Link:
https://twitter.com/CSIR_NEERI/status/1296475067635970050

ICMR empanelled CSIR-CSIO for the testing of UV-based Systems/Products

In an attempt to prevent the spread of COVID-19 pandemic, ICMR has empanelled Central Scientific Instruments Organisation (CSIR-CSIO) for the testing of UV-based Systems/Products. Accordingly, CSIR-CSIO started testing of UV radiation spatial distribution inside various products and furnish test reports for the same to the respective manufacturing/trading industries/agency. The testing procedure is used to verify the UV radiation intensity at various points inside the product/system to allow protection against microorganisms present on the surfaces by disinfecting and decontaminating daily essentials and office items.

A research proposal was submitted under INDO-US Science and Technology Forum (IUSSTF) for Handheld Electrostatic Disinfection Machine. Electrostatic spraying is one among the most effective and efficient liquid-based spraying techniques in which the droplet size and the aerodynamic conditions can be controlled in the desired manner. It provides economic and efficacious sanitization, reduces off-target losses and covers the surfaces uniformly. Electrostatic spraying achieves near-complete coverage of difficult targets than uncharged spraying in addition to minimize the chemical usage and natural resources. Disinfection is the process to destroy or inhibit the growth of disease causing microorganisms (pathogens, viruses etc.) thriving on the living and non-living surfaces. Surfaces, which are not cleaned properly and disinfected regularly can become a hotbed for pathogens growth. Public transport, poultry, livestock, medical devices and hospitals, airports and railways, hotels and catering, work place and offices are the objects/places, where harmful microorganisms makes people vulnerable to diseases. In the proposed work, the Institute shall develop various types of customized designs for spraying which will be for varied applications.

Further, a proposal was submitted for the low power radar system prototype which will be used for spontaneous as well as continuous monitoring of Heart Rate (HR) as part of a vital signs assessment. The idea is to design a prototype system for contactless recording of Heart Rate of subjects and design an algorithm to extract HR from the recorded data.

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https://www.csio.res.in/

एनबीआरआई ने लॉन्च किया हर्बल सैनिटाइजर 'जर्मिविड'

काउंसिल ऑफ साइंटिफिक ऐंड इंडस्ट्रियल रिसर्च (सीएसआईआर) की लखनऊ स्थित प्रयोगशाला नेशनल बोटानिकल रिसर्च इंस्टीट्यूट (एनबीआरआई) के वैज्ञानिकों द्वारा विकसित हर्बल हैंड सैनिटाइजर 'जर्मिविड' को बाजार मे लॉन्च कर दिया गया है।

यह एल्कोहल आधारित हर्बल हैंड सैनिटाइजर है, जिसकी तकनीक मेसर्स फर्विड हेल्थकेयर प्राइवेट लिमिटेड को व्यावसायिक उत्पादन के लिए सौंपी गई है। इस हैंड सैनिटाइजर को संस्थान के वरिष्ठ प्रधान वैज्ञानिक डॉ शरद श्रीवास्तव और उनकी टीम ने वैज्ञानिक सामाजिक जिम्मेदारी के तहत विकसित किया है।

'जर्मिविड' को विकसित करने वाले वैज्ञानिकों का कहना है कि यह उत्पाद एक उत्कृष्ट कीटाणुनाशक है और हाथ की नमी बनाए रखकर निर्जलीकरण से बचाता है। यह वैज्ञानिक रूप से मान्य है और नियमित उपयोग के लिए भी उपयुक्त है। अब इस उत्पाद को सार्वजनिक उपयोग के लिए लॉन्च किया गया है।

एनबीआरआई द्वारा जारी विज्ञप्ति में बताया गया है कि यह सैनिटाइजर एक लीटर, 500 मिलीलीटर, 200 मिलीलीटर और 100 मिलीलीटर की बोतलों में बाजार में उपलब्ध होगा। इसकी कीमत सरकारी निर्देशों के अनुसार रखी गई है।

इससे पहले भी एनबीआरआई के वैज्ञानिक कोरोना वायरस की रोकथाम के लिए तुलसी के तेल जैसे हर्बल तत्वों से युक्त हैंड सैनिटाइजर बना चुके हैं, जिसे विश्व स्वास्थ्य संगठन के दिशा–निर्देशों के अनुरूप सीएसआईआर के अरोमा मिशन के तहत बनाया गया था।

Website Link:

https://vigyanprasar.gov.in/isw/NBRI-Launches-Herbal-Sanitizer-Germivided-hindi.html

कोविड–19 की जाँच अब सस्ती और आसान

कोरोना वायरस का प्रकोप शुरू होने के साथ ही इसका परीक्षण तेज करने को कोविड–19 महामारी से लड़ने का सबसे प्रमुख अस्त्र बताया जाता रहा है। लेकिन, इसमें लगने वाले समय के कारण परीक्षणों को तेज करना चुनौती रही है। इस चुनौती से निपटने के लिए हैदराबाद स्थित सीएसआईआर–कोशकीय एवं

आणविक जीवविज्ञान केंद्र (सीसीएमबी) ने ड्राई स्वैब आधारित नया आरटी–पीसीआर टेस्ट पेश किया है। यह टेस्ट आमतौर पर प्रचलित आरटी–पीसीआर टेस्ट से मिलता–जुलता है, जिसे जल्दी ही भारतीय आयुर्विज्ञान अनुसंधान संस्थान (आईसीएमआर) की मंजूरी मिल सकती है।

आमतौर पर प्रचलित टेस्टिंग पद्धति में स्वैब नमूनों की पैकिंग और फिर परीक्षण से पहले पैकिंग को खोलने में चार से पाँच घंटे लग जाते हैं। जबकि, ड्राई स्वैब आरटी–पीसीआर परीक्षण पद्धति में कोई लिक्विड उपयोग नहीं किया जाता और स्वैब नमूने एक प्रोटेक्टिव ट्यूब में एकत्रित करके लैब को परीक्षण के लिए भेज दिए जाते हैं।

इस नयी पद्धति में परीक्षण के दौरान राइबोन्यूक्लिक एसिड (आरएनए) को पृथक करने की जरूरत नहीं होगी, जो स्वैब नमूनों से वायरस का पता लगाने से जुड़ी एक लंबी प्रक्रिया है। इसके तहत आरएनए पृथक्करण पद्ध ति की जगह ऊष्मीय निष्क्रियता (भ्मंज प्दंबजपवद) पद्धति का उपयोग किया जाता है। इस पद्धति में नमूनों को 98 डिग्री सेल्सियस ताप पर एक निश्चित अवधि के लिए गर्म किया जाता है और फिर आरटी–पीसीआर मशीन पर परीक्षण के लिए भेज दिया जाता है।

सीसीएमबी के निदेशक डॉ राकेश मिश्रा ने कहा है कि "इस संबंध में हमें आईसीएमआर से मंजूरी मिलने का इंतजार है। इसके बाद टेस्टिंग का पूरा परिदृश्य बदल सकता है। आमतौर पर प्रचलित आरटी–पीसीआर परीक्षण में लगने वाले समय के मुकाबले इस नये परीक्षण में सिर्फ आधा समय लगेगा।"

Website Link:
http://vigyanprasar.gov.in/isw/Now-cheaper-and-easier-check-covid-19-hindi.html

Sewage holds the key to measure the actual extent of COVID-19 spread

Various studies have demonstrated that faeces can harbour SARS-CoV-2. CSIR institutions Centre for Cellular and Molecular Biology (CCMB) and Indian Institute of Chemical Technology (IICT) in a joint study have harvested the sewage samples to estimate the number of potentially infected individuals in the city of Hyderabad.

The novel coronavirus (SARS-CoV-2) in sewage samples is found to be non-infectious, thus it can be easily taken for epidemiological studies. Estimating the spread is very important in identifying the affected areas and controlling the pandemic. Since an infected person sheds viral material in faecal samples for up to approximately 35 days, these studies will provide an overall estimate of the situation in a window of one month.

To carry out the studies, sewage samples from major Sewage Treatment Plants (STPs) were processed for detecting presence of SARS-CoV-2 viral RNA. While viral RNA is detectable

in the inlet samples, the outlet (after treatment) samples of STP were largely clean (free from viral RNA) in this regard, indicating efficient treatment practices at the STP.

Of the 1800 million litre water used daily in Hyderabad, 40% is processed at different STPs. This study covered about 80% of the STPs in Hyderabad and revealed that there are around 2 lakh people who are shedding viral materials. Since only 40% of the Hyderabad sewage reaches STPs, this data can be used to extrapolate the overall number of potentially infected people, which turned out to be approximately 6 lakhs, that is, around 6% of the city's population. The number includes symptomatic, asymptomatic, and also recently recovered individuals in a time window of about 35 days. A conservative estimate of the number of active cases who are shedding the virus may be around 2 lakhs.

"Our finding clearly indicates that a large proportion of the affected individuals are asymptomatic and did not need hospitalization. This is also in agreement with the observation that hospitalization rush or mortality is way lower than otherwise expected with such a large infection rates at a given time. It explains why our healthcare system has been able to handle reasonably well the situation during the pandemic. Such studies if carried out in coordination with civic bodies to identify the hotspots in the city and monitor the dynamics of the infection rate can assist the system in taking necessary measures," explained Dr Rakesh Mishra, Director, CCMB.

Website Link:
http://vigyanprasar.gov.in/isw/Sewage-holds-the-key-to-measure-the-actual-extent-of-COVID-19-spread.html

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

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

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

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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 brings forth a monthly newsletter 'e-Samvaad' for providing information on latest efforts to tackle COVID-19

During these unprecedented times of COVID-19 pandemic, ICMR rose to the occasion and obstinately contributed towards the fight. It has spearheaded a plethora of activities including setting up of pan-India testing infrastructure, evidence generation and policy support. Along with the pandemic, ICMR is fighting another battle – the infodemic of misinformation. To tackle these challenges posed to the society, ICMR is bringing out a monthly newsletter, e-Samvaad. This newsletter aims to provide the latest updates and a glimpse of the ardent efforts made by the ICMR and its Institutes spread across the Country.

Website Link:
https://www.icmr.gov.in/pdf/press_realease_files/ICMR_E_Newsletter_03072020_English.pdf

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

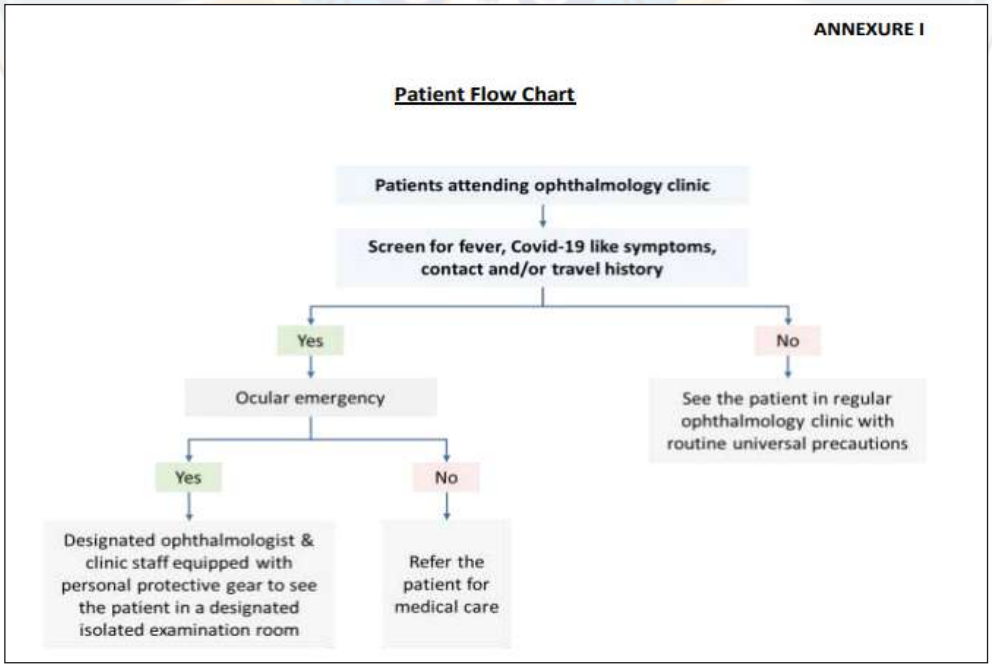
There is a pressing need for collection of systematic data on clinical signs and symptoms, laboratory investigations, management protocols, clinical course of COVID-19 disease, disease spectrum and outcomes of patients. Such data will serve as an invaluable tool for formulating appropriate patient management 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 will aim at collecting good quality real-time clinical data to inform evidence-based clinical practice, research, formulating guidelines and policy making. In view of this, Indian Council of Medical Research (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

MoHFW releases guidelines for safe eye care practices and facilities in COVID-19 scenario

Ministry of Health & Family Welfare (MoHFW) releases guidelines for eye care facilities in the COVID-19 scenario. These guidelines are aimed to minimize the spread of COVID-19 infection among ophthalmologist, ophthalmic assistants/technicians, nurses, support staff, patients and their attendants. Eye care facilities in containment zones shall remain closed. Only those outside containment zones will be allowed to open up.

The examination and procedures related to ophthalmology involve close interactions with the patient. This document outlines the preventive and response measures to be observed to minimize and avoid the spread of COVID-19 in eye care facilities.



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

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

DIPCOVAN Antibody-based Detection Assay for COVID-19 developed by DRDO

Antibody tests are being now used to identify healthcare workers that are immune to COVID-19 and how soon normalcy can be restored. Surveying large swathes of the public for antibodies to the new coronavirus promises to show how widespread undiagnosed infections are, how deadly the virus really is, and whether enough of the population has become immune for social distancing measures to be eased.

Defence Institute of Physiology and Allied Sciences (DIPAS) has developed an antibody-based detection assay for sero-surveillance in association with Vanguard Diagnostics Pvt. Ltd., Delhi. The test is for both spike as well as nucleocapsid proteins to cover a wide range of spectrum of disease.

Test license has been obtained from DCGI and brand name "DIPCOVAN" has been registered. Approval for validation of the kit by ICMR at NIV Pune is under process. After launching the kit manufacturing license will be obtained by manufacturing company for mass production.

Website link:
https://drdo.gov.in/hospital-aids

DRDO develops UVC LED-based handheld rechargeable sanitization device to combat COVID-19

UV 'C' light with 270 nm wavelength is useful for sanitization of any exposed surfaces and items of daily use. Previously device were developed which consists of a UV tube operated on the main supply. So, availability of power was essential requirement for such devices.

UVC1

A hand held UV'C' LED-based, rechargeable sanitization device has been developed which can be used anywhere and can be carried even in the briefcase.

The systems consist of UV'C' LED fitted in a metal-shielded body. A small lithium ion battery along with the charge controller unit has been fitted inside the body. A small charger has been provided to charge the battery.

UVC2

Two types of systems have been fabricated. One version with eight UV LED has peak wavelength of 275nm and 15mW radiant flux. The second one, consisting of six UV LED, having 19 mW radiant flux, is comparatively smaller so has been called mini system.

Website link:
https://drdo.gov.in/uv-based-disinfection-devices

Automated Disinfectant System (ADS) developed by DRDO to fight against COVID-19

A multipurpose disinfection chamber has been developed that can be customized for vehicles and personnel sanitization. The system supports automated operation with limited manual intervention.

The Twin Fluid injection produces fine mist that covers a large surface area while consuming less disinfectant. The system commences spraying of disinfection during vehicle drive-in with timer-based operation as per WHO-approved guidelines. System components include Drive-in Disinfection Chamber, 3-D printed twin fluid nozzle, Solenoid Valve, Motion Sensor, Timer Unit, System Piping, Compressor (optional), Hydraulic Pump (optional) etc.

This counter-COVID technology is a spin-off of the Mist-based Infrared Suppression Technology (MIST) designed by NSTL for naval ships stealth requirements. In this technology, the Twin fluid system produces very fine droplets compared to single fluid system and so less fluid is required to achieve the required cooling.

Estimated cost is less than Rs 1,50,000 (inclusive of compressor and pump).

Website link:
https://drdo.gov.in/personnel-vehicle-area-sanitization-equipment

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

SCIENTIFIC AND ACADEMIC INSTITUTIONS

IIT Kharagpur develops e-Classroom software DEEKSHAK for Indian Academia

Indian Institute of Technology (IIT) Kharagpur has developed e-classroom software, DEEKSHAK. The software is aimed to address operational issues faced during online teaching. DEEKSHAK is an online synchronous e-teaching platform that primarily uses one-way communication for bandwidth efficiency. The focus, hence instead of being all students participating in a class as in a meeting software, is on the teacher and the learning materials. Prof. Raja Datta of Electronics and Electrical Communication Department with his postgraduate students developed the software, the current version of which can be used within a campus LAN. Teachers can also record the attendance of the students on the platform. The software has been tested at IIT Kharagpur during the initial phase of social distancing with about 40 hours of classes being conducted with a total of approximately 300 students.

Website Link:
https://kgpchronicle.iitkgp.ac.in/iit-kharagpur-develops-e-classroom-software-for-india-academia-deekshak/

IISc has made strategies for rapid suppression of COVID-19 transmission in small world communities

Indian Institute of Science (IISc) has made strategies for rapid suppression of COVID-19 transmission in small world communities. The aim of the initiative in this project is to understand what policies can be implemented post-lockdown. Small world models are useful tools in Network Epidemiology. A city consists of many wards. Such cities are modelled as a Multi-Lattice Small World (MLSW) network where each ward of a city is modelled as a 2D lattice and nearby wards are connected together and simulate several interventions on MLSW.

A study on their effectiveness in suppressing COVID-19 on such networks revealed three key findings:

1. Usual contact tracing involves tracing the immediate contacts. If that can be enhanced to tracing the contacts and their contacts followed by sealing (TC2S), it would have a huge impact.
2. A restricted work week, such as 2-day work week, followed by a lockdown can be effective as lockdown.
3. A policy such as ward-wise sealing and opening depending on the infection levels in the ward not only has the lowest attack rate, the percentage of total population infected, but also requires the shortest time for the epidemic to end.

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Website Link:
https://covid19.iisc.ac.in/strategies-for-rapid-suppression-of-covid-19-transmission-in-small-world-communities/

IISc develops a novel modelling method of COVID-19 infections, based on population balance equation

Indian Institute of Science (IISc) develops Population Balance Equation (PBE)-based modelling of COVID-19 infections. The aim of this project is to develop and apply a predictive computational model for the COVID-19 epidemic based on a high-dimensional population balance modelling. The developed model is a paradigm shift in mathematical modelling of infectious diseases.

This model is based on a high-dimensional PBE. Unlike the existing (Compartment or Network) pandemic models, the proposed model predicts the distribution of infected population across the region, the age of the infected people, the day since infection, and the severity of infection, over a period of time. Moreover, the newly developed model incorporates the immunity, pre-medical history, effective treatment, point-to-point movement of infected population (e.g., by air, train etc.), interactivity (community spread), hygiene and the social distancing of the population.

This modelling framework introduces a multi-dimensional equation to predict the spread of pandemics with insights into the severity of infection, duration of infection, population age etc. Such insightful predictions are key for planning lockdown/unlock strategies and public health policies such as quarantine rules, hospital beds, health insurance and vaccination/ treatment scheduling. Moreover, these insights can be used to formulate science-informed policy to revive normalcy in the world, especially from the disruption induced by COVID-19.A detailed description of the predictive modelling framework can be found at: https://arxiv.org/abs/2006.15336.

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Website Link:
https://covid19.iisc.ac.in/pde-based-modelling-of-covid-19-infections/
https://cmg.cds.iisc.ac.in/covid/
https://arxiv.org/abs/2006.15336

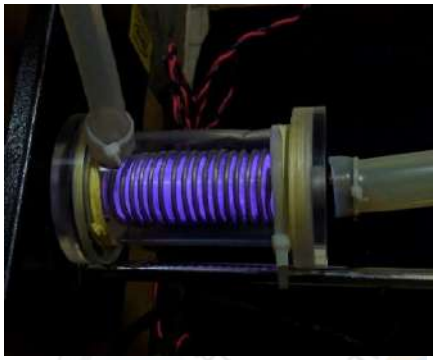
IISc develops plasma sterilization and disinfection method for PPEs & spaces

Centre for Sustainable Technologies at Indian institute of Science (IISc) has developed Rapid Plasma Sterilization of Personal Protective Equipment (RaPS), specifically for masks used by medical first responders. In this crisis, with shortage of such masks, this device permits reuse

of the masks with necessary disinfection. This low-cost equipment is easy to deploy at scale, which requires only atmospheric air and electric power as input.

The Centre has also developed a high throughput ozone generator, which works using cold plasma technology, for disinfection of spaces. Ozone generated from the ozonator shall be retrofitted for disinfection of spaces, both mobile and stationary.

Team Lead: Lakshminarayana Rao, Anand M Shivapuji Email: narayana@iisc.ac.in, anandms@iisc.ac.in



Website Link:
https://covid19.iisc.ac.in/plasma-sterilization-and-disinfection/

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

Efforts from Ministries, Departments & Scientific Organisations

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) andCouncil 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 vision and mission 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 Hackathonconsists 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 25th August 2020.

Website Link:
https://pib.gov.in/PressReleasePage.aspx?PRID=1648570

Government of India presents regular COVID-19 India factsheet

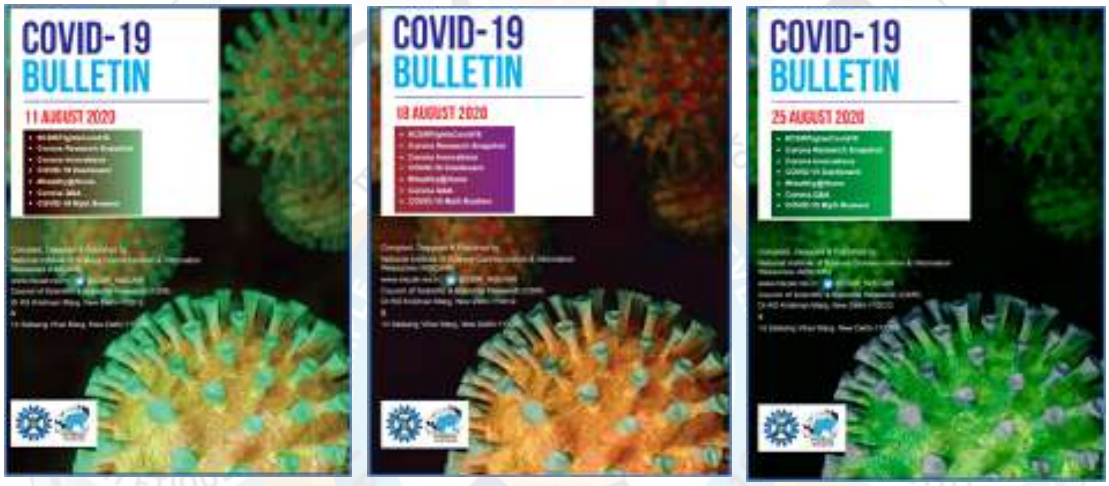
India's coronavirus cases have crossed 29-lakhs mark and as on 21st August 2020, 8:00 AM, stands at 29,05,823 cases out of which 21,58,946 have recovered. The recovery rate stands at 74%. Government of India, through its Open Government Data (OGD) Platform https://data.gov.in/ has taken the initiative 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-21st-aug-2020-800-am/

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

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is bringing out a newsletter dedicated for the COVID-19 outbreak. The newsletter covers stories and information on various aspects, like research, technology and innovation efforts to fight the pandemic out and related awareness and sensitisation information. In the last fortnight, three editions have been published dated 11th August, 18th August, and 25th August 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 video bulletin: Produced in both Hindi and English language on a 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 to COVID-19.

COVID Explained - Short films to explain important research finding related to COVID-19 in layman's lingo produced on a weekly basis. The subjects chosen for thee short films cater to the curiosity of common man related to COVID-19.

Facebook live sessions on interviews of various stakeholders and media with DST Secretary.

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

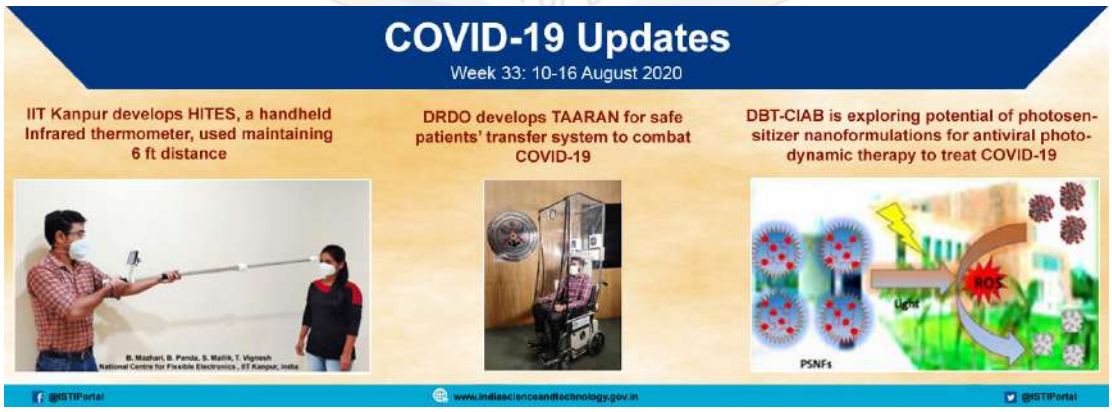
India Science, Technology and Innovation (ISTI) Web Portal

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 & award opportunities

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

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

The web portal provides all information related to COVID-19, its presentation of symptoms, transmission modes and mechanisms, and various models of protection of individuals, healthcare professionals 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 are sourced from various organisations for efficient delivery of the information and targeting the common people as the largest stakeholder. The frequently asked questions and myth busters are also answered here.

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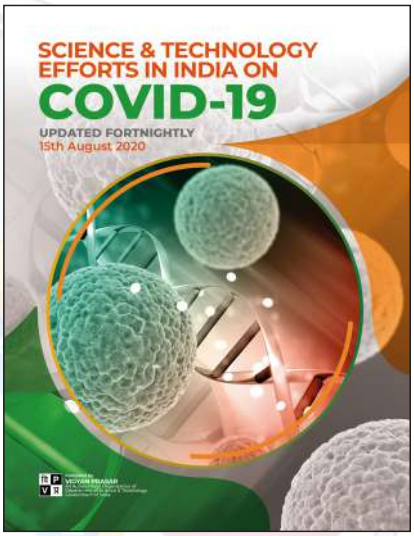
Website link:
http://indiascienceandtechnology.gov.in/covid-19-the-pandemic

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 of the e-Newsletter was conceived as an information product related to initiatives implemented towards getting people the freedom from COVID-19 disease and its transmission. The edition consisted 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 is attributed 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

SECTION - II

Scientific Endeavours in India: Emergence to Pandemic

The segment consists of the synopsis of all the initiatives taken after the outbreak of the pandemic to curb the menace by various academia of national importance. More than 600 ongoing research projects have been enlisted along with innumerable efforts towards society and tireless efforts to reach out to general public. These efforts have been initiated at and by institutions like Indian Institute of Science (IISC), Indian Institute of Science, Education & Research (IISERs), Indian Institutes of Technology (IITs), National Institutes of technology (NITs), and Central Universities.

RESEARCH, TECHNOLOGY AND INNOVATION

"Harnessing the power of science is critical for bringing this outbreak under control," said WHO Director-General, Dr Tedros Adhanom Ghebreyesus. "There are questions we need answers to, and tools we need developed as quickly as possible."

The Coronavirus attack and its rapid transmission has led the world and the individuals to an important lesson that cumulative efforts in the desired directions are necessary for the effective curtailing of the outbreak and also prepare for those in future. There is an urgent need for the scientists worldwide to agree on critical research questions that need to be answered urgently and to find ways to work together to accelerate and fund priority research. Majorly, there is a need to act on two main goals. The first is to accelerate innovative research to help contain the spread of the pandemic and facilitate care for those affected. The second is to support research priorities that contribute to global and national research platforms in hopes of learning from the current pandemic response to better prepare for the next unforeseen epidemic.

Building on the response to recent outbreak of SARS-CoV-2, the various scientific and academic institutions have developed an R&D strategy to deal with the problem at hand. Many of the products and innovative solutions developed so far have also facilitated a coordinated and accelerated response to COVID-19, including an unprecedented program to develop a vaccine and also research into potential pharmaceutical treatments.

Besides providing immediate solutions to control the outbreak and prevent the further spread of infection into the community, many of the scientific organisations and institutions are also engaged in long-term research activities. Established institutions are setting priorities and frameworks that can guide which projects need to be undertaken first. Setting clear research priorities for the novel coronavirus would accelerate the scientific response and lead to more efficient investments, high-quality research and synergies among global researchers. This would also fast-track the development and evaluation of effective diagnostic tests, vaccines and medicines, while establishing mechanisms for affordable access to vulnerable populations and facilitating community engagement.

This section details upon the research and innovation activities undertaken by the various national-level scientific and technological institutions in response to the global pandemic COVID-19. Majority of these institutions are technological institutions and hence focussed on the deployment of the technological solutions. However, it is evident that background research forms the basis of these technological developments. The previous edition of the newsletter, dated 15th August 2020, had highlighted the initiatives taken at the ministerial level in the domain of research, technology and innovation. Several projects enlisted here have received funding through various Science Ministries; however, many of them are working with the help of the institutional funding as well.

Indian Institute of Science (IISc)

Originated from the voyageur meet between Jamshetji Tata and Swami Vivekananda, the Indian Institute of Science (IISc) was conceived as "Research Institute of Science for India." IISc is a public university for higher education and research in science, engineering, design, and management with its brand statement: "Discover and Innovate; Transform and Transcend; Serve and Lead." Started with just two departments, the institution, to keep up the current needs, continues setting up of new centres and departments regularly, and have more than 40 departments spread across six verticals.

At the Indian Institute of Science (IISc), several timely research and technology development projects have been initiated to address problems arising from the current COVID-19 pandemic. However, due to the lockdown, the researchers are facing difficulties in sourcing assistance and information, as well as in disseminating the results of their work. The goal of this section is to consolidate and present all the ongoing COVID-19-related projects at the Institute and motivate the future researches in India.

Diagnostics & surveillance

1. Sero-CoV-ID
2. CovidWATCH: Rapid monitoring tool for regions with low smartphone penetration
3. Rapid point-of-care test for mass surveillance at public transit systems
4. Coswara: Speech and sound-based diagnostics
5. GoCoronaGo – contact tracing app and network analytics
6. Mobile diagnostic testing lab for COVID-19

Vaccine development

1. A recombinant subunit vaccine for SARS-CoV-2

Hospital assistive devices

1. S3 medical oxygen generator
2. Open-source aerosol shield for intubation and anaesthesia
3. 3D-printed valves for split use of ventilators to serve multiple patients
4. Cyclone separator design for compressor exit flow oil and dust particle cleanup
5. Sub Rs. 50,000 Ventilator
6. Oxygen concentrator
7. Project Praana: Novel low-cost ventilator technology development

Modelling, Simulation and Analysis

1. PDE-based modelling of COVID-19 infections
2. Direct numerical simulation of "cough/sneeze flows" to understand transmission dynamics of COVID-19 infections
3. Strategies for rapid suppression of COVID-19 transmission in small world communities
4. COVID-19 infection rate estimation
5. Framework for studying testing strategies for COVID-19
6. Medical inventory short-term projection with district-level granularity
7. COVID-19 automatic phase analysis
8. Modelling of epidemic spread in Indian urban conditions

Sanitization and disinfection

1. Plasma sterilization and disinfection
2. Virucidal composite fabric for PPE
3. N95 mask renewal and testing
4. UV-based disinfecting device
5. Drones for disinfection

Preprints

1. Design of a highly thermo-tolerant, immunogenic SARS-CoV-2 spike fragment
2. COVID-19 epidemic: Unlocking the lockdown in India
3. City-scale agent-based simulators for the study of non-pharmaceutical interventions in the context of the COVID-19 epidemic
4. Protective roles of flu infections and BCG vaccination in lowering COVID-19 mortality
5. Mechanistic modelling of the SARS-CoV-2 and immune system interplay
6. Functional genomics of Indian SARS-CoV-2
7. Targeting TMPRSS2 and CathepsinB/L together may be synergistic against SARS-CoV-2 infection
8. Drug repurposing approach targeted against main protease of SARS-CoV-2

For more information, contact kverma@iisc.ac.in; supradeepa@iisc.ac.in

Indian Institutes of Science, Education & Research (IISERs)

Basic Sciences have always proved a warrior in any scientific war that the world has ever encountered. Similar were the situations with the COVID-19. The war with the virus was well fought by the Indian Institutes of Science Education & Research (IISERs), which are group of premier public research institutions for basic sciences in India. These institutes have developed many effective weapons in the war with COVID-19 and have provided the background research details for other institutes to work upon. From molecular studies to diagnostics and vaccine developmental theories, IISERs have worked on everything. Following list provides a glimpse of their efforts in these areas.

Ventilators and PPE

IISER Pune

1. Design and fabrication of low-cost ventilators
2. Making superhydrophobic and germicidal nano-coating for personal protection equipment

Molecular Studies

IISER Pune

1. Imaging the SARS-CoV-2 virus using Atomic Force Microscope to understand its morphology
2. Generating knockout mice for ACE2 receptor as a model for studying COVID-19 pathogenesis
3. To study metabolic pathways being dysregulated upon SARS-CoV-2 infection

Diagnostics

IISER Pune

1. To assess if early detection of olfactory dysfunctions can be used as a screening method for COVID-19 patients
2. To develop a synthetic biology-based solution and diagnostic test
3. To make an ultra-sensitive nano-biosensor platform for field effect transistor-based point-of-care detection
4. To develop a carbon nanotube (CNT)-based surveillance diagnostic tool for detecting the SARS-CoV-2 virus
5. Synthesis of oligonucleotide probes for COVID-19 detection
6. To develop peptide-based diagnostics: Exploring S-protein epitopes for the detection of SARS-CoV-2
7. To develop fluorescence-based peptide diagnostics without secondary antibodies

Vaccines and Drug Candidates

IISER Pune

1. To identify potential lead candidates against SARS-CoV-2
2. To find new and repurpose existing drugs to inhibit spike protein/ACE2 interaction
3. To test any effects of hydrogen sulphide, which has anti-inflammatory properties, on COVID-19
4. Targeting SARS-CoV-2 Nsp13 helicase for structure-based inhibitor design
5. To explore the use of amphiphilicheparan sulfate mimetics as antivirals for COVID-19

Modelling and Data Analytics

IISER Kolkata

1. CESSI studies various aspects of lockdown in India

IISER Pune

1. To produce an infectious diseases hotspot map for India with predictive capabilities

Indian Institutes of Technology (IITs)

Popularly acclaimed as the Higher Technical Institutes of India, the Indian Institutes of Technology (IITs) are autonomous public technical and research universities located nationwide. Presently, these are twenty-three in number. Each IIT is functioning as an autonomous institution; however, Ministry of Education form the governing body of all the IITs. These institutes of national importance are spearheading initiatives to help control the coronavirus pandemic in the country and encouraging student participation during a nationwide lockdown that has closed the nation's universities since March 2020.

From diagnostic test kits and pharmacological treatments to drones for the surveillance and data models for the epidemiological studies, IITs have provided over 300 technological and innovative solutions and interventions in the service of the nation, that too in limited timeframe and limited human and financial resources. These institutions have proved that the motivation drives the student and academic community of the institutes. The following list is an attempt to encapsulate their mountainous efforts, compiled for the readers to have a comprehensive view.

Testing Kit

Indian Institute of Technology (IIT) Roorkee

1. Development of rapid and instrument-free point-of-care screening device for SARS-CoV-2 viral infection detection

Indian Institute of Technology (IIT) Kharagpur

1. Development of smartphone-integrated paper-strip kit for rapid low-cost diagnostics of COVID-19 infection
2. Bootstrapping the ambu-bag as automated ventilator
3. Production, Purification and Testing of Marine Bacterial Surfactin and its Congeners as Potent Anti-COVID-19 Therapy
4. Development of immunodiagnostic kit and siRNA based therapy for COVID-19 in an advanced unique facility as a regional hub

Indian Institute of Technology (IIT) Hyderabad

1. Developing rapid, ultrasensitive biomolecule sensor for detecting coronavirus in individuals
2. Working on rapid, affordable, portable SARS-Cov-2 screening kit
3. Developing a nanobiosensor for rapid and early detection of SARS-CoV-2

Indian Institute of Technology (IIT) New Delhi

1. Detection assay for COVID-19 developed at IIT Delhi
2. Rapid detection of COVID-19
3. Indian Institute of Technology (IIT) Palakkad
4. Development a low-cost test kit for the rapid screening of COVID-19 patients

Indian Institute of Technology (IIT) Gandhinagar

1. Rapid Diagnosis of SARS-CoV-2 using aptamer-functionalized Oxygen Microbubbles

Indian Institute of Technology (IIT) Madras

1. Development of a real-time RT-PCR test for COVID-19 diagnosis to detect the SARS-CoV-2 in 2 hours and at a fraction of current cost of testing
2. Alternate Test protocols (by pooling)
3. A novel and cheap RT-PCR-based diagnostic kit for COVID-19
4. IIT Madras to set up a COVID-19 testing facility

5. Use of passive microwave radiometry for measuring core body temperature and to monitor lung infections

Indian Institute of Technology (IIT) Guwahati

1. Development of portable RT-PCR device
2. Non-contact InfraRed (IR) Human Fever Tester
3. Viral Transport Media (VTM) kit
4. Development of RNA isolation kits
5. Development of RT-PCR kit

Indian Institute of Technology (IIT) BHU, Varanasi

1. Electrochemical Sensor for coronavirus (SARS-CoV-2) based on Antibody-Antigen interaction over low-cost screen printed electrodes
2. Microfluidic Multiplex Immunoassay devices for Clinical Diagnosis of COVID-19

Indian Institute of Technology (IIT) Dhanbad

1. Development of low-cost, portable rapid diagnostic Surface Plasmon Resonance (SPR) sensor kit for detection of COVID-19 molecular targets

Indian Institute of Technology (IIT) Bhilai

1. Detecting and understanding COVID-19 at an early stage: Micro robot-assisted SERS-based platform
2. Development of a low-cost on-chip PCR (polymerase chain reaction) platform for rapid nucleic acid-based disease diagnosis (COVID-19)

Personal Protective Care Equipment

Indian Institute of Technology (IIT) Kharagpur

1. COVID Review newsletter: IIT KGP Researcher is brought to you by: Office of Media, Branding & Communications
2. Personal Protective Equipment for Healthcare Workers (Face Shield, Face Mask and Protective Gown
3. Development of a body suit for COVID-19 patients to protect the spread of infection
4. A Hazmat Suit with Forced Purified and Cooled Air Circulation for Medical Professionals

Indian Institute of Technology (IIT) Madras

1. Manufacturing of N95 face masks to avoid contact with microorganism shed in the form of liquid droplets and aerosols
2. NexGen3D Technologies to design and manufacture Face Shields, which are used as PPE over the Face Masks, to cover eyes and other parts of the face from infectious materials
3. Development of Shield for Pulmonologist. Hardware development using FRP soft materials to protect the Pulmonologist during Medicare
4. Development of anti-viral agents as coating material on Masks, filters, Textiles, Food packaging materials

Indian Institute of Technology (IIT) Roorkee

1. Manufactured Face Shields for first line defense of healthcare professionals
2. Development of nanometal-based therapeutics and air filter to combat respiratory and other air borne/ transmitted viruses

Indian Institute of Technology (IIT) New Delhi

1. Production of 3-layered good quality surgical masks for hospitals & health workers
2. Production of High efficiency face masks (N95)
3. Design and Production of good quality other personal protective equipment (PPE) (such as coveralls and hoods etc.) for hospitals & health workers
4. New Development of knit-based masks
5. Development of antimicrobial fabric for protection against hospital-acquired infection

Indian Institute of Technology (IIT) Bhubaneswar

1. Mass production of metal oxide nanomaterials with antimicrobial characteristics, and nanofibers, which can be used to develop air filters and biomedical applications
2. Mass production of nanofibers, which can be used to develop air filters and biomedical applications
3. Development of a face shield with antimicrobial properties

Indian Institute of Technology (IIT) Hyderabad

1. Air purifiers that can help residents, hospitals and malls to purify air contaminated with viruses
2. Developing Smart accessories for control and mitigation of infectious organisms

Indian Institute of Technology (IIT) Guwahati

1. Development of highly water repellent and economic face mask
2. Development of peptide-based ELISA for the detection of SARS-CoV-2 from serum samples
3. Antiviral efficacy of Giloy against influenza and other related respiratory viruses
4. Understanding the spike protein of SARS-CoV-2 for identifying the biomarker against its infection
5. Expression of the spike protein of SARS-CoV-2 in Newcastle disease viral vector
6. Design Intervention for Low-Cost Face Shields as an Effective Personal Protective Equipment against COVID-19 Transmission
7 Design Intervention for Low-Cost Respiratory Venturi Mask Valve for COVID-19 Patient
8. Design and Development of Copper Oxide Containing Respiratory Face Mask against COVID-19
9. Facilitating production/supply of medical textile as immediate requirement with industry support
10. Production of compostable Plastic Masks
11. Complete Medical Textile Development and Manufacturing Centre at IIT Guwahati
12. Affordable Antiviral/Antimicrobial Spray-based Coating for Personal Protective Equipments to Kill and Prevent Spread of Coronavirus
13. Design and Development of a simple, cost-effective and efficient system for fabrication of multilayered surgical masks needed for bio-medical application

Indian Institute of Technology (IIT) Gandhinagar

1. Designing More Efficient Cloth Masks Using Nanocoated Fabrics
2. Biopolymer-nanoparticle hybrid coatings for facial mask filters

Indian Institute of Technology (IIT) Jodhpur

1. Low-Cost Reusable Marble Dust-Appended Composite Ceramic Porous Mask for Air Purification
2. Design and Development of Face Shield for COVID-19 Health workers
3. Development of Anti-microbial Superhydrophobic Coating on Personal Protective Equipment (PPE) to combat COVID-19
4. Usability and reuse of N95 masks
5. Curcumin-CNT-based Polymer Composites for Low-Cost and Reusable Antiviral Textile

Indian Institute of Technology (IIT) Indore

1. Design and development of customized reusable 3D-printed mask

Indian Institute of Technology (IIT) Palakkad

1. Respirator with disposable filters for the medical professionals and general civilian population
2. Development of breathability test setup for mask/respirator filters

Indian Institute of Technology (IIT) Tirupati

1. New generation reusable antimicrobial respirator

2. Design and Development of Face Shield for COVID-19

Indian Institute of Technology (IIT) Kanpur

1. Low-cost components for PPE kits

Indian Institute of Technology (IIT) Bhilai

1. Large-scale synthesis of anti-viral nanoparticles and their coatings on personal protective equipment using an industrially scalable spray technique
2. Antiviral nano-coating for materials used for making N-95 respirator and medical masks
3. Development of Reusable and Efficient N95 Respirator by Low Temperature Deployable Interactive Nano-structured Oxide Coating
4. Design and Development of a Powered Air-purifying Respirator Incorporating Nano-coated Filters along with Headgear for Healthcare Workers Involved in Treatment of COVID-19

Indian Institute of Technology (IIT) Dhanbad

1. Design and Development of MWCNT-based low cost mask
2. Development of polymeric superhydrophobic coatings on personal protective care equipment having excellent virucidal and bactericidal properties

Indian Institute of Technology (IIT) Jammu

1. Design and fabricate face shield at large scale to help various professionals especially Front line warriors in J&K region

Sanitization

Indian Institute of Technology (IIT) Kharagpur

1. Smart Antiviral Coating - Easy to use and more efficient material than conventional detergent and alcohol-based sanitizer

Indian Institute of Technology (IIT) Mumbai

1. Portable / Wheeled UVC Germicidal Unit / station for Disinfection
2. Development of Incineration device for safe disposal of Masks/Gloves in Hospitals and Quarantine Centres
3. Surface Spray for Decontamination and Antiviral Action

Indian Institute of Technology (IIT) Madras

1. To design and deploy a scalable touchless sanitizer dispenser
2. Developing novel filter media which filters particles of the size of 0.25 microns
3. To reduce contagion of COVID-19 through waste generated at CVPs
4. To develop a cost-effective IoT-based automated solution for disinfection
5. Low-cost disinfectant tunnel in commercial places to get disinfected

Indian Institute of Technology (IIT) Kanpur

1. Development of Functionalized Inanimate Surfaces with Repurposable Multi-targeted Virucidal agents/drugs for Preventive and Cost-effective Antiviral Applications

Indian Institute of Technology (IIT) New Delhi

1. Preparation of low-cost hand sanitizer in the Chemistry department lab for campus community

Indian Institute of Technology (IIT) Guwahati

1. Development of room enclosure to spray disinfectant to health workers
2. 3-Layer fabric mask

Indian Institute of Technology (IIT) Bhubaneswar

1. Development of UVC Disinfection Cabinet
2. Waste treatment and sanitization methods and preparedness for COVID-19 outbreak at domestic, hospital, community and urban scales

3. Alcohol-based hand sanitizer as per WHO parameters
4. Development of Pocket Sanitizer
5. Development of a Disinfectant Station to combat COVID-19
6. Development a Disinfectant Tunnel to combat COVID-19

Indian Institute of Technology (IIT) Roorkee

1. Development of hand-sanitizer in the combination of plant-based antimicrobials and Ethanol/or Isopropanol

Indian Institute of Technology (IIT) Hyderabad

1. Developed sanitizer bottles and supplied to the campus requirements to serve the campus
2. Provide Protection to potential suspect of the COVID-19
3. Sanitizer bottles for supplying to the campus and local administration

Indian Institute of Technology (IIT) Mandi

1. Automatic Hands-free Wearable Sanitizer Dispenser

Indian Institute of Technology (IIT) Varanasi

1. UVC Sterilizer
2. Low-cost Hand Sanitizers and training of sanitization

Indian Institute of Technology (IIT) Palakkad

1. Alcohol-based hand sanitizer
2. Development of hands-free sanitizer/ soap dispensers to contain COVID-19

Indian Institute of Technology (IIT) Dhanbad

1. Rapid creation of negative pressure MWCNT-embedded FRP composite isolation ward for COVID-19 patients
2. Design and fabrication of Development of disinfectant station for quick sanitization of personnel

Indian Institute of Technology (IIT) Jodhpur

1. A UV-light Sterilization System/Hybrid UV-H2O2 Sterilization System to disinfect artefacts and N95 masks for reuse
2. Development of Hand sanitizer
3. Development of light-activatable quantum dot impregnated antiviral paint
4. Food Products Sterilization using UV Light to fight COVID-19

Indian Institute of Technology (IIT) Jammu

1. Preparation of Hand-Sanitizers as per the guidelines prescribed by WHO

Indian Institute of Technology (IIT) Indore

1. Preparation of Hand Sanitizer
2. Florescent bricks and coatings with self-illuminating properties for application in UV disinfection Chambers
3. Development of UV-based set up to deactivate SARS-CoV-2 virus
4. Development of Disinfection Tunnel using ICMR-approved water-soluble biocompatible disinfectant
5. Development of UV-C LEDs and UV-C photo detectors for disinfection of surfaces/PPEs against COVID-19 and other pathogens
6. Development of sterilization chamber

Medical Equipment/Robots

Indian Institute of Technology (IIT) Kharagpur

1. Design and Development of an indigenous Real-Time PCR Machine
2. Design and Development of an affordable Ventilator for usage in suburban and rural hospitals in India

Indian Institute of Technology (IIT) Madras

1. Development of Smartphone-based portable battery-operated ventilator with humidifier
2. IITM Incubation Cell develop 'mediCAB' (instant medical facility for COVID-19)

3. Standalone Solar Power backup systems for Ventilators & Isolation homes
4. Provide rapid screening and triage in crowded areas to curb the spread of SARS-CoV-2 in a multi-stage setup

Indian Institute of Technology (IIT) Kanpur

1. Invasive Ventilator
2. Fuel-cell-based oxygen generator and ventilator

Indian Institute of Technology (IIT) New Delhi

1. Development of Low-cost ventilator design

Indian Institute of Technology (IIT) Indore

1. Design and Development of Wearable shape memory alloy sensor for body temperature monitoring

Indian Institute of Technology (IIT) Bhubaneswar

1. Development of a portable ventilator to fight against COVID-19 in emergency pandemic situation
2. Development of a Patient Responsive Active Assist coNtrol (PRAAN) Ventilator

Indian Institute of Technology (IIT) Hyderabad

1. Working on IoT-enabled remote monitoring of temperature and respiratory rate for COVID-19-infected patients
2. Developing mechanically actuated ventilators
3. Low-cost, portable ventilator for fast scale-up
4. Developing DC motors for ventilators
5. Developing Lithium batteries for thermal scanners and medical equipment

Indian Institute of Technology (IIT) Varanasi

1. Bio-engineering Optimization of Cytoprotective Action of inhaled clinical gases as therapeutic approach for COVID-19 disease
2. Development of silver nanoparticles modified antibacterial and antiviral mask

Indian Institute of Technology (IIT) Dhanbad

1. Development of Low-cost ventilator

Indian Institute of Technology (IIT) Roorkee

1. Development of a low-cost portable ventilator

Indian Institute of Technology (IIT) Palakkad

1. Pulse Plethysmograph Instrument for
2. Continuous Monitoring of blood pulse, heart rate and oxygen saturation of patients in ICUs
3. An affordable emergency portable ventilator for COVID-19 patients

Indian Institute of Technology (IIT) Guwahati

1. Development of Robotic cart for safe delivery of food and medicine in isolation wards
2. Development of Robotic cart for safe disposal of medical waste
3. Design and manufacture of beds for isolation wards
4. Riboswitch POCT Diagnostic kits for Specific & Simultaneous Detections of Coronaviruses: COVID-19, SARS & MERS
5. Centre for Excellence in Disruptive Innovations & Product Development for Affordable Rural Healthcare
6. Regular Health Monitor
7. High capacity Autoclave
8. Robot-based screening unit for temperature measurement and Drug/ food carrying unit to work in isolation wards
9. Medical waste and food waste disposal in the isolation wards
10. Shower for disinfection
11. Hospital beds
12. Ventilator

Indian Institute of Technology (IIT) Tirupati

1. Development of a prototype of a Continuous Air Heater with Recycle
2. Development of Integrated Ventilator and Oxygen Concentrator Unit

Indian Institute of Technology (IIT) Mumbai

1. Development of Low-cost ventilator

Surveillance

Indian Institute of Technology (IIT) Mumbai

1. Use of "SAFE" app for Quarantine Adherence
2. Tracking and Tracing of Asymptotic Carriers During Pandemic

Indian Institute of Technology (IIT) Madras

1. Hands-free Thermal scanner
2. IoT-enabled patient monitoring system
3. Deploy 4 drones (or more based on funding) for deliveries during COVID-19

Indian Institute of Technology (IIT) Guwahati

1. Travel Tracker

Indian Institute of Technology (IIT) Bhubaneswar

1. Development with design innovation on cost-effective Pulse Oximeters and thermal scanners

Indian Institute of Technology (IIT) Kanpur

1. Day-and-night surveillance using UAVs

Indian Institute of Technology (IIT) Roorkee

1. Tracking of people under quarantine

Indian Institute of Technology (IIT) Patna

1. Develop techniques for using the contact and mobility information obtained through mobile devices to indentify the vulnerable and leaders

Indian Institute of Technology (IIT) Jodhpur

1. CoViDoc - A platform to connect patients with hospitals/doctors in contactless mode
2. Scale up to scale COVID

Indian Institute of Technology (IIT) Indore

1. Experiments and lattice Boltzmann simulations of infectious virus transport in the air from humans

Indian Institute of Technology (IIT) Palakkad

1. A software tool for law enforcement agents that indicates crowd locations

Indian Institute of Technology (IIT) Gandhinagar

1. COVID-19 dashboard

Treatment: Pharmacological, Non-Pharmacological

Indian Institute of Technology (IIT) Kharagpur

1. Towards large-scale Production of Recombinant Proteins for Vaccine and Testing of SARS-CoV-2 to produce reagents for the development of indigenous vaccine
2. Telemedicine for fighting viral pandemic such as COVID-19

Indian Institute of Technology (IIT) Mumbai

1. In-situ Gel for Rapid Capture and Inactivation of SARS-CoV-2
2. World Wide Help: A Proposal
3. Plasma Proteomic Analysis of COVID-19 patients to identify the potential biomarkers and therapeutic targets: A Pilot Study
4. Identification of global metabolite biomarkers in COVID-19-infected patients for targeted therapy

Indian Institute of Technology (IIT) Guwahati

1. Preparation of Disease management Manual for Primary Health Centres (PHCs) and Hospitals
2. Repurposing of FDA drugs and exploitation of ancient Ayurvedic knowledge to discover novel inhibitors to block coronavirus propagation

Indian Institute of Technology (IIT) Bhubaneswar

1. Neutralizing Peptide Antibody Designed for Human Complement Fragment 5a (hC5a)
2. Rational Design of Broad-Spectrum Antiviral Peptides Targeting SARS-CoV-2-Spike Protein

Indian Institute of Technology (IIT) Madras

1. A Novel First Aid Technique for Treating COVID-19
2. Adapt Ubiqare's Specialty Care Platform to take care of COVID-19 patients during home quarantine and isolation ward stages

Indian Institute of Technology (IIT) New Delhi

1. Computational prediction of possible nCoV-19 structural proteins inhibitors from Azadirachtaindica (Neem) Five potential compounds screened for CL-3 protease protein of nCov19
2. Designing virus-like particles as vaccine candidates against nCoV-19 Proposed express M (Membrane), N (Nucleocapsid), E (Envelope) and S (Spike) proteins of nCoV-19 simultaneously in HEK293 cells for generating virus-like particle
3. Targeting n3CLPro main protease, spike surface protein of COVID-19 In silico screening of FDA-approved compounds

Indian Institute of Technology (IIT) Hyderabad

1. Engineering of epitope peptides from structural and non-structural proteins of coronavirus 2019-nCoV on Virus-Like particle (VLPs) to develop vaccine candidates
2. Working on mRNA/peptide-based vaccine for SARS-CoV-2
3. Identifying potential drug targets in the structural proteins of SARS-CoV-2

Indian Institute of Technology (IIT) Kanpur

1. Creating candidate vaccine against the SARS-CoV-2

Indian Institute of Technology (IIT) Roorkee

1. Optimize ultraviolet irradiation of an infected patient's blood to improve the immunity
2. Design, develop and synthesize potential small molecules as COVID-19 inhibitor with the help of in-silico structural study followed by AI-based drug optimization model
3. Development of mammalian cell-based models to screen potent leads that might inhibit viral infection and validation of some natural products for their efficacy in the prevention/cure/management of COVID-19
4. Identification and development of potential antiviral drug molecules against SARS-CoV-2

Indian Institute of Technology (IIT) Varanasi

1. Indian spices and medicinal plants as antiviral against COVID-19 and other related viruses
2. Standardized Extracts and Biomarkers of Andrographispeniculata (Kalmegh)

Indian Institute of Technology (IIT) Gandhinagar

1. Virtual Screening and in vitro validation of SARS CoV-2 Main Protease inhibitors
2. Small molecules screening on spike protein of COVID-19

Indian Institute of Technology (IIT) Indore

1. Scrutinizing the SARS-CoV-2 protein information for designing an effective vaccine encompassing both the T-cell and B-cell epitopes

2. International Network Research Project on "Stopping COVID-19 pandemic"
3. Identifying Possible Potent Inhibitors against COVID-19 via Computational Drug Repurposing Study
4. Computer-Aided Drug Discovery against COVID-19
5. Identification of a Potential Peptide Inhibitor of SARS-CoV-2 Targeting its Entry into the Host Cells
6. Dual Targeting of 3CLpro and PLpro of SARS-CoV-2: A Novel Structure-Based Design Approach to treat COVID-19 infection
7. Structure-based design of novel peptidomimetics targeting the SARS-CoV-2 spike protein
8. Designing of a novel fusion peptide as a preventive as well as therapeutic agent against SARS-CoV-2 infection

Indian Institute of Technology (IIT) Dhanbad

1. Development of affordable synthetic route of re-purposed small molecule drugs for the treatment of SARS-CoV-2

Data Analytics, AI to model epidemic patterns and disease dynamics

Indian Institute of Technology (IIT) Kharagpur

1. H+AI (Healthcare and Artificial Intelligence) Dataport and Factory

Indian Institute of Technology (IIT) Guwahati

1. Local Home Delivery Networks
2. Model the SARS-CoV-2 virus etiology using the tools of biophysics
3. AI model to predict epidemic pattern of a disease

Indian Institute of Technology (IIT) Hyderabad

1. Developing apps that collect data about health conditions of the citizens to provide to local administration on a constant basis
2. Working on Data analysis and modelling of COVID-19 disease spread
3. Working on exploring working mothers' experiences, regarding housework, childcare and professional work during the lockdown through regular interviews
4. Working on the impact of COVID-19 on financial markets

Indian Institute of Technology (IIT) Gandhinagar

1. Investigation of host-pathogen interactions of SARS-CoV2 variants in the Indian population
2. COVID Explorer
3. Artificial Intelligence-based detection of COVID-19 from Chest X-ray images

Indian Institute of Technology (IIT) Goa

1. Data Science and Epidemic models to tackle COVID-19 pandemic

Indian Institute of Technology (IIT) Bhubaneswar

1. An Inter-disciplinary approach towards predictive modelling of COVID-19 for Public Policy in Odisha

Indian Institute of Technology (IIT) Jodhpur

1. AI-driven diagnostics using X-ray and CT-images of lungs

Indian Institute of Technology (IIT) Indore

1. Detection of Coronavirus using advanced machine learning techniques
2. The time-dependent Mathematical Model based on COVID-19

Indian Institute of Technology (IIT) Palakkad

1. Identify COVID-19 hotspots in Kerala
2. Forecasting the spread of COVID-19, analysis of factors contributing to the spread of COVID-19, policies to reduce the spread of COVID-19 in India trading off with societal factors
3. An automated lung ultrasound workflow to detect anomalies in lung specifically related to COVID-19

4. A Rapid Large-scale COVID Detection Tool through Classification of X-rays using Deep Learning

Indian Institute of Technology (IIT) Mandi

1. Model to predict COVID-19 recoveries across the world
2. Model to predict COVID-19 susceptible population, recoveries, deaths, and data features that impact the susceptible population, recoveries, deaths

Indian Institute of Technology (IIT) Patna

1. Speech, text and video analytics applied to epidemic domain with special emphasis to COVID-19
2. A data integration platform for integrating disease-related data from diverse data sources
3. An automatic diagnostic system for COVID-19 based on CT Scan Image Analysis
4. An End-to-End System will be built for multilingual event monitoring during health disaster
5. Blockchain-based Data collection and Prediction of Epidemic growth to develop an Early warning system
6. Summarize the information available over social media related to COVID-19
7. COVID-19: Implying Gender Transformative Lens to address Gender Equity in Bihar and Jharkhand
8. Decentralized Blockchain-based Platform Towards Achieving Fair and Transparent Distribution of Essential Commodities during COVID-19 Pandemic

Indian Institute of Technology (IIT) Bhilai

1. Data Analytics, AI to model epidemic patterns and disease dynamics

Indian Institute of Technology (IIT) Tirupati

1. Chest X-Ray-based Screening of COVID -19
2. Misinformation Detection for COVID-19
3. SurviveCOVID-19 -- A Game for Improving Awareness of Social Distancing and Health Measures for COVID-19 Pandemic
4. Mood of India During COVID-19 - An Interactive Web Portal Based on Emotion Analysis of Twitter Data
5. COVID-19 Mobility Data Network – Creation of Situation Reports and Mobility Pattern Predictions of Red Zones
6. YTCoder - Towards Turning YouTube to a Code Editor
7. GeoCov19 Algorithm for Red-zone proximity monitoring for India
8. Drug discovery for blockade of essential proteins for SARS-CoV-2 survival

Indian Institute of Technology (IIT) Dhanbad

1. Bayesian Hierarchical space and time statistical modelling of COVID-19 pandemic
2. Development of Deep Learning-based Model for the Automatic Identification of COVID-19 disease using CT image history

National Institutes of Technology (NITs)

The National Institutes of Technology (NITs) are a group of higher education engineering institutes in India. All NITs were referred as Regional Engineering Colleges (RECs) and were governed by their respective state governments. Comprising thirty-two autonomous institutes, they are located in one each major state/territory of India.

The NITs and its various Autonomous Institutions made some significant efforts to address R&D and innovation-related challenges arising out of COVID-19 pandemic. Considering the multifarious problems caused by coronavirus which require multi-fold interventions and multi-pronged strategy, NIT has set up seven research verticals to fight COVID-19 pandemic. These verticals include data analysis, surveillance, medical equipment, sanitization, testing kit, PPE care equipment and treatment. The following list gives a brief look, around 200 projects, at their research to combat COVID-19.

Dr. B R Ambedkar National Institute of Technology (BRANIT), Jalandhar

1. Low cost face mask
2. Cost-effective surgical gown/PPE for healthcare workers
3. Service Robot in Isolation centre
4. Hand Sanitizer
5. Shoe Sanitization Facility
6. Low cost sanitizer for fruits, vegetables and packed food items
7. Sanitizing capsules for human beings at NIT Jalandhar

National Institute of Technology Karnataka (NIT), Surathkal

1. Design and fabrication of 3D-printed Ventilator Components, Mask N95 filters and Face Shields
2. Design and Development of disinfecting boxes to disinfect fruits, vegetables and other items of daily use

National Institute of Technology (NIT), Manipur

1. Design of Full-body Disinfection Chamber for Installation in Public Places

Visvesvaraya National Institute of Technology (VNIT), Nagpur

1. Ultraviolet Sanitization units for medical PPE Kits Developed for AIIMS, Nagpur
2. Pedal-operated Sanitation Machines

Malaviya National Institute of Technology (MNIT), Jaipur

1. Design and Development of disinfecting boxes to disinfect Mask, mobile, PPE, papers, files, currency notes
2. Design and Development of UV Tower to Sterilize ICU, Medical rooms
3. Design and Development of UV Masks for COVID-19
4. Rapid Testing of Novel Coronavirus using Optical detection with Machine Learning models
5. Detection of Novel Coronavirus using early symptoms with IoT-based Primary health check up System
6. Development of a Low-cost Thermal Scanning Device for Public Places
7. Help Support System "AAS"
8. Design and Development of Epidemic Model for COVID-19
9. Webinars on COVID-19: Risk Management & Simulation Efforts
10. Lockdown as a COVID-19 Pandemic Mitigating Policy Intervention

National Institute of Technology (NIT), Uttarakhand

1. Development of Low-cost Full-body Self-sanitization Equipment
2. Development of an optimized search algorithm for minimizing the number of COVD-19 test kit requirements for mass testing and area-wise optimal allocation of testing kits distribution using Game Theory

Maulana Azad National Institute of Technology (MANIT), Bhopal

1. Fabrication of low cost manual and electric ventilator machine
2. Production of layered good quality (i) reusable mask made with fabric and (ii) consumable mask made with fabric and fine grade filter paper
3. Fabrication of Low-cost Automatic Hand Sanitizing Machine
4. Design and development of Multi-utility Sanitization chamber to terminate COVID-19 virus transmission at initial stage
5. IOT-based Device for quarantine monitoring of infected people
6. Development of nanostructured TiO_2-based photocatalysts for antiviral and antibacterial activity
7. Mapping Sources of Stress, Well-being, and Coping Strategies among Students during COVID-19 Pandemic
8. COVID-19 Vulnerability Assessment of slums using Morphological Parameters
9. IOT-based health data collection and its analysis
10. Computational Repurposing of Drugs/ Synthetic Compounds for Inhibiting RNA-dependent RNA polymerase (RdRp) in COVID-19 Infection in Humans
11. Detection of fake tweets related to COVID-19
12. Psychological Health Issues and Solutions under Lockdown Period of COVID 19 Outbreak: A Psychological Experiment
13. Empowering the students with enhanced immunity, will power through creative visualisation and Neuro Linguistic Programming
14. Coronavirus Disease (COVID-19): Its Impact on Economic and Social Life of Vegetable Growing Farmers in Madhya Pradesh
15. Development of Standards for Waste Disposable Generated from COVID-19 Treatment & Quarantine Centers
16. Development of 3D-printed arm- or elbow-operated water tap handles to make the water tap handles safer in common washrooms
17. Spatial analytics to monitor COVID-19 and suggesting recovery plan

Motilal Nehru National Institute of Technology (MNNIT), Allahabad

1. Low-cost 3d-printed Face Shield
2. Modified N95 Masks and Anti-Viral and Anti microbial gloves
3. ViroShield: Very low cost, disposable face shield
4. Development and installation of sanitizing tunnel connecting hostel and academic campus
5. "PeopleTracker" app to trace the close contacts of individuals who may be in the asymptomatic stage
6. AI-enabled cost effective solution for COVID-19 detection
7. Fabrication of Portable and Cost-efficient UV Torch "Prajjwal 1.0" for surface Disinfection
8. VIRALYSER 1.0: A Portable Box to Sanitize Inanimate Items

National Institute of Technology (NIT), Jamshedpur

1. To design a microwave-based sensor for real-time detection of coronavirus (SARS-CoV-2)
2. Design and development of low-cost automatic self-sanitizing COVID -19 patient bed
3. Design and Development of Inflatable low-cost spray tunnel and sanitizer
4. Development of Motorized Roboticmedical Assistant for Nursing, Sanitization, and House-keeping in Isolation Wards
5. Deep Learning and Lungs X-Ray image-based Detection System for COVID-19 patients at Airports and Hospitals
6. Wireless Pulse Oximeter with Heart beat measurement
7. Infra Red thermometer module for recording body temperature of multiple persons at a time without coming in close proximity
8. Low-cost ventilator with wireless control system
9. Wireless Stethoscope
10. Social Distancing Monitoring and Warning System
11. The U mask - a specially designed cloth-based and centre HEPA padding option

National Institute of Technology (NIT), Arunachal Pradesh

1. Replacement of facemask with reusable face cover as protection from virus
2. Fabrication of biodegradable material for personal protective care equipments
3. Gel-based hand Sanitizer developed from Tea plant extract oil
4. To Increase the Performance of Human Immune System to fight against COVID-19

National Institute of Technology (NIT), Puducherry

1. Melia Azedarach as Repurposed Antiviral Drug & Electrospun Nanofibrous Membrane as Air Filter: In-Vitro Approach For COVID-19
2. HOPE - A proposal for developing an mobile App Hopefulness Portal for Employment
3. Development of Mathematical Modelling and Analysis of Transmission of Coronavirus Disease (COVID-19) incorporating the Lockdown and human consciousness Factors

National Institute of Technology (NIT), Sikkim

1. COVID-19 Tracker Android Application
2. Forecasting of COVID-19 Disease Spread by a Neural Network based Model

National Institute of Technology (NIT), Tiruchirappalli

1. Social Distancing Sensor
2. Drone automation solution for surveillance and delivery
3. Intensive Care Management system for Coronavirus disease
4. Statistical and Data-Driven Machine Learning, Forecasting and Inferences from Pandemic Data
5. Detection of COVID-19 with Lung Sound with Artificial Intelligence
6. Predictive Models for COVID-19
7. Algorithm to extract respiration waveform from PPG signal to diagnose COVID-19
8. Predicting Hotspot detection to share resources effectively for COVID-19 control in Tamil Nadu using Deep learning
9. Influence of Demographics and HAbitual Patterns for COVID-19 for predictive and prescriptive analytics – INDHAP – 2020
10. Robotic Assistant and Companion Robot for COVID-19
11. Impact of COVID-19 in Toddlers and Teenagers in India
12. Handheld ON-OFF and Door opening–closing product
13. Sourcing and stockpiling strategies of PPE (Personal Protective Equipment) in India under COVID-19 global supply disruption
14. 3D-printed Face shield and Re-usable Face mask to protect against COVID-19
15. Development of Reusable/Washable Face shields
16. Affordable Non-Contact Temperature measurement device
17. Development of Cough Recognition App to Track the Spread of the Coronavirus
18. Smart Shopping System to maintain social distancing
19. Digital infrastructure for patient screening and monitoring for pandemic COVID-19 outbreak
20. Current trending of COVID-19 and strategies for post-pandemic period
21. Design and development of Automatic Hand sanitizing station
22. VIRUMASK
23. Photocatalytic disinfection of small scale PPEs (gloves, head cover, goggles)
24. Automated Personal hygiene system
25. Large area aqua sanitizer

National Institute of Technology (NIT), Durgapur

1. Fast Detection of SARS-CoV-2 antigen by a dot blot
2. Development of non-PCR-based point of care SARS-CoV-2 RNA detection technique
3. Identifying Potential Small Molecule Inhibitors of the COVID-19
4. Development of IoT-enabled rapid screening device for COVID-19 specific antigen and antibody in point of care application

National Institute of Technology (NIT), Calicut

1. Reusable Aerosol Boxes for treating COVID-19 Patients
2. Design, Fabrication and Installation of Automatic Baggage Sanitization Machine

3. Development of automated kiosk for sample collection from patients with protective shield
4. Development of service, sanitization and surveillance assistive robot for COVID-19 isolation room
5. PRANESH: An Automatically Pressurized AMBU Bag
6. Mathematical Modelling of COVID-19 Coronavirus
7. Design and Development of Humanoid Robot to Fight Epidemic like Corona Virus
8. Emergency Ventilator with Exhale Disinfector
9. Development of Nasal Air filter
10. Fabrication of UV disinfection chambers for office files

National Institute of Technology (NIT), Srinagar

1. Designing low-cost masks and Innovative Quick screening
2. UV LIGHTROOM
3. Pandemic Drone
4. Detection of COVID-19 virus from the Ph of blood
5. Merkle and Binary Tree-Inspired Method for Accelerated COVID-19 Testing
6. A Deep Neural Network for Detection and Diagnosis of COVID-19 from Chest X-ray Images

National Institute of Technology (NIT), Hamirpur

1. Deep Learning-based imaging data analysis for the diagnosis of COVID-19 patients
2. Preparation and Distribution of alcohol and aloe vera (herbal)-based Hand Sanitizers
3. Development of Web Portal under "Research Initiative regarding COVID-19"
4. Toward Securing-Tracing apps related to COVID-19
5. Development of Indian Reusable Face Shield for Personal Protection Against COVID-19

National Institute of Technology (NIT), Agartala

1. Indigenous Design and low-cost implementation of a Solar-powered unmanned functional sanitization tunnel to fight with COVID-19 infection
2. Technological innovation towards development of unique vaccine targets against Novel COVID-19
3. Towards development of new drug against Novel COVID-19
4. Development of logistics and reverse logistics supply chain model considering uncertainty during worldwide COVID-19 outbreak

National Institute of Technology (NIT), Delhi

1. Development of Ensemble Model for Predicting Trends of COVID-19
2. Minimizing Risk of COVID-19 Spread in Essential Services with help of Reliability Centred Analysis
3. Contact Tracing
4. The Game of Self-interest vs. Social interest: Estimating Effective Strategic Interventions against COVID-19 with Stochastic Networks and Behavioral Games
5. Development of Hand Sanitizers and their distribution among campus residents, personnel working in local banks and Public Sector Enterprises, police force, district administration and medical personnel of the district
6. Evaluation of filter capacity of N-95 masks and PPE kit for the District Medical authorities

National Institute of Technology (NIT), Silchar

1. Disinfection of inanimate objects from COVID-19 contagion by irradiating with UV light
2. Low-cost laboratory synthesis of sanitizer
3. Development of a Quarantined Patient Health and Location Tracking System with GUI support and breach alert system
4. Development of a progress+B124ive web application for intelligent cost optimization using IOT in hotels, post COVID-19 pandemic
5. Investigation on developing model of transmission dynamics characteristics of COVID-19 in human health

6. Forecasting the probability of spread of COVID-19 considering Community Hygiene parameters

S V National Institute of Technology (SVNIT), Surat

1. SVNIT manufactured simple and cheap "Face Shield" and "Face Mask" using 3D printing
2. Low-cost self-cleaning coating for PPEs
3. SMART Wristband for maintaining social distance
4. Preparation of sanitizer at bulk level
5. Preparation of large-scale green chemicals-assisted sanitizer
6. Development and fabrication of low-cost sterilizer box using UV-Hot Air combination (yoUVen)
7. Designing of nanomaterials for the extraction and identification of novel coronavirus
8. Synthesis of Drugs for the Prevention of COVID-19
9. Searching inhibitors for the potent COVID-19
10. RdRp/ACE2/SGp through molecular docking and other computational approaches
11. Impact of News on Social Media during Pandemic of COVID-19

National Institute of Technology (NIT), Raipur

1. Evaluation of socio-economic consequences and formulation of early effective strategies for post-pandemic stages
2. Development of low-cost hand sanitizer for disinfecting COVID-19 virus
3. Crowdsourcing-based Distribution of Food and Relief Materials to Poor Family distressed by COVID-19 Epidemic, under Lockdown Scenario
4. Camera-based detection of Mask on human face and social distancing
5. Self-testing health risk app (AI-ML-powered android-based application Platform)
6. Web application to predict COVID-19 through X-ray images
7. Tracking, Preventing and Controlling COVID-19 through Android App
8. Addressing mental health challenges of quarantined people using AR/VR
9. Investigation on role of AI on formulated systemic structure of pandemic COVID-19
10. Development of alternative therapeutic strategies for treatment of COVID-19 patients at early stage of the disease

National Institute of Technology (NIT), Kurukshetra

1. Single-body disinfectant sprinkler
2. Portable Artificial Breathing system
3. Non-contact Digital Stethoscope
4. Development of aerodynamically-optimal nasal swab using 3D printer for effective detection of COVID-19 virus with minimal invasion
5. Development of low-cost 3D-printed chip for rapid detection of COVID-19 infection
6. Development of nano-coating technique for disinfecting PPE materials using electrochemical method
7. Development of technique for re-cycling of used mask for development of PPE materials
8. Nano Surface Texturing of Materials for Self Cleaning of Medical Equipment
9. Transaction Sanitization Tunnel for Infection-free transactions
10. Design of Efficient Low-cost Ventilator for Emergency COVID-19 Patients
11. Battery-less, touch-free water tap Add-on module
12. Design and Development of an IoT-based Smart Ventilator
13. Health care facility ventilation system design to minimize cross infection risk against airborne COVID-19
14. Protection equipment and low-cost ventilator
15. A prototype Two-way Ventilator Splitter
16. SAHAYAK - A Robot to Help in Fighting the Coronavirus pandemic
17. Prediction of growth and review of factors influencing the transmission of COVID-19

Indian Institute of Engineering Science and Technology (IIEST), Shibpur, West Bengal

Indian Institute of Engineering Science and Technology, Shibpur (IIEST Shibpur) is a public technical university located at Shibpur, Howrah, West Bengal. It is recognised as an Institute of National Importance under MHRD by the Government of India. IIEST, Shibpur functions as an Institute of higher learning and advanced research. Prime activities include creation and dissemination of knowledge; producing engineers, scientists, and entrepreneurs of highest quality equipped with the latest technologies; and developing innovation technology solutions for the cause of the society.

With the country facing an unprecedented crisis due to the coronavirus pandemic, the institutes prioritize research and scientific interventions so as to deliver solutions for the pandemic. The following research project details the action taken by the institute in combating the COVID-19 crisis.

1. Coating antimicrobial peptides and conducting polymers over cotton/polyester blends as smart PPEs;
2. Feasibility of novel optomagnetic platform for rapid detection of COVID-19;
3. Developing a SERS-based diagnostic system for label-free detection of COVID-19;
4. Empirical and machine learning model for predicting viability of COVID-19 in different environmental conditions;
5. Amino acid analogues as nasal formulations for early virus entrapment and PPE coatings;
6. Potential agent in the ayurveda and homeopathy formulations for prophylaxis of COVID-19 spread analyzed by mathematical modelling; and
7. Mathematical model of COVID-19 transmission incorporating herd immunity dynamics and family structures of Indian society.

Post Graduate Institute of Medical Education & Research, Chandigarh

The following research project details the action taken by the institute in combating the COVID-19 crisis. The details of these studies are entailed in the provided links. These are the first-of-its-kind comprehensive studies representing over 130 sites over India to assess the changes in spatial temporal patterns in pollution during lockdown to support future mitigation strategies. These studies have been performed in association of PGIMER-Chandigarh with Panjab University, Chandigarh Pollution Control Committee and National Atmospheric Research Laboratory, Gadanki, Andhra Pradesh.

1. Diurnal and temporal changes in air pollution during COVID-19 strict lockdown over different regions of India
   Website Link:
   https://www.sciencedirect.com/science/article/pii/S0269749120360565

2. Impact of COVID-19 lockdown on air quality in Chandigarh, India: Understanding the emission sources during controlled anthropogenic activities
   Website Link:
   https://www.sciencedirect.com/science/article/pii/S0045653520321731

3. COVID-19 lockdown and its impact on tropospheric NO_2 concentrations over India using satellite-based data
   Website Link:
   https://www.sciencedirect.com/science/article/pii/S0045653520321731

SCIENCE AND SOCIETY

An expected gratitude to support prosperity during a period of emergency could be to broaden individuals' feeling of 'making a difference' through volunteering.

The world is presently facing a health pandemic as several countries battle the widespread transmission of COVID-19. The healthcare community across the nations is engaged in desperate attempts to save lives and stem this crisis, even while becoming highly vulnerable through continuous exposure to the dreaded infection. Developing countries are among the most burdened, given their limited public health infrastructure and lack of economic capacity. The pandemic has also posed a challenge to their ability to supply the required social protection and other sorts of state support which would have helped the poor and vulnerable deal with this situation.

In India numerous scientific institutes are supporting and helping individuals to beat sentiments of inertia and helplessness. Scientific institutes having direct relationship with the communities are often well placed to boost awareness, communicate accurate information, counter rumours, and provide needed services. They have developed many technologies and products (such as masks, PPE kits, sanitizers, testing centre, etc.) which could be utilized by the community for combating COVID-19.

Indian Institute of Science (IISc), Bengaluru

MITR Labs for COVID-19 testing

MITR Labs is India's first and only Biosafety Level two plus (BSL2+)-compliant mobile diagnostic lab approved by the Indian Council for Medical Research (ICMR). The mobile labs which consist of a fleet of vans allow healthcare workers to collect, process, and test samples using RT-PCR onsite and upload results directly to the ICMR portal. RT-PCR is considered the gold standard for the detection of the novel coronavirus.

Website link:
https://www.iisc.ac.in/events/inauguration-of-mitr-labs-for-covid-19-testing/

Public engagement and community service efforts by IISER Pune members

IISER Pune explores the feasibility of setting up a testing centre to contribute to the available capacity in India for testing for SARS-CoV-2, several members from the Institute including students, staff, and faculty members have come forward to volunteer for this activity. Several Institute members are also contributing in their individual capacity to help debunk myths surrounding the disease and aid the public understanding of the science behind the functioning of the virus and on ways to target the virus, while also urging the public to follow government advisories on physical distancing and lockdown measures.

Volunteers helping to run the COVID-19 Testing Centre

COVID-19 Testing Centre at IISER Pune

Website link:
https://www.iiserpune.ac.in/news/covid-19-testing-centre-at

Led by Dr Nagaraj Balasubramanian, members from the MANAV team, is creating a tool that can curate COVID-19-related published information from Twitter and rate content and make it easily accessible to a general readership. The team has also created a recurring online quiz on COVID-19 to engage students with verified information on the pandemic.

Website link:
http://www.iiserpune.ac.in/news/efforts-at-iiser-pune-against-covid-19

Led by Dr Pooja Sancheti, a team of volunteers from the campus is in the process of collating questions and disseminating correct educational information about the pandemic through easily accessible channels such as WhatsApp; arranging for low-cost reusable masks for the campus workforce as well as to people in the slums and bastis in the neighbourhood; putting together hygiene kits (soap, detergent, masks, sanitizers) for the campus workforce; and circulating educational material (such as stories and short videos) for children who may access these. The team is also in preparing to distribute relief kits with dry ration and hygiene products to high-risk families in the neighbourhoods adjoining the campus.

Website link:
http://www.iiserpune.ac.in/news/efforts-at-iiser-pune-against-covid-19

Dr Joy Merwin Monteiro and team is developing a rapid COVID-19-related literature explorer, based on contextual similarity of research articles. A website prototype has been deployed

here: http://coronastory.in and the team has carried out annotation of COVID-19 research article dataset for NLP research community.

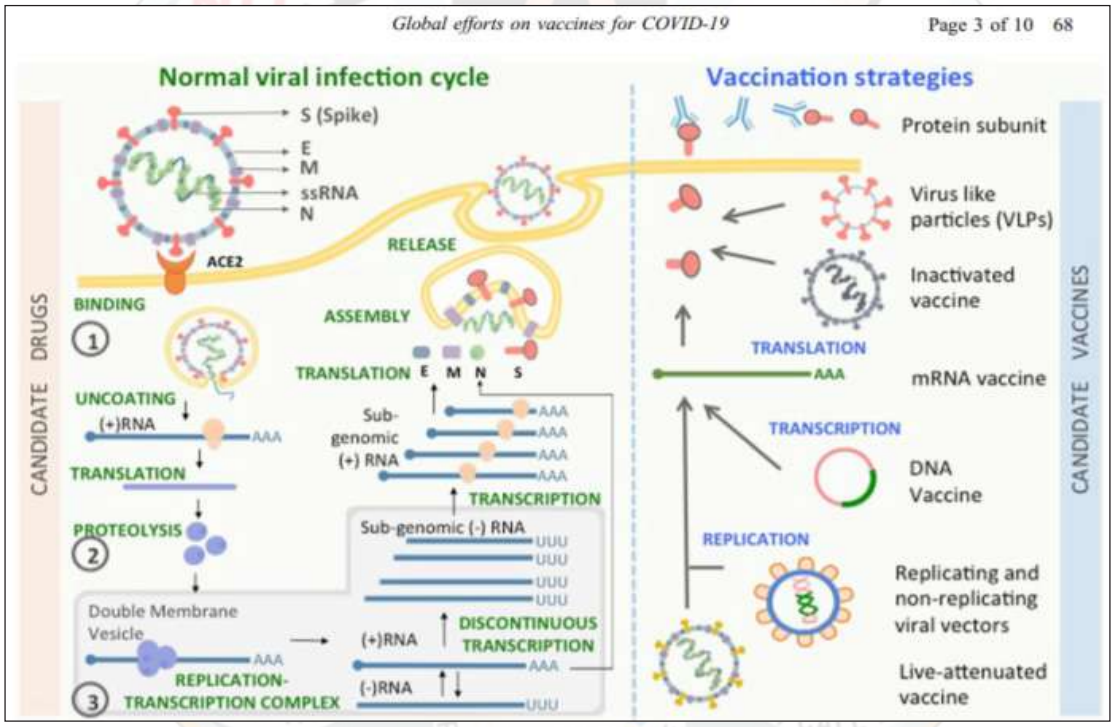
Website link:
http://www.iiserpune.ac.in/news/efforts-at-iiser-pune-against-covid-19

All through this lockdown period, Smt Indrani Balan Science Activity Centre at IISER Pune has continued to produce and post simple science activities for educators and students, adding further to the online educational material. Do check out their latest collection on the Balan Centre's Facebook page.

Website link:
https://www.facebook.com/IISERPSAC

Efforts by IISER Tirupati to reach out to the society

IISER Tirupati reviews the "Global efforts on vaccines for COVID-19" in the Topical Collection on COVID-19: Disease Biology & Intervention issue of the Journal of Biosciences.



COVID-19 is an emerging infectious disease that has turned into a pandemic. It spreads through droplet transmission of the new coronavirus SARS-CoV-2. It is an RNA virus displaying a spike protein as the major surface protein with significant sequence similarity to SARS-CoV which causes severe acute respiratory syndrome. The receptor binding domain of the spike protein interacts with the human angiotensin converting enzyme 2 and is considered as the antigenic determinant for stimulating an immune response. While multiple candidate vaccines are currently under different stages of development, there are no known therapeutic interventions at the moment. This review describes the key genetic features that are being considered for generating vaccine candidates by employing innovative technologies. It also highlights the global efforts being undertaken to deliver vaccines for COVID-19 through unprecedented international cooperation and future challenges post development.

Website link:
http://www.iisertirupati.ac.in/events/Raju_Mukherjee_article.pdf

IISER Tirupati prepared sanitizers as per WHO norms for COVID fighters

IISER Tirupati had prepared 100 liter of hand sanitizers as per WHO norms and distribution to the COVID warriors. The Institute has also volunteered to support with technical manpower and assist in standardizing equipment and consumables for testing purposes.

Website link:
http://www.iisertirupati.ac.in/announcements/press_note_on_COVID_support.pdf

IISER Tirupati CSR to old age homes, orphanages, rehabilitation centres and others

Humane and generous contributions provided from the faculty and staff of the Institute in reaching out to the Abhaya Kshetram Trust, Mother Teresa Charitable Trust, Pass Manovikas Residential Special School for mentally retarded children, Telugu Talli Old Age Home, Ashraya Welfare Organisation (rehabilitation centre for senior citizens and specially abled), and Nirmala Old Age Homes (Mother Teresa Homes – Tirupati) to provide them with essential ration for their food and hygiene.

Website link:
http://www.iisertirupati.ac.in/announcements/press_note_on_COVID_support.pdf

IISER Tirupati awareness spread

The Institute counselled and prevailed upon the migrant labour population in its Yerpedu campus to stay put in the safety of its premises rather than venture to go to their hometown far away and in other states. The awareness campaign for migrant labour eased their stress and they were provided with essential soap and sanitizers to maintain hygiene.

Website link:
http://www.iisertirupati.ac.in/announcements/press_note_on_COVID_support.pdf

IISER Thiruvananthapuram makes hand sanitizers in support of the fight against COVID-19

IISER TVM has made a substantial quantity of hand sanitizers for distributing to various agencies in support of the fight against the COVID-19 infection. The initiative was spearheaded by Prof. J N Moorthy, Prof. K George Thomas, Prof. Y Vankar, Prof. Mahesh Hariharan, Dr Reji Varghese, Dr Veera Reddy Yatham, Dr Soumen De and Dr Basudev Sahoo with several of technical assistants and students chipping in.

Website link:
http://www.iisertvm.ac.in/news/read/news-iiser-tvm-makes-hand-sanitizers-in-support-of-the-fight-against-covid-19

IISER Kolkata community service during COVID-19 pandemic

Members of IISER Kolkata distributed and provide essential ration and items of personal hygiene to local slum dwellers and labourers.




Website link:
https://www.iiserkol.ac.in/gallery/gallery.php?year=2020&type=IISER%20Kolkata%20Community%20Service%20during%20the%20COVID-19%20Pandemic

COVID-19 testing facility at IISER Bhopal

IISER Bhopal COVID testing team successfully conducted more than 1000 tests so far and putting the collective needs of this mission on priority.

Website link:
https://www.iiserb.ac.in/order

https://twitter.com/iiserbhopal/status/1287022608324554753

Faculty members of Chemistry at IISER Bhopal made sanitizer to give a bottle to every students who are travelling back home and also to all members of the staff. This proves that ideas get implemented when there is need and urgency to solve problems.

Website link:
https://twitter.com/iiserbhopal/status/1240324882019143681

COVID-19 testing facility at IISER Berhampur

During this difficult time of COVID-19 pandemic, members of the IISER Berhampur fraternity have ignored their own hardships and joined hands in combating this enemy of humankind. With their perseverance, they have completed a total of 5000 tests.

Website link:
https://twitter.com/IISER_BERHAMPUR/status/1292835337551544320

https://www.iiserbpr.ac.in/index.php?category=pages&pid=office-orders

IIT Kharagpur and its alumni to support COVID lockdown-affected poor people around the campus

Indian Institute of Technology Kharagpur (IITKGP) has come forward to support the needy people in and around its campus for a period of six months. It has set up a temporary fund for those who have been severely affected economically due to COVID-19. The short duration fund is exclusively meant for about 10500 poor workers on-campus and people coming from villages near the campus who are dependent on IIT Kharagpur for livelihood and are now out of job due to the lockdown. The beneficiaries include daily wagers working in different eateries, halls as ward boys, dhobi, small culvert tea shops, rickshaw pullers, maid servants, workers in construction projects etc.

Website links:
https://kgpchronicle.iitkgp.ac.in/iit-kharagpur-alumni-to-support-covid-lockdown-affected-poor-people-around-the-campus/

IIT Kharagpur lends support to COVID-19 quarantine facility

With the announcement of the lockdown, a large influx of people moved to the borders of Bengal from various southern states with medical documents. They were patients and their families returning from Chennai, Bengaluru, Hyderabad, and Vellore after undergoing treatment or health check-ups. As per hygiene and safety protocols, they were scheduled to be tested for COVID-19. But testing about 300 people would have taken extensive facilitation for the local state administration. Here is where IIT Kharagpur came to the rescue. About 9200 sq. m. area spread over two floors of the superspecialty hospital of IIT Kharagpur was made available to the district administration of Paschim Medinipur to be used as a quarantine facility for these passersby.

Website link:
https://kgpchronicle.iitkgp.ac.in/iit-kgp-lends-support-to-covid-quarantine/

Students of IIT Kharagpur pool in resources to support neighbouring panchayats with COVID essentials

Students of IIT Kharagpur, working with the Gopali Youth Welfare Society, pool in their resources to rush both essential goods and protective gear to the underprivileged in Gopali and neighbouring gram panchayats.

Website link:
https://kgpchronicle.iitkgp.ac.in/chipping-in/

IIT Kharagpur develops mechanised mobile broom for cleaning large public spaces

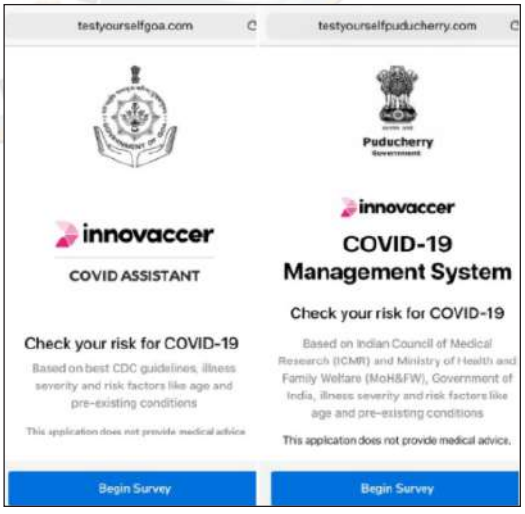
Researchers at IIT Kharagpur have developed a vehicle-based mechanized broom to clean the 2100 acre campus area. Named Sammarjak MB 4.2 this technology consists of two mechanized brooms in the front and one side, running on battery and solar power. It has the flexibility to move the dirt on roads in angular directions or in up and down direction to fit various road conditions.

Website link:
https://kgpchronicle.iitkgp.ac.in/iit-kharagpur-develops-mechanized-mobile-broom-for-cleaning-large-spaces/

IIT Kharagpur alumni start-ups innovate COVID-19 health technologies

Four alumni starts-ups from IIT Kharagpur have developed technologies to offer assistance towards surveillance, mass-scale sanitization and automation of dissemination of official information related to novel coronavirus.

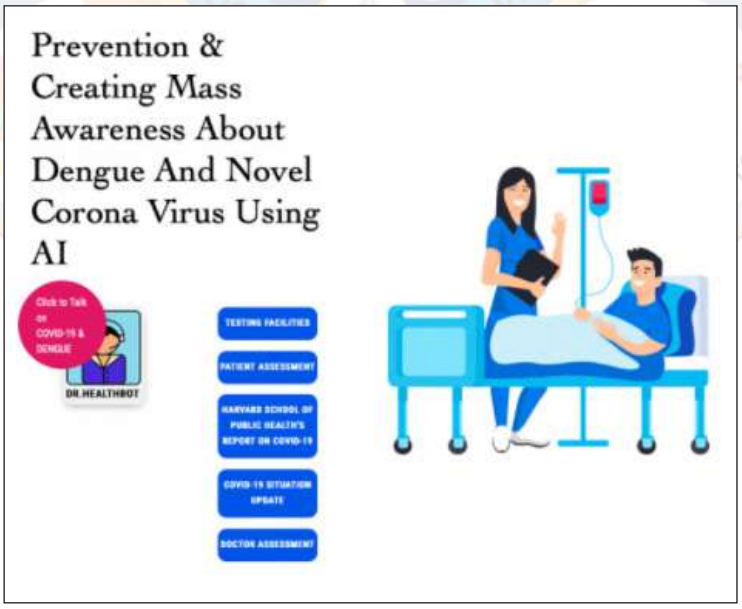
a) Innovaccer, a data-driven healthcare technology start-up has launched a self-assessment-based app to screen for COVID-19 patients. The self-assessment test asks users to fill in a survey based on their symptoms. It also provides coronavirus-related updates to citizens in the region.



b) Intugine, co-founded by IIT Kharagpur alumni is using their flagship product 'Mobile Number Location Tracking' to monitor huge number of home-quarantined individuals and ensure they follow social distancing. The 'Kgpians' claim that their location intelligence platform, which is based on cell triangulation technology, can work on SMS-based user content without installing any application, i.e., even on basic phones, which makes it easy to implement.

c) Alumnus Debayan Saha collaboratively developed Airlens Minus Corona, a device which may help sanitise large areas. The innovators claim that the product might be able to address the challenge by using charged water droplets which are ionised using the viral discharge.

d) Apollonius Voicebot developed by alumnus Souva Majumder is helping in addressing queries. People can record their queries on the platform denguebot.in which are answered by an AI application. The bot has integrated information provided by the World Health Organization, Ministry of Health and Family Welfare, Govt. of India, and My Gov platform.



Website link:
https://kgpchronicle.iitkgp.ac.in/alumni-innovate-covid-19-health-technologies/

IIT Dharwad supplies 500 face shields for KIMS doctors

Research scholars and faculty members at IIT Dharwad along with volunteers residing in Dharwad town with the continuous help and support from the office of DC, Dharwad and KIMS Hospital doctors, have fabricated about 500 face shields to be provided for healthcare workers following WHO guidelines.

Website link:
https://www.iitdh.ac.in/announcements_news.php

IIT (ISM) DHANBAD reaches out to society with a deterministic approach

As the world is battling COVID-19, the IIT [earlier known as Indian School of Mines (ISM)] community has been fighting against the pandemic with a deterministic approach. Following all protocols, appropriate proactive measures have been taken by the administration, right from enforcing complete lockdown to ensuring the physical and mental well-being of all residents. Major initiatives taken by the Institute include:

- Hand sanitizer is being prepared and supplied on a daily basis to PMC Hospital, the nodal centre for COVID-19 testing and treatment in Dhanbad;
- Setting up of make-shift quarantine centres on campus;
- Providing psychological counselling to students;
- IIT (ISM) donated a refrigerated Microcentrifuge to speed up COVID-19 tests to the Pataliputra Medical College and Hospital (PMCH), Dhanbad.

Microcentrifuge

- The Deepthi Ladies Club of IIT (ISM) has been whole-heartedly supporting the Community Services Initiatives team by shouldering responsibilities that come their way.

Deepthi Ladies Club of IIT (ISM) Dhanbad packing food for the needy.

- A community kitchen has been set up in the campus to provide cooked packets of food to all homeless and needy in Dhanbad during the nationwide lockdown in the wake of Coronavirus pandemic. Initially, 300 cooked packets of food were distributed, but gradually it scaled up to 450. Seven distribution points in the city have been identified and the food

packets are being distributed in association with the Bengali Welfare Society, a local NGO of Dhanbad. The kitchen is functioning from 1st April.

- Distributing rations to the leprosy hit: In order to provide relief to the distressed, Confederation of Indian Industry (CII) and IIT (ISM) in association with CII partner Sasakawa- India Leprosy Foundation (S-ILF) have been distributing dry rations in nine leprosy colonies covering 384 families in Dhanbad area.
- It is also distributing lassi and soft drinks to police who are safeguarding lives by enforcing lockdown and supporting and helping all those who are in the front lines, fighting every day to save hundreds of lives.

IIT-ISM helps Leprosy hit

Community Kitchen

Website link:
https://www.iitism.ac.in/assets/uploads/news_events/admin/Corona-Warriors.pdf

Initiative by IIT HYDERABAD to reach out to the society

Social Initiatives to support fight against COVID -19:

- Dr Mudrika Khandelwal (MSME dept.) has developed sanitizer and distributed to various essential services in the IITH campus.
- Dr Jyotsnendu Giri (BME dept.) has developed hand sanitizer and at present under his leadership about 100 liter of Sanitizer is being prepared daily and supplied to the District Collectorate.
- Pure EV, a company incubated out of IITH and situated just outside IITH Campus have manufactured about 5500 3-ply masks and distributed to local needy people

Website link:
https://iith.ac.in/assets/files/pdf/Social-and-R-D-Initiatives-to-fight-against-Covid-19.pdf

IIT Gandhinagar collaborates with CPWD to launch series of welfare measures for migrant labourers

Indian Institute of Technology Gandhinagar has joined hands with Central Public Works Department (CPWD) to launch a series of welfare measures for the benefit of migrant labourers working in the construction projects at the Institute.

The Institute constituted a 'Shramik Kalyan Samiti' (Labour Welfare

Committee) to interact, educate and help construction workers fight against the pandemic.

The Institute volunteer groups regularly sensitize the workers and create awareness about preventive measures against COVID-19, such as frequent hand wash and social distancing. Breathing techniques have been explained to the labourers. All the workers' colonies are equipped with a first aid box.

The Labourer colonies and frequently-touched surfaces are regularly disinfected. The Institute ensures that soaps and water are available in toilet blocks/washbasins of these colonies at all times. Hand wash has also been placed in labour camps at various places.

Website link:
https://news.iitgn.ac.in/2020/05/02/iitgn-collaborates-with-cpwd-to-launch-series-of-welfare-measures-for-migrant-labourers/

IIT Roorkee community kitchen distributing food during the COVID-19 pandemic

IIT Roorkee community kitchen (Faculty Club) in association of Nagar Nigam Roorkee is supplying cooked food for around 200+ deprived persons of Roorkee daily during the COVID-19 pandemic. Packets of hot meals are being delivered at the doorsteps of needy people with the help of Nagar Nigam. Milk and biscuits are being distributed to small kids in village Bhangeri where construction workers who work in the campus construction activities live with the efforts of all members of IIT Roorkee community.

Website link:
http://covid19.iitr.ac.in/iit-roorkee-community-kitchen-distributing-food-during-the-covid19-pandemic/

IIT Roorkee students distribute lab-made hand sanitizer to the municipality

PhD students from the Laboratory for Integrated Nanophotonics and Biomaterials (LINB) have prepared hand sanitizers under the supervision of Prof. Soumitra Satapathi from the physics department and provided to IIT's community kitchen, which is making and supplying food to the municipality. This has also been provided to the Roorkee local volunteers who are associated with the food distribution to the local city council.

Website link:
http://covid19.iitr.ac.in/iit-roorkee-students-distribute-lab-made-hand-sanitizer-to-the-municipality-2/

IIT Guwahati alumni has developed and deployed drones for spraying disinfectant in public spaces to prevent Coronavirus

Marut Dronetech Private Limited, a start-up, founded by IIT Guwahati alumni has developed and deployed drones for spraying disinfectant in public spaces to prevent Coronavirus.

Marut Dronetech is working with the Government of Telangana and departments across the state to deploy drones for public safety applications. Recently, Karimnagar Municipal Corporation, Telangana had deployed customised drones of Marut Drones for spraying disinfectants in Mukarampur area of Karimnagar where 10 Indonesians and one local had tested positive for COVID-19. Disinfectants were also sprayed at District Collectorate, Municipal Corporation, District Hospital, Bus Station, Auto stand, markets, Police Commissionerate and Rythu Bazars.

Website link:
https://www.iitg.ac.in/covid-19/

UAVs for COVID Surveillance provided by IIT Kanpur

The drone, provided by Indian Institute of Technology Kanpur (IITK) is being used for surveillance of an area of radius up to 15 km. It has high-resolution camera with night vision capabilities. The endurance of these UAVs ranges from 1.5 to 10 hours. The team is working with the Kanpur city administration to help them in the day-and-night surveillance of the hotspots in the city

Website link:
https://www.iitk.ac.in/dord/newsletter/May2020/May2020.pdf

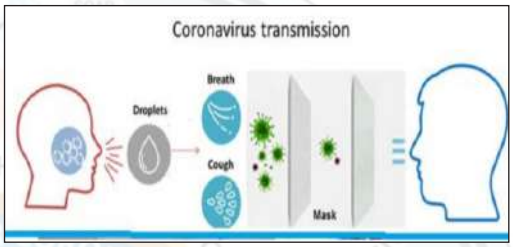
IIT Kanpur, with Kanpur Parivartan Forum, Feeding India (Kanpur) and FICCI Flo distributed food packets

IIT Kanpur, with Kanpur Parivartan Forum, Feeding India (Kanpur) and FICCI Flo has taken up the task of ensuring that 'No Starvation in Times of Corona'**.** The lockdown has created a crisis for millions and the livelihoods of domestic workers, street vendors, auto or rickshaw drivers, construction and utility workers is at risk. In Phase 1, 18500 family ration packs and 11,000 lunch packets have been distributed in 120+ bastis across 50+ locations in our city, Kanpur.

Website link:
https://iitk.ac.in/dora/funds/covid.php

Maulana Azad National Institute of Technology (MANIT) faculty and staff distributed homemade washable masks

Faculty and staff of Maulana Azad National Institute of Technology has developed homemade washable mask from cotton fabric. These masks are being distributed among the residents of MANIT Campus, security guards, sweepers, maintenance and horticulture staff, drivers and in-house vendors. The Institute has distributed these masks to the poor and needy people living in nearby slums. The main material of mask is cotton fabric that comforts the person from heat and sweat of the season.



Website Link:
http://www.manit.ac.in/sites/default/files/documents/Waheble_Mask_300420.pdf

NIT Jalandhar distributes hand sanitizer

In order to promote hand hygiene and minimize the transmission risk of the COVID-19 virus among the individuals, NIT Jalandhar in collaboration with Bharat Herbals, Jalandhar developed a low-cost hand sanitizer which is herbal in nature and has more than 70% Alcohol and very effective in destroying Coronavirus. Dr Lalit Kumar Awasthi, Director of Dr. B. R. Abmedkar National Institute of Technology, Jalandhar provided 216 bottles of 100 ml each to Sh Navjot Singh Mahal, SSP, Jalandhar Rural, Jalandhar. The sanitizer was also given to CRPF and BSF Jalandhar for taking care of the defense persons during this pandemic.

Website Link:
https://www.nitj.ac.in/index.php/nitj_cinfo/pages/377

Faculty of NIT Jalandhar voluntarily arranged food for labourers living in the nearby villages around the campus

Faculty of NITJ voluntarily arranged food for labourers living in the nearby villages around the campus. These daily wage workers were without work and money due to imposition of curfew in Jalandhar in wake of COVID-19 outbreak in the city. Daily 180 packets of food have been distributed regularly since 22nd March 2020.

Website Link:
https://www.nitj.ac.in/index.php/nitj_cinfo/pages/368

National Institute of Pharmaceutical Education & Research (NIPER)

NIPER Mohali develops immunity booster herbal tea

Low or weak immunity makes a person more vulnerable to viral/bacterial infections like the COVID-19. As no new effective drugs and vaccine are available yet to treat the disease, it is important to strengthen our immunity. Considering the challenge, National Institute of Pharmaceutical Education and Research (NIPER) at SAS Nagar (Mohali) has developed Immunity Booster Herbal Tea. The formula has been designed to achieve maximum immune boosting effect. The five potential immune booster herbs that are used in the form of herbal tea bags are Ashwagandha (Withania somnifera); Giloe (Tinospora cordifolia); Mulethi (Glycyrrhiza glabra); Tulsi (Ocimum species); and Green Tea (Camellia sinensis). It is recommended to take the tea three times a day. Children and aged persons can also consume the tea without any problem. It feels soothing on throat and can help the body to fight seasonal flu also. It is an in-house preparation with all the herbs collected/procured from within the NIPER medicinal plant garden on the campus.

Website Link:
http://www.niper.nic.in/Immune%20booster%20Herbal%20Tea-NIPER.pdf

At NIPER Mohali, in association with the Government of Punjab, steps have been initiated to set-up an RT-PCR-based COVID-19 testing facility to expedite COVID-19 confirmatory tests in the state.

Website Link:
https://pib.gov.in/PressReleasePage.aspx?PRID=1623835

Indian Institute of Engineering Science and Technology (IIEST), Shibpur, West Bengal

MANODARPAN - An initiative to provide psychosocial support to students for mental health and emotional wellbeing during COVID outbreak and beyond

The aim of Manodarpan is to help students to live their lives happily, effectively, productively and become resilient over time with the help of life skill even in face of challenges and roadblocks. Under this initiatives all students from schools/Universities/colleges and Institutions of higher education have been covered.

Website Link:
https://www.iiests.ac.in/IIEST/HappeningsDetails/?id=OQ==

SCIENCE OUTREACH & POPULARISATION

The COVID-19 pandemic of 2020 was a drastic reminder about the importance of science outreach and popularization. The pandemic has shown us how important it is for science communication to more effectively put public interests in mind while translating information and in developing, sharing and applying knowledge products.

COVID-19 pandemic has created global health emergency today. A wide array of programmes and exercises functioned around awareness, and outreach are envisaged involving print, electronic, digital, and intuitive media to succeed in informing large cross sections of the society. So as to facilitate necessary actions and preparedness of the society and to deal with the crisis, the strategies were figured out by involving academic, research, media, and voluntary organisations.

The rapid transmission of infection has so far hampered existences of individuals and has restricted their movement, maintain social distancing and cleanliness and opting for telecommuting. Within this state of uncertainty, enormous confusion is formed among commoner because of abundant supply of misinformation, disinformation, fake news, misbelieves and rumours on various media platforms including social media. While steps are being taken by different organizations to curtail and check such infodemics, there is a requirement of concerted and sustained efforts to show and enable people to make informed decisions after due verification and analysis, especially when it involves health and wellbeing of the people at large.

In the current scenario, where there is extreme amount of anxiety, depression and challenges vis-a-vis translation and usage of common minimum science and authentic information to communicate the risks and facilitate risk management, an immediate and effective science communication for promoting community-level response was desired. Here we have listed some of the most significant initiatives by leading institutes of the country.

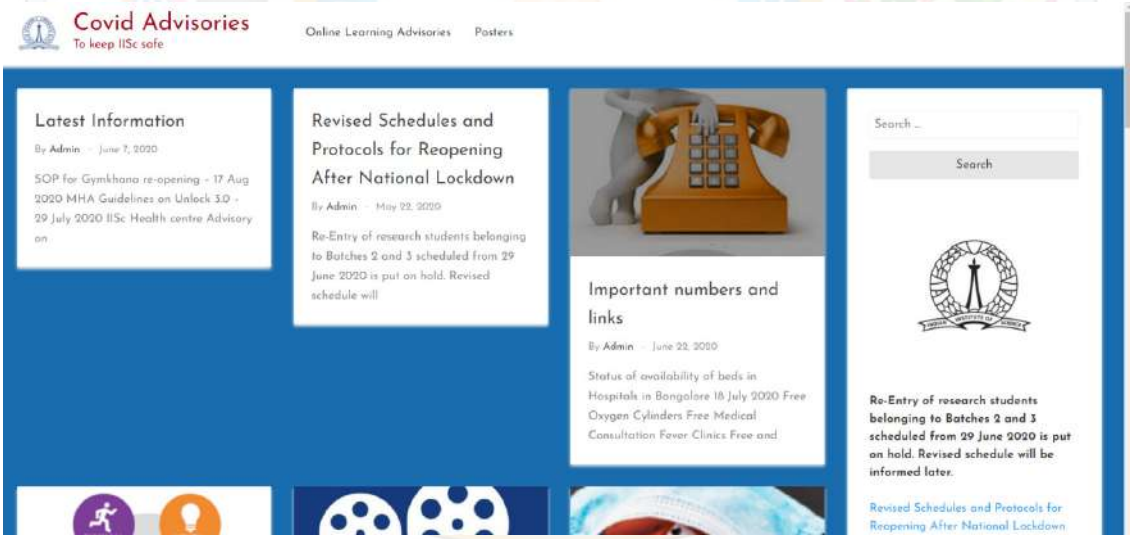
KERNEL – Special COVID-19 Research Newsletter of the Indian Institute of Science

The Indian Institute of Science (IISc) is India's premier destination for science and engineering. Research at IISc spans six divisions and is distinctively interdisciplinary in nature. Kernel was launched as an annual magazine to showcase the Institute's major research contributions. In its new avatar, Kernel will now be published as a monthly digest, providing snapshots of recent research and initiatives. This issue also features efforts to combat the COVID-19 pandemic.

Website link:
https://www.iisc.ac.in/wp-content/uploads/2020/06/Kernel_June2020.pdf

COVID Advisories to keep IISc campus safe

Due to the continued COVID-19 pandemic, workplaces got to effectively follow guidelines so as to make it safe. IISc has developed website which enabled the scholars, faculty and other members to know their current level of preparedness. This website provided latest information, revised schedule, important numbers and links, wellness and students corners, videos and posters associated with COVID-19 awareness.

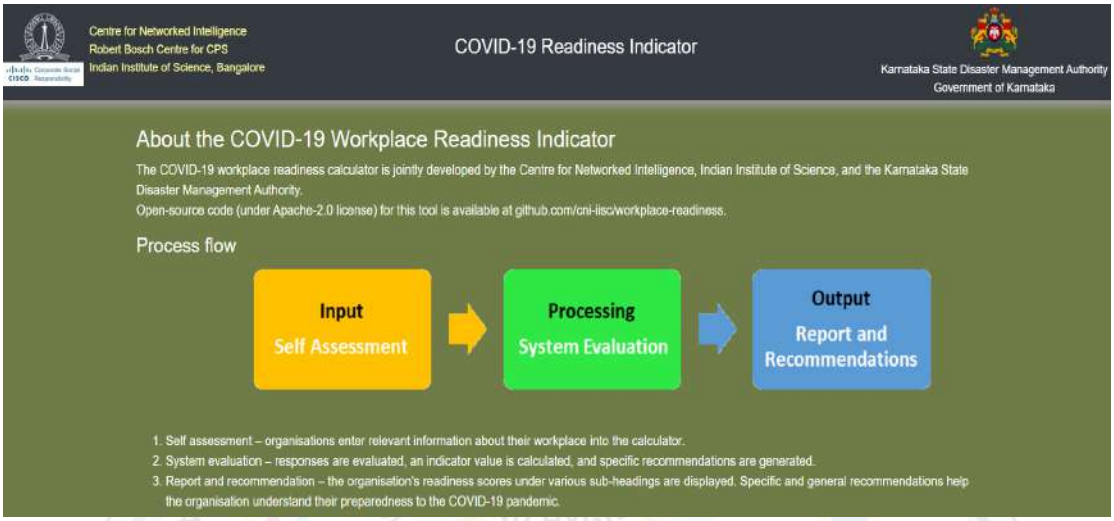


Website link:
https://covidadvisories.iisc.ac.in/

IISc develops online self-assessment tool for workplaces: COVID-19 Readiness Indicator tool

With COVID-19-related restrictions easing and lots of workplaces slowly resuming work, IISc, together with the Karnataka State Disaster Management Authority (KSDMA), has developed a 'Workplace Readiness Indicator', a web self-assessment advisory tool that helps organisations establish pandemic-specific policies and practices.

"The indicator is an advisory tool which will enable organisations to know their current level of preparedness and key risk areas. It'll also help them plan and establish pandemic-specific policies, procedures, and necessary management practices," said a release.

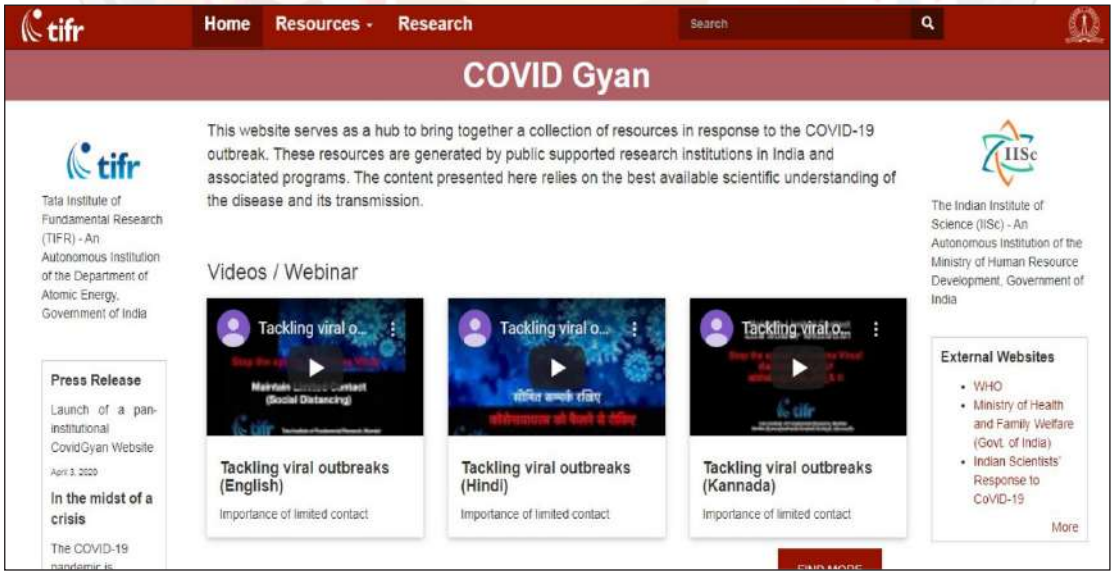


Website link:
https://covid.readiness.in/

COVID GYAN developed to reach out to scientific fraternity

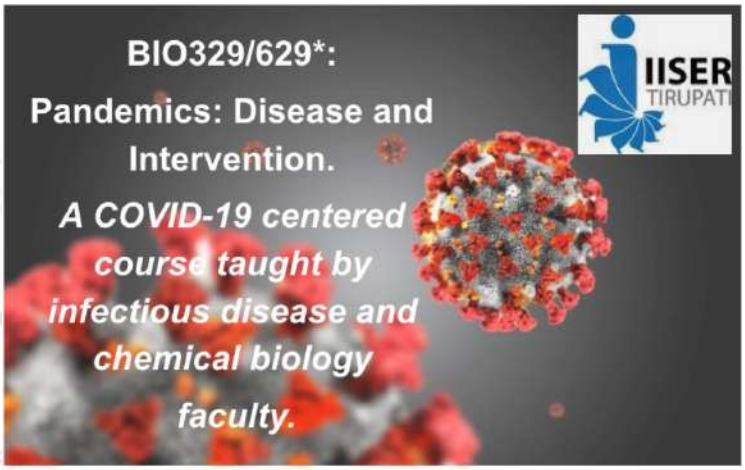
COVID Gyan website serves as a hub to bring together a collection of resources in response to the COVID-19 outbreak. These resources are generated by public-supported research institutions in India and associated programs. The content presented here relies on the best available scientific understanding of the disease and its transmission.

The chief contributor organisation to COVID Gyan are Tata Institute of Fundamental Research (TIFR), Mumbai; Indian Institute of Science (IISc), Bengaluru; Tata Memorial Centre (TMC), Mumbai; Institute for Stem Cell Science and Regenerative Medicine (inStem), Bengaluru; Vigyan Prasar (VP), New Delhi; India Bioscience, Bengaluru; and Webduniya, New Delhi.



Website link:
https://covid-gyan.in/

IISER Tirupati Introduces new course, "BIO329/629: Pandemics: Disease & Intervention"



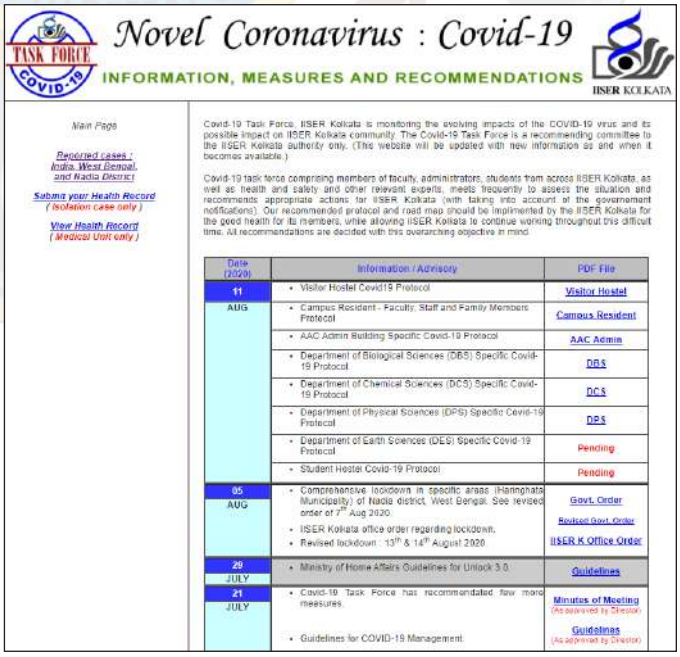
* Course launched through online teaching methods with students enrolling from their safe locations.

100% subscribed for this year

As the world grapples with COVID-19, there is an ever-increasing need for developing a scientifically rigorous awareness course on Infectious Diseases, especially those which potentially could turn into a COVID-19-like pandemic. With biological and related expert faculty, students will get a first-hand contemporary scientific literature discussed in the course. With a focus on COVID-19, but deriving a broad analysis of related ones from history of pandemics, this course will systematically introduce the scientific topics of identification, analysis, biomarker discovery for detection and treatments with drugs and possible vaccination pathways in the context of a realistic pandemic and integrate these with regulatory aspects of prevention and control of spread.

Website link:
http://www.iisertirupati.ac.in/events/Pandemics_Course_Bio_329_629.pdf

COVID-19 Task Force developed by IISER Kolkata



COVID-19 Task Force at IISER Kolkata is monitoring the evolving impact of the COVID-19 virus and its possible impact on IISER Kolkata community. COVID-19 taskforce, comprising members of faculty, administrators, students from across IISER Kolkata, as well as health and safety and other relevant experts, meets frequently to assess the situation and recommends appropriate actions for IISER Kolkata.

Website link:
https://www.iiserkol.ac.in/~covid19/

Magazine 'CONOCIMIENTO' on COVID-19 published by IISER Berhampur

The issue of Magazine 'CONOCIMIENTO' on COVID-19 is published by IISER Berhampur Biology Club 'La Vida'. This 'Conocimiento' or anthology of COVID-19, comprises of essays and review articles on the recent literature on SARS-CoV-2, contributed by the BS-MS students of all four batches. A motivation for publishing a second part prevails as there are numerous topics to be covered. The purpose will be served if this first COVID-19 issue of IISER Berhampur could help to reach out to one and all.

Website link:
https://drive.google.com/file/d/1hSdIJaHt51kluWQhHRN-SXwU0b4vBSvp/view

IIT Delhi reaches out to rural public impacted by outbreak of COVID-19 pandemic

Rural Technology Action Group (RuTAG) at Indian Institute of Technology Delhi (IITD) has brought forward the latest newsletter targeting the rural population impacted by reverse migration due to the outbreak of COVID-19 pandemic. In the prevailing situation, the worst-affected section of the population has been the large multitude of migrant labourers and small entrepreneurs. It is becoming increasingly evident that decentralized industrialization of the rural sector providing local employment stability to the rural population must be urgently taken up. This newsletter is the outcome of 22 online sessions/ conferences/workshops during lockdown period at various locations across India. It includes several rural technological innovations. Now, to reach out to the maximum number of target population, RUTAG division at IIT have started publishing their publications on rural technological innovations in local languages, like Malayalam, Tamil, Kannada, Hindi, Bangla and Punjabi.

Website link:
http://rutag.iitd.ac.in/rutag/sites/default/files/images/user38/RuTAG%20Newsletter%20July%202020.pdf

IIT Kanpur brings out special issue of R&D newsletter on research and innovation related to COVID-19

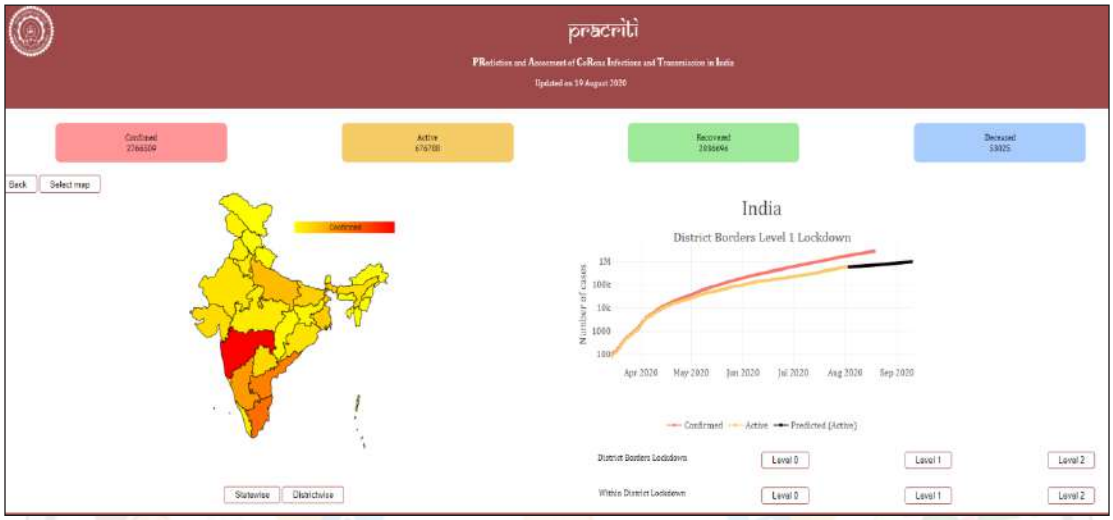
The R&D newsletter released regularly by Indian Institute of Technology Kanpur (IITK) covers research and development activities of the institutions which are aimed at innovation and technology development through interaction with universities, governments and industries to meet the needs of the society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

Website link:
https://www.iitk.ac.in/dord/newsletter/May2020/May2020.pdf

IIT Delhi develops PRACRITI, a platform for monitoring COVID-19

PRACRITI is an acronym for PRediction and Assessment of CoRona Infections and Transmission in India. It is a web-based dashboard that gives details of state- and district-wise predictions of COVID-19 transmission in the country. The dashboard also takes into account different

lockdown scenarios and how the transmission will be affected if the lockdown conditions are changed. This is important to develop the prevention and mitigation strategies for COVID-19. The predictions are updated on a weekly basis to account for any variations in India including changes in the government policies. The COVID-19 predictions are based on a recent mathematical model, namely, Adaptive, Interacting, Cluster-based, Susceptible, Exposed, Infected, Removed (AICSEIR) model. This is a modified form of the traditional SEIR (Susceptible, Exposed, Infectious, Recovered) model and it caters for the interactions that occur between sub-populations such as districts or states. It represents a more realistic approach towards prediction of COVID-19 trajectory than the traditional SEIR models.



Website link:
http://pracriti.iitd.ac.in/

IIT Hyderabad brings out newsletter, KIRIITH, dedicated to COVID-19

Though COVID-19 outbreak has shaken the world economically and emotionally, it has given a chance to come together and create a better ecosystem, unaffected by any such or even worse situation which can erupt in future. The second issue of quarterly newsletter of Indian Institute of Technology Hyderabad (IITH) is dedicated to COVID-19 which encapsulates the S&T efforts taken by the institution towards combating the pandemic.

Website link:
https://iith.ac.in/assets/files/newsletters/Kiriith-2nd-Issue.pdf

IIT Kharagpur brings out COVID REVIEW Special Issue

COVID REVIEW Special Issue has featured the work undertaken by various researchers and students at IIT Kharagpur related to COVID-19 healthcare and advisory.

Website link:
https://kgpchronicle.iitkgp.ac.in/3d-flip-book/covid-review-iit-kgp-researcher-e-newsletter/

IIT Tirupati develops SurviveCovid-19 game for COVID-19 awareness

Indian Institute of Technology (IIT) Tirupati has developed an educational game 'SurviveCovid-19' for both Android and Web platform for increasing awareness of health measures for COVID-19 pandemic. In order to make people understand the prevailing emergency situation and the seriousness of it, a team at the Research in Intelligent Software & Human Analytics (RISHA) Lab of Department of Computer Science & Engineering, IIT Tirupati, thought of developing educational games for COVID-19 awareness. SurviveCovid-19 helps people understand the importance of masks, sanitizers and social distancing to keep themselves and others safe from this contagious virus when they walk around the theme of a city.

Website link:
https://survivecovid-19.itch.io/game2020

IIT Palakkad brings special edition on COVID-19 initiatives: Heroes In The War Against COVID-19

When COVID-19 was starting to engulf our nation, IIT Palakkad has been testing out ways to help the community, policymakers, and fellow researchers. The initiatives included both actual device implementations to data-backed case study explorations/visualisations. A team of faculty and staff, both on campus and outside, has been set up for the same. The entire initiative is headed by Dr S Kanmani Subbu, appointed as Nodal Officer, coordinating the various activities and forming the interface with the collaborating industries for creating the products.

All the efforts (initiatives, projects, and case studies) taken by the Institute and an update on the latest developments, such as Preparation and Distribution of Hand Sanitizer, Making reusable Respiratory Masks, Portable Emergency Ventilator, Foot-operated Hands-free Sanitizer Dispenser, Pulse Plethysmograph Instrument for Continuous Monitoring of blood pulse, heart rate and oxygen saturation of patients in ICUs, Affordable Rapid Testing Kits, Models and analysis making use of Machine Learning, Panchayat Level Vulnerability Map, Lung Ultrasound Imaging for Monitoring COVID-19 patients, Pool Testing Strategies, Crowd Sensing and Localization and others.

Website link:
https://iitpkd.ac.in/sites/default/files/2020-05/TFS_SpecialEdition_on_Covid19Initiatives.pdf

IIT Bhilai enlists initiatives in fight against COVID-19

Ink is the IIT Bhilai newsletter. Intended to be a bi-annual publication, this is to keep everyone updated in a timely manner with the news of all the exciting developments happening on the campus. It features news items on students, faculty as well as staff and others. The Newsletter gives snapshot of the science & technology in India with focus on the activities, achievements and events. The latest edition brought forth in July 2020 covers the scientific efforts initiated by IIT Bhilai after the outbreak of COVID-19 pandemic.

ink
The IIT Bhilai Newsletter

भारतीय प्रौद्योगिकी संस्थान भिलाई
INDIAN INSTITUTE OF TECHNOLOGY BHILAI
Vol. 4, Issue 1, January - June, 2020

IIT Bhilai Fights COVID19

An interview with Prof. Rajat Moona, Director, IIT Bhilai

Indian Institute of Technology Bhilai has always kept its promise to lead the nation at all times. During the novel Coronavirus outbreak, IIT Bhilai once again showed its spearheading initiatives and innovative researches to help the country in its fight against the pandemic. Our Newsletter Team interacted with Prof. Rajat Moona, Director IIT Bhilai to know how various developments at IIT Bhilai help meet these challenges.

We were not ready to bow down to this situation. The future of our graduating students was at stake ... We therefore took a very big and bold decision: Commencement of Online Classes.

Prof. Moona, Director, IIT Bhilai

Newsletter Team: Professor Moona, would you please tell us how IIT Bhilai faced the challenges when Novel coronavirus outbreak started in India. How did the administration ensure the safety of students and at the same time, continue with their academic curriculum?

Prof. Moona: The pandemic became suddenly prevalent around Holi and this was the mid semester break for our students. On 13th March, the institute took a decision to postpone the classes and informed all the students to stay put wherever they were and not return to the campus. We allowed our students to leave the campus to go home, if they wish to. Some students left, but many MTech and PhD students chose to stay back in the hostel.

Newsletter Team: It must have been a very difficult situation to carry out further academic activities. Many other institutes shut down their academic program temporarily. What path IIT Bhilai chose?

Prof. Moona: Yes, it was really a tough situation. From 25th March the first phase of lockdown started, and students could not come back to the institute. We were not ready to bow down to this situation. We wanted to carry on with the academic activity, because the future of our graduating students was at stake. Some would be required to join jobs; others would go for higher education or have some other plans. We therefore took a very big and bold decision: Commencement of Online Classes. We chose online platforms for delivery of classes. We trained and helped teachers to conduct them. We worked with students to ensure its success.

Newsletter Team: That was really a pioneering step IIT Bhilai took becoming a harbinger of a new era in our education system. How was it all arranged?

Prof. Moona: From March end, we started holding online classes for all those courses in which final year students were involved. Later, on conclusion of classes, online examinations were arranged which ran for almost a week. A timetable was drawn, and the students were asked to appear in online method of examination. Students were given open book/notes exam. Their exam solutions were checked by instructors and grading was carried out. It was noticed that grading was exactly similar as in other times of the offline activities. It was therefore a good learning experience for everybody and was done flawlessly.

Newsletter Team: It is really assuring to all of us that with these initiatives, education is in full swing at IIT Bhilai.

Prof. Moona: Yes, very much. Meanwhile, our researchers, faculty members and others were involved in variety of things to contribute in their own ways to handle COVID 19. Few faculty members developed the sanitisers which are in use in the campus. Faculty members contributed to the design of face shields which can be the first

(continued to page 2)

Editorial

Colours of Holi had not even faded, and festive mood of spring days were still reverberating at all beats of our campus life, when tides of Corona pandemic hit our country. We hardly got any time to prepare ourselves for what we were going to face in next few months, but we evolved, improvised and fought this battle together, with three P's- precaution, perseverance and progress.

Always, the first challenge was safety of our students, more than hundred of them was in campus and their safety was of utmost importance. We shifted all students of castle Tria which was outside main campus, to Castle Ena and Dio inside the campus. Circles with gaps of six feet are drawn on the floors of the mess-area, mealtimes were staggered, maximum number of students to travel on the shuttle buses at a time were also reduced. Sanitization kiosks were installed at every prime entry points and no-contact-hand washing installed at main gate. Students were asked to go outdoors only at designated times, and those outdoor times had also been staggered to preventing crowd. The number of students sharing rooms was also reduced within our scope of logistics. A taskforce of faculty members and group of student volunteers was formed to monitor, make aware and engage our students in constant practice of distancing, the task which could never be successful without the enthusiastic cooperation of our students.

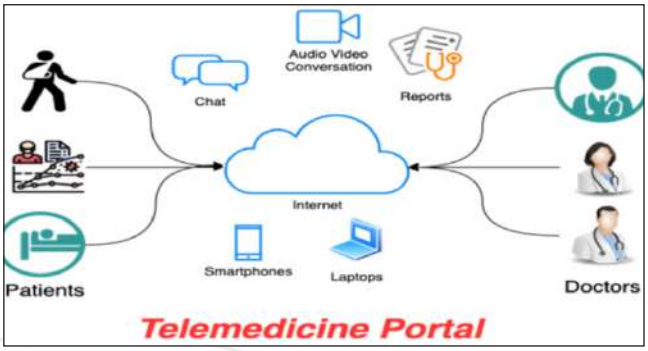
It is always said that new age of technology blooms amidst the age of fog and fight. The same also can be said for today's India, now on her new path of 'Atmanirbhar Bharat'. IIT Bhilai shall always be remembered in this journey as the harbinger of new age of online classes and online exam. Despite the challenges of growing pandemic and lockdown, Prof. Rajat Moona, the visionary educationist and Director of IIT Bhilai, led the institute through a new format of education system and today our students are in their full course of their curriculum and the first batch of BTech has graduated.

This issue of Ink, brings you all these stories of IIT Bhilai for the past six months, the pre-lockdown tunes of events and workshops, the lockdown days and the era of transition.

Avishek Adhikary, Editor

Website link:
https://iitbhilai.ac.in/index.php?pid=newsletter_june_20

Telemedicine Portal developed by IIT Jodhpur

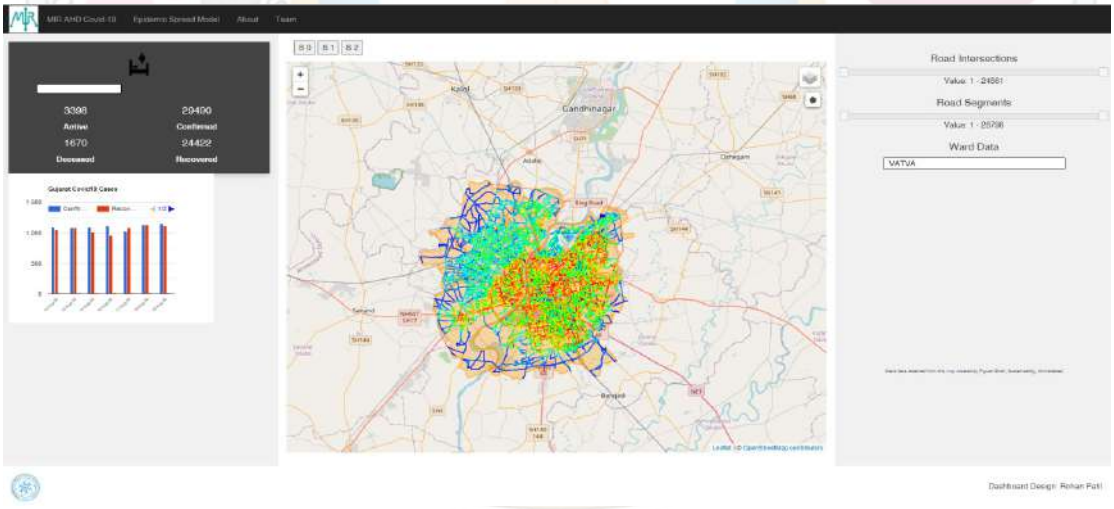


Visiting a health centre or hospital for any kind of ailments has become a new challenge due to the high risk of possible COVID-19 infection. Doctors are also naturally cautious and sensitive about examination of patients. However, such situations provide opportunity for technology to usher in new solutions. At IITJ, Kunal Tawatia, an undergraduate student of the Computer Science and Engineering Department, under the mentorship of Dr Sumit Kalra has developed a tele-consultation platform. Through this platform you can consult doctors for your ailments.

Website link:
https://telemedicine.iitj.ac.in/

IITGN researchers develop an interactive COVID-19 dashboard to aid optimised testing and post-lockdown operations

Indian Institute of Technology Gandhinagar (IITGN) has developed an interactive "COVID-19 Dashboard" that provides different epidemiological scenario-specific information at a city-scale. It is aimed at helping various stakeholders in optimised testing efforts and post-lockdown operations to contain community infection.



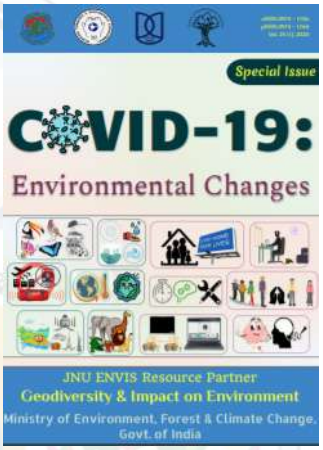
The dashboard called "MIRAHD COVID-19 Dashboard" is a city-scale project which integrates the complex social and transportation patterns with state-of-the-art epidemic spread models, in addition to testing and quarantining rates, and contact tracing rates. As cities prepare to open after current lockdowns, the recovery strategies have to account for social distancing, congestion-free transits and unusual traffic patterns these cities would witness with red and containment zones declared as a no-travel zone. This dashboard, first of its kind for Indian cities, assesses the local risk factors to give a city-scale projection of COVID-19 incidence while accounting for various social distancing scenarios. In addition to the epidemiological data, it also disseminates information about potential congestion zones and rerouting under different containment scenarios to the stakeholders.

For the general public, this dashboard provides risk indices based on various socio-economic indicators; ward level information on the number of cases; current statistics of COVID-19 situation for all the districts of Gujarat; maps of the red, green and orange zone; COVID-19 hospitals; location of government testing laboratories; and an interactive slider to choose their travel paths in case they want to avoid travelling through a particular zone.

Website link:
http://covid19.iitgn.ac.in/

Jawaharlal Nehru University (JNU), New Delhi

A Special Issue of newsletter on 'COVID-19: Environmental Changes' by JNU ENVIS Resource Partner



The special issue of the newsletter COVID-19: Environmental Changes by Jawaharlal Nehru University (JNU), ENVIS Resource Partner highlights air pollution and health scenarios before and after COVID-19 lockdown covering from global-to-local scales. It also highlights that the reduced anthropogenic activities have provided a favourable environment for the butterfly population in NCR Delhi.A report describes the origin of the novel coronavirus SARS-CoV-2.

Website link:
http://jnuenvis.nic.in/newsletters/COVID-19.pdf

All India Institute of Medical Sciences (AIIMS)

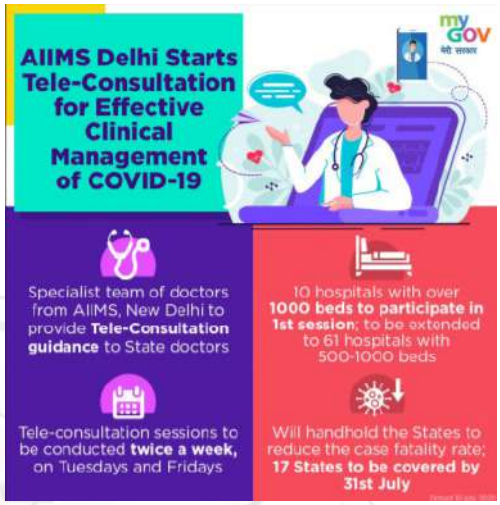
AIIMS Delhi launches a COVID web portal

All India Institute of Medical Sciences (AIIMS), New Delhi has launched a web portal related to the information about COVID-19. It aims to contain the infodemic related to the eruption, transmission, diagnostics and treatment aspects of the COVID-19 pandemic. The information on the portal are categorised as per the target audiences, like professionals, staff, scientific communities and general public. The portal aims to be update all the information with recent developments related to COVID-19 pandemic in the country and the institute.

Website link:
https://covid.aiims.edu/

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

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

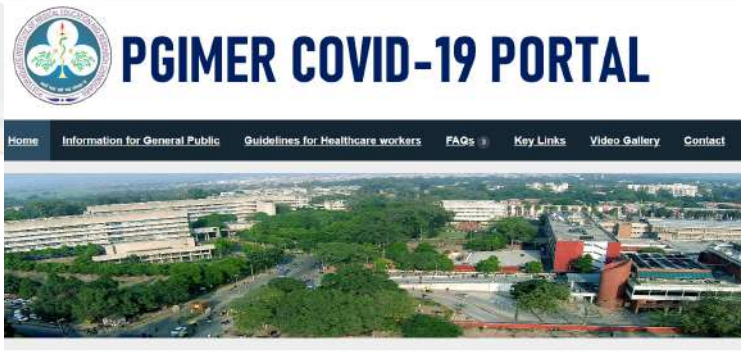


This tele-consultation exercise has been initiated with 10 hospitals which shall be extended to another 61 hospitals that have the bed capacity ranging from 500-1000 on twice-a-week basis. A calendar of these expert-led tele-consultation sessions has been drawn up to cover the States till 31st July.Total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

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

Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh

PGIMER Chandigarh developed COVID-19 portal to sensitise general public

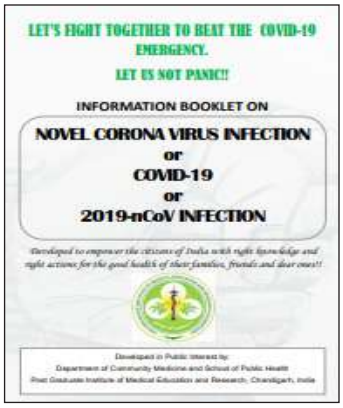


Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh has developed a portal on COVID-19 which is now active on website pgimer.edu.in. The portal includes an information booklet on COVID-19 for general public, FAQs in Hindi and English, public awareness posters in Hindi; various information/guidelines for healthcare workers developed by the PGIMER like infection control guidelines and drug therapy; and links of varied other sources of data regarding COVID-19.

Website link:
https://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/covid19/index.html

PGIMER Chandigarh developed COVID-19 booklet

A COVID-19 booklet has been developed by PGIMER Chandigarh to empower the citizens of India with right knowledge and right actions for the good health of their families, friends and dear ones.

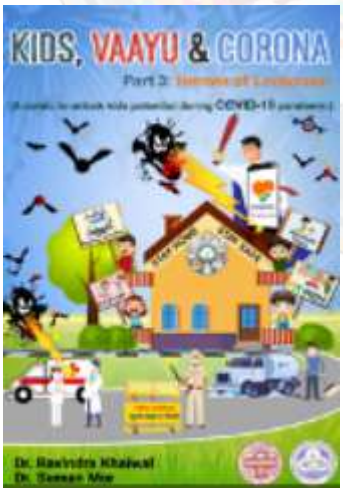


Website link:
https://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/covid19/PDF/COVID%20booklet.pdf

Kids, Vaayu & Corona, PGIMER-Chandigarh and Panjab University produce an Educative Comic Series for COVID Awareness

COVID-19 has become a nightmare for most of the people around the world. And while some of the adults are busy and could gather data from the common platforms like newspaper, for kids it really becomes incomprehensive to understand the talks, advisories and other scientific information. To overcome the challenge, Postgraduate Institute of Medical Education and Research (PGIMER, Chandigarh) and Panjab University (PU) have created an educative comic series titled 'Kids, Vaayu & Corona,' for children to make them aware about the threats of Coronavirus and ways to remain safe by taking simple precautionary steps for prevention and control of spread of the infection.

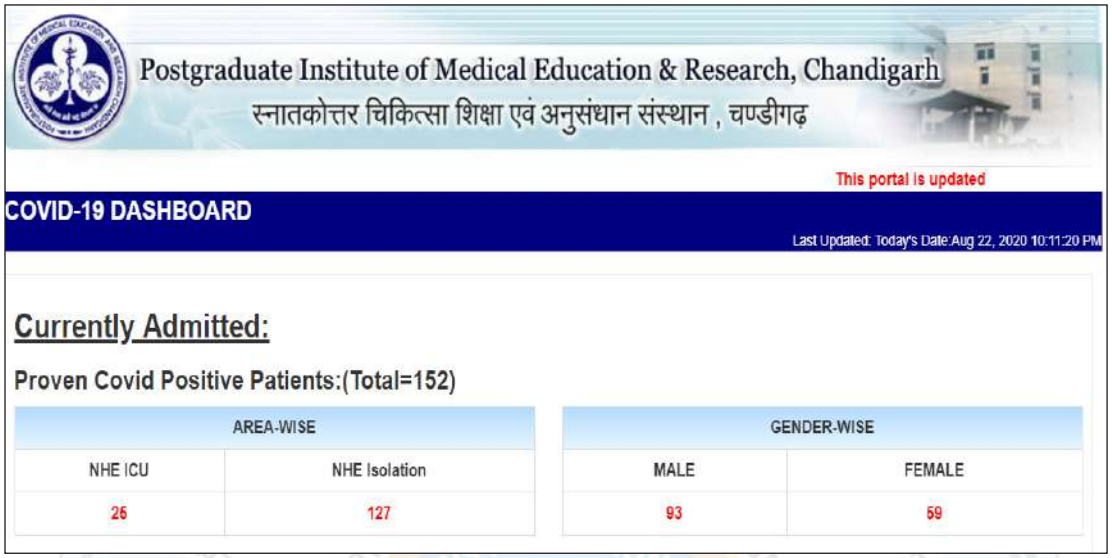
The Comic is based on dialogues between three kids and a superhero of the series, Vaayu - a global citizen who works for better public health and environment. The first part of the series explains simple terms like virus, the spread of virus, symptoms of the Coronavirus, steps for hand washing, importance of social distancing and other common dos and don'ts. The second part deals with more technical terms like quarantine, isolation, pandemic, lockdown, community transmission, vaccine development, surgical masks, PPEs and help lines for contacting in case of emergencies. The comic also removes fear from the minds of children by defining the mortality rate of the Coronavirus, etc.



Website link:
https://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/GlobalPages/JSP/seerecone.jsp?id=sp87&tableid=3

COVID-19 Dashboard developed by PGIMER, Chandigarh

Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh creates COVID-19 Dashboard which gives data on every day update of COVID-19 positive cases in specific territories.



Website link:
http://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/GlobalPages/JSP/covidDashboardyy.jsp

National Institutes of Technology (NITs)

Dr B R Ambedkar National Institute of Technology, Jalandhar releases Newsletter dedicated to COVID-19 initiatives

Dr B R Ambedkar National Institute of Technology, Jalandhar (NITJ) has released its monthly Newsletter from April to June, 2020 specially focused on COVID-19. In its Newsletter, NITJ emphasizes on few initiatives which was taken by NITJ like dispensing of free food, contribution to PM Care fund, devising and operation of shoe sanitization facility at the main entrance gate, development and distribution of low-cost indigenous hand sanitizers, low-cost facemasks, full-body PPE and development of service robot prototype, and chemical-free sanitization set-up. Additionally, TEQIP-III projects to the tune of ₹17 lakh have been sanctioned on the theme to combat the COVID-19 menace.

Website Link:
https://www.nitj.ac.in/nitj_files/links/Newsletter-April-June-2020_83515.pdf

Mission Fateh launched by NITJ to fight against COVID-19

In order to create awareness about the COVID-19, a month-long awareness drive has been initiated by Dr B R Ambedkar National Institute of Technology, Jalandhar (NITJ) with the support of Punjab Government. Under this drive, the state government creates awareness about eleven things emphasizing that the threat of the virus has not diminished, rather it has become more menacing. Mission Fateh symbolises the resolve of the people of Punjab to halt the spread of the Novel Coronavirus through discipline, cooperation and compassion: Discipline in observing all precautions, cooperation with the state government by faithfully abiding by the lockdown restrictions and compassion towards the poor by helping them and giving them aid. It is the true reflection of the Punjabi spirit that can overcome all odds to emerge victorious.

Website Link:
https://www.nitj.ac.in/nitj_files/News/MissionFateh-FightingCovid19_20063068883.pdf

National Institute of Technology (NIT), Durgapur Newsletter on COVID-19

National Institute of Technology (NIT), Durgapur in its newsletter, which is special issue on COVID-19, has compiled details of its ongoing and completed projects, list of publications, Published News and Blogs, Students' endeavours during lockdown, invited talks, Eminent Alumni Lectures and webinars organized on COVID-19.

Website Link:
https://admin.nitdgp.ac.in/files/newsfeed/2020/08/04/COVID_Special_Newsletter.pdf


National Institute of Technology Durgapur
NEWSLETTER: Special issue on COVID-19
Director's message:
COVID-19 Related Activities
I. Projects ongoing and completed

COVID-19-related technological Interventions by SVNIT Surat

During the challenging times of COVID-19, the Director of the Sardar Vallabhbhai National Institute of Technology (SVNIT) Dr Shailesh R Gandhi encouraged the students/research scholars of the institute to come forward and contribute in fighting against COVID-19. Students and faculty responded to this call and contributed in various ways. The brief descriptions of each intervention are described in this publication.

Website Link:
http://www.svnit.ac.in/Data/achievements/2020/COVID%202019.pdf

COVID-19 Bulletin by National Institute of Technology (NIT), Durgapur for public awareness

National Institute of Technology (NIT), Durgapur has released its COVID-19 bulletin, which has been created for public awareness about the coronavirus disease, its symptoms, treatment and prevention.

Website Link:
https://admin.nitdgp.ac.in/files/newsfeed/2020/08/18/COVID-19_Bulletin.pdf

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