



NATIONAL REAGENTS CONSORTIUM

Promoting high-quality, affordable and indigenous manufacture of reagents and diagnostic kits

“Test-Test-Test” emerged as a mantra quite early in the course of the pandemic. Naturally, stepping up production of commercially available COVID-19 testing kits and parallel development of better, rapid, point-of-care testing kits, were identified as immediate points of action. The ultimate goal being testing, followed by tracing and eventually isolating those infected. Shortage of diagnostic kits was recognized as a possible bottleneck as the pandemic progressed and the cause being a lack of supply of high-quality reagents required to manufacture these kits. Sudden rise in global demand; price and supply risk of imported products; and quality, capability and capacity issues of the local manufacturers; all could contribute to supply-chain obstruction.

Indigenous manufacturing of kit reagents and components, thus, emerged as an integral link in the value chain of diagnostic manufacturing. The office of PSA led the creation of public-private partnership models for a nation-wide capacity-building programme for diagnostics through Science and Technology city clusters at Bengaluru, Delhi, Hyderabad, and Pune.

The initiative to form the Reagent Consortium is led by the Hyderabad City Cluster (HCC). Academic partners - CSIR-CCMB (Centre for Cellular and Molecular Biology), supported by RICH (Research and Innovation Circle of Hyderabad), the nodal entity of HCC. Funding partners - Foundation for Innovative New Diagnostics (FIND), India, Bill and Melinda Gates Foundation (funded the pilot phase).

A target of 500,000 reactions for COVID-19 testing was set for the pilot phase of this programme, to be scaled up to enable production of 10M kits per month within about a year of beginning the programme. The programme will help expand India's R&D capabilities by making low-cost, high-quality reagents readily available with creation of a streamlined network of the entire value chain.

Guarding the Guardians

Mentored Laboratory Training for healthcare workers

The number of ICMR-designated private and public sector laboratories stands at [2360](#) who had conducted close to 200 million tests (while drafting this). As COVID-19 testing continues to be significant for continued surveillance of SARS-CoV2 spread, we need more professionals adequately trained to handle molecular biology tools, and maintain biosafety standards, essential while working with highly infectious diseases. Trained personnel are required for sample collection, transportation, testing, and reporting data. The **Mentored Laboratory Training for COVID-19 and Infectious Diseases** was, thus launched by the Foundation for Innovative New Diagnostics (FIND).

Partners: Tata Institute of Fundamental Research (TIFR), PanIIT Alumni Reach for India, and DBT-National Institute of Immunology (DBT-NII).

Enabled by the Office of the PSA, with support from the Bill & Melinda Gates Foundation, the training will be carried out through a hybridised online/offline module and will comprise five 'Workstreams'. These 'Workstreams' will include online training coursework, weekly mentoring workshops with regional and national experts across multiple associated functions, upskilling sessions at COVID-19 testing sites, pre-service training on basic molecular biology, and online query support from experts for troubleshooting. This integrated approach will help to create a skilled laboratory workforce that can carry out sustained, high-quality COVID-19 sample processing, testing, and reporting – without compromising the accuracy of the results or the biosafety of India's brave 'Corona Warriors'.



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

A major project was launched to indigenously manufacture bulk quantities of all reagents needed for RT-qPCR-based and other molecular methods of diagnostics of COVID-19 at lower costs. India scaled up testing rapidly and widely across its population. Considering the nature of the virus, its mode of transmission, the best way to check the spread of the infection, when a vaccine was still not available, was by testing a larger number of individuals and isolating the positive cases. In this context, there was an urgent need to scale up the production of RT-PCR and other molecular diagnostic testing kits in the country.

Academic partner: Bangalore Life Science Cluster (C-CAMP, DBT-InStem, NCBS)

Funding partner: Rockefeller Foundation

The project called Indigenisation of Diagnostics (InDx), anchored at Centre for Cellular and Molecular Platforms (CCAMP), aimed to build a robust supply-chain network of Indian MSMEs capable of producing reagents required in a testing kit as well as to manufacture them. The project involved identifying bottlenecks in the supply-chain network, short-falls in quality levels and gaps in the ability of these MSMEs to scale-up. The project would handhold MSMEs in meeting both quality and quantity such that the network would be able to put together a million indigenous kits a day. The project employs a dynamic digital supply-chain platform developed pro-bono by Tata Consultancy Services (TCS).

What did these partnerships achieve?

The Office of PSA initiated a consortium with academic and industry partners who came together to develop COVID-19 technologies uniquely tailored taking into account gaps in pandemic preparedness and response in India.

TEST! TEST! TEST! Development of COVID-19 Diagnostics

IIT Delhi & NCL Pune developing an ELISA-based assay for COVID-19 testing

IIT-Delhi and CSIR-NCL joined hands to develop a peptide-based, ELISA-based diagnostic, serological assay against COVID-19. The aim was also to create an economical, commercial process for manufacturing the antigens used in ELISA and home-based diagnostic kits to offer an effective, quick, robust, and affordable diagnostic solution for the COVID-19 outbreak. The resulting assay is expected to provide robust, quick, reliable and economical solution for mass testing of the novel coronavirus. This novel expression system will aid private sector companies to provide home-based detection kits economically.

Academic partner: IIT-Delhi; CSIR-NCL, Pune

Industry Partners: Wells Fargo, and United Way of Bengaluru

ICMR-approved probe-free RT-PCRs for diagnosis of COVID-19 developed at IIT Delhi

Researchers at Kusuma School of Biological Sciences (KSBS), IIT Delhi developed a SARS-CoV2 detection assay later approved by ICMR making IITD the first academic institute to have obtained ICMR approval for a real-time PCR-based diagnostic assay. This was the first probe-free assay for SARS-CoV2 detection approved by ICMR. The assay can be easily scaled up as it does not require fluorescent



probes. The team is targeting large-scale deployment of the kit at affordable prices with suitable industrial partners. The kit was also approved by DCGI and launched in July 2020.

Industry partners: Newtech Medical Devices

Asian Paints supports MyLab Discovery Solutions to stock emergency supply of COVID-19 testing kit – PathoDetect

Availability of indigenously developed SARS-CoV2 testing kits was important to conduct mass testing and create an emergency supply bank to meet any increase in requirement. MyLab Discovery Solutions' COVID-19 testing kit, named PathoDetect was developed for *in vitro* diagnostic real-time PCR assay for qualitative detection of the SARS-CoV2 RNA in respiratory specimens and sera. The kit offers universal detection of SARS-like coronaviruses and specific detection of SARS-CoV2. Each indigenously produced PathoDetect kit can test 100 patients at 1/4th the cost of an existing kit, thus significantly reducing the financial burden on the government. The kit is simple to use and can significantly expedite the testing process, as it provides results in just 3 hours, compared to the 7+ hours required for existing kits in the market.

Industry partner: Asian Paints Limited extended financial support to Mylab Discovery Solutions to manufacture and keep available an emergency stock of kits required to help in mass testing.

Portable Fluorescence Reader to enable PCR-based tests for COVID-19 diagnosis, supported by Infineon Technologies

Only a limited number of labs in the country are equipped with RT-PCR facilities. The goal of a project by IISc, Bengaluru was to develop assays and instrumentation that result in cheaper testing kits that do not require expensive set-ups. These involve the use of cheaper and widely available PCR thermal cyclers for the RNA amplification process, in combination with intercalating dyes for detection (instead of conventional dyes that use a probe and are very expensive), as well as the development of a reader that measures the resultant fluorescence emissions. Fluorescence readers were validated in diagnosing other diseases as part of previous research at IISc.

Industry partner: Infineon Technologies

IIT Madras gets support from Fluor India and Capgemini for mass production of COVID-19 testing kits

Fluor Daniel India Private Limited (Fluor India) has been providing comprehensive EPC services since 1995, combining global strength with local expertise. The Fluor Delhi office along with Capgemini, a global leader in consulting, technology services and digital transformation, funded the development and mass production of COVID-19 testing kits through an initiative of the Health Technology Incubator of IIT-Madras.

Industry partner: Fluor Daniel India Private Limited (Fluor India), Capgemini

IISc builds mobile diagnostic lab for COVID-19

As the pandemic spread to India's hinterlands which do not have access to advanced molecular diagnostic test capabilities, there was an urgent need to build and deploy safe and accurate testing capabilities at various locations. An end-to-end COVID-19 testing solution called Mobile Infection Testing and Reporting (MITR) Labs was developed by faculty members at the Indian Institute of Science (IISc), in collaboration with an IISc-incubated start-up ShanMukha Innovations ([read the coverage here](#)). An ambulance and two vans were donated for this purpose by industry partners. The interiors of these vehicles were equipped with instrumentation required to convert them into mobile labs. After



multiple iterations of the lab designs, workflows, SOPs and protocol with inputs from several experts within IISc and outside, the final version of the designs and protocol were approved by ICMR. Soon after the successful deployment of the first unit in Karnataka, the project aims to scale the solution within and beyond the state by engaging with central and state governments, NGOs and other partners.

Industry partner: Tata Motors, Collins Aerospace, and SBI Foundation

NCBS-TIFR and InStem, Bengaluru working on pooled sampling and compressed sensing of COVID-19

NCBS and DBT-InStem began SARS-CoV2 testing facilities in coordination with the state health authorities. Given the acute shortage of reagents for the manufacture and procurement of COVID-19 test kits, pooled samples testing and compressed sensing technology for COVID-19 was developed. The idea is to use smart pooling of samples to dramatically reduce the number of tests. In addition, a rapid, RNA-based, point-of-care screening technology is also being developed. The development of these technologies is a step closer towards enabling low-cost, mass testing critical for continued surveillance of the spread of SARS-CoV2 infection.

Industry partner: Punjab National Bank and Standard Chartered Global Business Service

Capgemini supports IISc for antibody testing for COVID-19

COVID-19 antibody-based, serological tests are designed to detect antibodies in a blood sample. Antibody or serological tests are relatively cheaper, faster and easier and can detect whether a person was infected with the virus in the past. Serological tests have been implemented to determine prevalence of SARS-CoV2 infection in a population. However, these tests can suffer from poor sensitivity and specificity, which can complicate interpretation of the data. Team at IISc developed two distinct variants of indirect ELISA tests to detect SARS-CoV-2-specific antibodies. The assay employs SARS-CoV-2 specific antigen or peptides for detection. This method can be used to understand seroprevalence in a country like India where PCR-based assays are not feasible for all. Read about the work [here](#).

Academic partners: Bangalore Medical College (BMC), St. John's Research Institute (SJRI), and Tata Center for Interdisciplinary Sciences (TCIS)

Industry partner: Capgemini Corporation India

Health technologies

IIT Kanpur – Nocca develops Invasive Ventilator with IoT-enabled features

An invasive ventilator is the most recommended type of ventilator for patients with Acute Respiratory Distress Syndrome (ARDS) thus making it more suitable for the COVID-19 patients requiring respiratory support. Nocca Robotics Pvt. Ltd's V110 is a modular, power-efficient, invasive ventilator that operates in a pressure-controlled mode and the IoT-enabled design allows multiple ventilators to be controlled remotely. The ventilator will be available at a fraction of the cost proposed by competitors across the world. The company received active support and guidance from IIT Kanpur. The ventilator has been designed in a way so that it can be manufactured at a large scale at multiple sites and meets all the essential specifications laid out by the Government of India. The product is currently at the compliance and pre-clinical testing stage. The project has been a brilliant union of the academia, start-up and hospital. This was possible with industry being the major component of all, binding everyone together.



Industry partners: ACT Grants (for prototype development and preclinical trials of the product), Ansys (The fund by Ansys has helped the product's initial research and development), Standard Chartered (project's initial product R&D), ICICI Securities (project's initial product R&D), Cummins India (supplying one of the most critical components in the ventilator – the flow sensors), Naukri.com (prototyping and compliance testing of the ventilator), AdorPowertron (mass manufacturing of the product)

IIT Madras students scale up production and donate face shields for frontline workers

Face shields offer protection to healthcare workers against possible transmission of droplets carrying virus particles. IIT-Madras students manufactured face shields using 3D printing, with a production rate of around 1,000 pieces per day. As the project gathered momentum and attracted more orders, the team shifted to 'Injection Moulding' technique, which enabled them to quadruple the production rate to around 4,000 pieces per day at a reduced cost with an improved design. The students have already delivered over 45,000 face shields to hospitals and police personnel in Chennai, Puducherry, Avadi and Cuddalore among other places. This was seen as a good replacement to the Hazmat Suit Helmets which most users felt were suffocating and did not allow smooth access to stethoscopes as well.

Industry partners: Cholamandalam MS General Insurance Company Ltd.

Venture Center develops simple and low-cost face shields

To safeguard the health of workers, staff and entrepreneurs at Entrepreneurship Development Center of Pune's Venture Center, CSIR-NCL, have designed and manufactured a simple and low-cost face shield, which provides a physical barrier between the workers and people they interact with, significantly minimizing their contact to the infection. The face shield comprises of a transparent clear polyester sheet that protects the face from any airborne fluid particles. The sheet is kept in place with the help of a headband and an elastic strap. The face shield design uses MDF and can be machined (instead of laser cutting), which makes the process simpler, cheaper and scalable. The designs are now available freely for download under a Creative Commons Attribution – Non-Commercial – ShareAlike 4.0 International Public License. So far, nearly 1 lakh face shields have been delivered to healthcare workers and police forces across the country.

Industry partners: Cummins India Foundation, Persistent Foundation & Kirloskar Brothers Ltd. Pune

IIT-Delhi developing infection-proof fabrics

Fabiosys Innovations Private Limited, a start-up incubated at IIT-Delhi had been working on developing infection-proof fabrics to prevent hospital-acquired infections (HAIs). The mission at Fabiosys is to make hospitals safer. The public healthcare facilities in developing countries like India have always been crowded. The fabric developed by Fabiosys kills around 99.9% of the pathogens in 1-2 hours. The team has developed an affordable novel textile processing technology which converts regular cotton fabrics into infection-proof fabrics. They take rolls of cotton fabrics and treat those with a set of their proprietary developed chemicals under a set of particular reaction conditions using the machinery already commonly available in textile industries. The fabric, after undergoing these processes, gains powerful antimicrobial functionality.

Industry partners: Huawei Telecommunications (I) Co. Pvt Ltd.

IIT-Madras start-ups' efforts to develop 'Portable Hospital Unit' funded by Wells Fargo

With a contagious disease such as COVID-19, it is essential to have smart health infrastructure to screen, contain and treat people. Unlike urban areas, rural areas do not have plenty of existing infrastructure that can be converted to hospitals. Also, it is difficult to construct buildings from scratch as the requirement is immediate. IIT Madras-incubated start-up, Modulus Housing has developed a



portable hospital unit that can be installed anywhere within two hours by four people. Called 'MediCAB,' it is a decentralised approach to detect, screen, identify, isolate and treat COVID-19 patients in their local communities through these portable microstructures. It is foldable and is composed of four zones – a doctor's room, an isolation room, a medical room/ ward and a twin-bed ICU, maintained at negative pressure. These modular cabins have already been sold to L&T, Tata Group, Shapoorji & Selco, and others.

Industry partners: Wells Fargo, L&T, Tata Group, Shapoorji & Selco.

IIT-Madras develops 'Doffing Units' for safe disposal of PPEs

It has become paramount to ensure the safety of the frontline healthcare workers treating the COVID-19 patients. A key aspect of this is facilitating the safe removal of their Personal Protective Equipment (PPE). 'Donning' is the procedure of assembling PPE on the healthcare providers and 'doffing' is the procedure for removal of PPE. An IIT-Madras project aims to design and enable rapid construction of a modular 'Doffing Unit' for the safe removal of PPE. This project was undertaken in collaboration with the Chengalpattu Medical College and Hospital (CMCH) in Tamil Nadu where the doffing unit has already been deployed. Such procedures will have to adhere to certain standard protocols to prevent further spread of infections. It is therefore essential to have donning and doffing units for PPEs in hospitals providing treatment for COVID-19 patients.

Industry partners: Tube Investments of India Limited (Murugappa Group) funds

Pune's Venture Center and BMek develop and donate infrared digital thermometers

The non-contact IR thermometer is designed and developed by BMek Tech LLP and Protoshop, Venture Center using readily available modules to provide safe and quick temperature measurement of the forehead for primary screening. The design is made available open source wherein the complete knowhow with mass manufacturing ready hardware and software design is available to manufacturers for free. This is an effort to enable a large number of manufacturers to make IR thermometers and cater to their local needs. The technical details of this device are available for copying under the Creative Commons–Noncommercial-share Alike License at: <http://www.protoshop.in/covid19/>

Industry partners: International Biotech Park Limited (IBPL), Pune; Bharat Electronics Ltd.

Cygni Energy, IIT-Madras to develop power backup system for ventilators

While the majority of COVID-19 cases result in mild symptoms, some progress to cause Acute Respiratory Distress Syndrome (ARDS), requiring mechanical ventilation. Reliable power backup for ventilators and isolation homes in B & C towns, where power availability is not reliable or at the remote locations which are off-grid has become essential. This will save substantially the need for diesel generators for powering such systems in the rural areas. With industry support, Cygni Energy, an IIT Madras start-up developed a power backup system for the ventilators. The power backup for ventilators will be targeted towards off-grid and weak-grid areas.

Industry partners: Infineon Technologies

IIT Jodhpur develops innovative face shield and sterilisation system for N95 masks

IIT Jodhpur developed an innovative face shield, now available in the market as a commercial product of M/s Iscon-Surgical Ltd, Jodhpur, and a few thousand units have been manufactured and sold. The Institute has also developed an advanced photocatalytic oxidation sterilization system based on UV-light and metal oxide nanoparticles catalyst to treat N95 filtering facemask respirators for reuse. The knowhow of the sterilisation system - has been transferred to seven firms Jaipur in May 2020.



Industry partners: Iscon-Surgicals Pvt Ltd, Jodhpur; Kamtech Associates Pvt Ltd, Jaipur; Chempharm Industries India Pvt Ltd, Sonipat; Parappadi Technologies (P) LTD, Trivandrum; Johri Digital Healthcare Ltd, Jodhpur; Mai Bharat Society, Jaipur; and Zintex Blue Ocean Pvt Ltd.

IIT Ropar develops negative pressure room, now developing negative pressure ambulance, isolation rooms & ICUs

IIT Ropar has signed a technology transfer agreement with an industry partner for manufacturing UV-C Sterilization Unit. The institute has also developed a design of a Negative Pressure Room (NPR) to prevent the transmission of SARS-CoV2 through air inside isolation wards and testing labs. This is important as transmission in closed spaces has resulted in more transmission, more infections. IIT Ropar is installing these low-cost, negative pressure cabins in COVID-19 wards of the medical centres in Rupnagar through CSR support. In addition, it is jointly developing the country's first negative pressure ambulance, isolation room, and ICU rooms (fully equipped with medical facilities) under an exclusive MoU. Researchers at the institute have also developed anti-microbial coatings for PPE kits and disinfectant spray in tunnels. This technology has received a lot of traction, and active technology transfer negotiations are underway.

Industry partners: Espee Industries, Ansys Inc., Bafna Healthcare Pvt Ltd.

IISc's Project *Praana* for novel ventilator design

IISc's Project *Praana* has developed a novel design to build an emergency electro-mechanical ventilator for COVID-19 patient care using components available indigenously. The ventilator will have the functionality, and safety standards of commercially available ventilators. The hardware framework is designed to immediately meet the key functionality requirements of an ICU-grade ventilator, while it can also support future add-on features available in advanced commercial ventilators. The main features of this project are the novel design for robust and safe operation, easy sourcing of components, rapid scaling up in terms of manufacturing and deployment of the product, and simple user interface. Though it is not a stop-gap solution or a 'low cost' ventilator, it is expected to be priced in the range of Rs. 1.5 to 2 lakh per unit, substantially lower than currently priced models in the Indian market. The project has successfully realised a full proof-of-concept for the new design on a benchtop experimental setup. Narayana Health, Bengaluru, provided medical testing equipment for verification of the ventilator performance. Read more about the ventilator and the people behind it [here](#).

Industry partners: SBI Foundation, Infineon Technologies India Pvt Ltd.

CSIR-National Aerospace Laboratories (NAL) develops PPEs and Hospital Assistive Devices

CSIR-NAL and MAF Clothing have jointly developed and certified polypropylene-spun laminated multi-layered non-woven fabric-based coverall to ensure safety of healthcare workers. The coverall made with indigenous material has gone through stringent testing at SITRA, Coimbatore and have been certified to ASTM F1670/ F1670M-08(2014) for use. After the technology transfer, they were manufactured and 65,000 PPE coverall supplied to HLL-Thiruvananthapuram and others. Additionally, CSIR-NAL has also developed BiPAP Non-Invasive ventilator, *SwasthVayu*, a microcontroller-based precise closed-loop adaptive control system with a built-in biocompatible 3D-printed manifold and coupler with HEPA filter (Highly Efficient Particulate Air Filter). These unique features help to alleviate the fear of the virus spread. It has features like Spontaneous, CPAP, timed, AUTO BIPAP modes with provision to connect Oxygen concentrator or Enrichment unit externally. The system has been certified for safety and performance by NABL-accredited agencies. The system has undergone stringent biomedical 31 tests and beta clinical trials at NAL Health Centre. The system is best suited for treating the mild and moderate COVID-19 patients. Prototypes are under clinical trials. Industries are ready to take-up manufacturing after clinical trials and orders to be received from hospitals.



Industry partners: Apollo Computing Laboratories Pvt Ltd, Hyderabad; Kavitul Technologies Pvt Ltd., Vadodra; Paras Defence & Space Technologies, Navi Mumbai; Datasol (B) Pvt Ltd., Bengaluru; Nfotec Digital Engineering Pvt Ltd., Bengaluru; and Unimech Aerospace & Manufacturing Pvt Ltd. Bengaluru.

IIT Delhi developing PPE kits customised for healthcare professionals

E-TEX, a start-up incubated at IIT-Delhi joined hands with PNB Housing Finance Limited (PNBHFL) towards its fight against COVID-19 by developing personal protective equipment (PPE) for healthcare professionals.

E-TEX will work to develop and deliver smart textile solutions for healthcare.

PNBHFL, a leader in the construction finance, will be contributing corporate social responsibility (CSR) funds towards this project. Read more [here](#).

Therapeutics

Development of a Novel Peptide Therapy against COVID-19

This project, being carried out at DBT Centre of Excellence for Biopharmaceutical Technology, IIT Delhi, is utilizing bioinformatics tools to design a novel peptide for blocking coronavirus. They are being supported in their endeavour by Kisankraft Limited.

Industry partner: Kisankraft Limited

NCBS and DBT-InStem working on repurposing FDA-approved drugs to treat COVID-19

A method to rapidly screen FDA-approved drugs that interfere with key steps of viral entry and processing is being developed at InStem, in collaboration with NCBS. These approaches will yield targets that will be tested in virus uptake in airway epithelial cells – the primary target of tissue of the SARS-CoV-2 virus. Since these drugs are already FDA approved, rapid and pilot clinical trials may be carried out by clinicians to test the efficacy of the same, based on these inputs. This pipeline will also be useful for drugs that are being simultaneously screened *in silico* by the Computational Biology group at NCBS. This project aims to greatly reduce the cost of treatment of COVID-19, helping boost health infrastructure at national and global scale.

Industry partner: Punjab National Bank

Public health measures

IIT Madras develops blockchain-based tracker technology for human-to-human transmission of contagious disease and renovation of healthcare infrastructure

The COVID-19 pandemic was very challenging for the developed world's healthcare system, an alarm for India to revamp its overall healthcare management system into one that is robust and delivers timely, quality healthcare. This can be possible by increased preparedness underlying the healthcare systems. IIT-Madras, in collaboration with the IT Firm Infosys has created 'BlockTrack'. This project leverages Blockchain, Internet of Things (IoT) and AI/ ML (Artificial Intelligence/Machine learning) to build an infrastructure for single-point records, interoperability, and track unwanted or new contagious diseases spreading in the population. The Blockchain-based solution seeks to maintain tamper-proof record of movements of target persons, and interoperability among health organizations (across geographical barriers). Here's listed the salient features of 'BlockTrack': i. Unique patient records for identification without duplication of data; ii. Interoperability across platforms and geographies; iii. Supply chain



management using tamper-proof Blockchain technologies; and iv. Tracking movement and gathering information around proximity (especially during the outbreak of new diseases).

Industry partner: Infosys Foundation

NCBS and JNCASR working on mathematical modelling of outbreaks

NCBS-TIFR and JNCASR are working on mathematical models of the COVID-19 spread, including agent-based models and course-gained epidemiological models. These will be matched to national level quantitative data on COVID-19 spread to provide recommendations on how to suppress the impact of future outbreaks. In addition, a team at NCBS is also working on an olfactory test for anosmia, which can identify clusters of potential COVID-19 and high-risk individuals. The global pandemic COVID-19 has reached unprecedented international spread and cases are still being reported. Institutes with cutting-edge capabilities like NCBS and DBT-InStem will have a significant impact in responding to this crisis. Read DST's coverage of this work [here](#).

Industry partners: Punjab National Bank (PNB), Azim Premji Foundation, Standard Chartered Global Business Service, Nuclear Power Corporation of India Limited (NPCIL)

NCBS and DBT-InStem work on disinfection technologies

Teams at DBT's InStem and NCBS are developing effective disinfecting technologies in light of its impact in containing the spread by SARS-CoV2. There was a need for a rapidly-deployable method for disinfectants capable of sterilizing surfaces to prevent fomite-led transmission during the early months of the pandemic. The teams developed a low-molecular-weight, quaternary ammonium salt (QAS) which can be attached to fabric by heating at 56°Celsius. This compound can be made at an industrial scale and a Hyderabad-based company expressed its interest to produce high quantities of the compound. The developed product was expected to provide an immense boost to the longevity of protective equipment in an extremely economical manner, rendering protective equipment more accessible and reusable.

Others:

Persistent Foundation supports TRAC study, a retrospective analysis for COVID-19

The Principal Scientific Adviser to the Government of India, Dr. VijayRaghavan, has constituted a [Task Force on Repurposing of Drugs for COVID19 \(TFORD-COVID-19\)](#). The advisory group of this task force has been reviewing evidence on repurposed drugs for use in India. After much deliberation it was felt that there is need to study the outcome of the therapeutic modalities in use currently, using a retrospective study design.

A protocol has been prepared and the Ethics Committee approval obtained. The study has been registered on the Indian Clinical Trial Registry (CTRI). This is a non-interventional study, and poses no risk to any patient or volunteer. Data collection will comply with international principles for protecting privacy and confidentiality. Data collected shall remain the property of the participating hospital, and the group will only use anonymized data for analysis.

<https://nclinnovations.org/covid19/wp-content/uploads/2020/07/TRAC-Study-Note-Website-2June2020.pdf>

Drone technology tapped for disinfection

The Office of the Principal Scientific Adviser (PSA), Government of India and Invest India, India's National Investment Promotion Agency have closely collaborated through the AGNli Mission and Invest India's Business Immunity Platform (BIP) to facilitate the use of specially designed drones to support COVID-19 disinfection in Varanasi. Using drones, disinfectant could be sprayed over large, crowded,



**Office of the Principal Scientific Adviser
to the Government of India**

vulnerable urban areas: protecting city-dwellers from COVID-19, while reducing human contact to keep frontline workers safe. Drone-as-a-service (DAAS) provider, Garuda Aerospace, a Chennai-based drone start-up, responded to Varanasi's disinfection drive. The team worked with Central, State, and Local government authorities across the country to get Garuda's technologies and personnel to these places, and help in disinfection.