COVID-19 BULLETIN

18 AUGUST 2020

- #CSIRFightsCovid19
- Corona Research Snapshot
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Compiled, Designed & Published by
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#CSIRFightsCovid19

Ever since the Coronavirus pandemic broke out, CSIR has mounted a strategic, well-coordinated and integrated approach towards mitigating the Coronavirus outbreak ranging from containing the spread of the virus by providing sanitisation and disinfection solutions to equipping the frontline workers and health warriors with protective gear, and from exploring repurposing of existing drugs to discovering new drugs and vaccines. Here are some major developments this week.

CSIR to Create Megalabs for Boosting COVID-19 Testing

CSIR-IGIB has generated data that demonstrated enhanced sensitivity compared to quantitative polymerase chain reaction (qPCR) test, with an overall 8-10 percent increase in diagnostic yield.

With more than 2.5 million cases of COVID-19, India has the third highest number of cases worldwide. Therefore, higher testing capacity is essential to mitigate the continued spread of the virus. CSIR-IGIB has assessed the ability of Illumina's COVIDSeq™ research assay for detection of SARS-CoV-2. COVIDSeq, a high-throughput next-generation sequencing based assay, typically generates results within 24 hours using the NovaSeq™ 6000 Sequencing System and is complimented with the highly accurate and ultra-rapid analysis performed using the COVIDSeq

Test installed on a local DRAGEN™ Bio-IT platform.

CSIR-IGIB has generated data that demonstrated enhanced sensitivity compared to quantitative polymerase chain reaction (qPCR) test, with an overall 8-10 percent increase in diagnostic yield. COVIDSeq confirms the presence of the virus in a symptomatic person while simultaneously sequencing its genome, providing valuable resources for tracking COVID-19.

The genomic coverage offered by COVIDSeq facilitates the genetic epidemiology and phylogenetic classification of isolates into lineages. This could provide insights into the introduction and emergence of the epidemic which are central to evidence-based approaches to disrupt the spread of the disease.

The completion of the COVIDSeq validation represents important progress in helping India combat and categorize this devastating disease," said Anurag Agarwal, Director at CSIR-Institute of Genomics and Integrative Biology. "Illumina's technology has the potential to greatly expand India's COVID-19 testing capacity and get us closer to controlling the outbreak."

Recycling PPEs

With the increasing use of Personal Protective Equipment (PPEs) to afford protection against COVID-19, it is feared that increasing plastic waste could be the next major problem arising in the aftermath of the coronavirus pandemic.

While CSIR has been contributing to developing PPEs, it has also been assessing the surge in plastic waste owing to single-use PPE kits and other plastics. Full-body PPE kits, face shields, and several components in the RT-PCR testing kits are made of plastic and have to be disposed of after single use for hygiene reasons. Standard protocol for managing biomedical waste dictates that it should be incinerated. But this poses a significant burden for the environment in view of the sheer quantity of such plastic now requiring disposal.

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Four CSIR institutes – the National Chemical Laboratory (NCL) Pune, Indian Institute of Petroleum (IIP), Dehradun, Central Mechanical Engineering Research Institute (CMERI) Durgapur, and Indian Institute of Toxicology Research (IITR), Lucknow – are pooling expertise to convert discarded PPE and other plastic waste arising during the pandemic into fuel or pellets that can be moulded into automobile parts or used for road construction.

The work on sanitising waste materials is already under way at the IIP and the CMERI to ensure the safety of all those involved in handling it. The waste will be shredded and then agglomerated into standardised plastic pellets. These pellets will be sent to the NCL, which has the technology to test their structural and chemical properties. Based on the properties of the pellets produced, the researchers will work with industry partners to decide their potential applications.

CSIR-IGIB Analyses Potential Impact of Genomic Variants in SARS-CoV-2 Genomes from India on Molecular Diagnostic Assays

Molecular detection of SARS-CoV-2 using reverse transcription polymerase chain reaction (RT-PCR) forms the mainstay in screening, diagnosis and epidemiology of COVID-19. The virus has been evolving through base substitutions.

The recent availability of genomes of SARS-CoV-2 isolates from different countries including India drove CSIR-IGIB to assess the presence and potential impact of variations in target sites for the oligonucleotide primers and probes used in molecular diagnosis. The CSIR-IGIB team catalogued a total of 132 primers or probes sequences from literature and the public domain. The analysis revealed a total of 125 unique genetic variants in 80 primers or probe binding sites. A total of 13 unique variants had allele frequency of ≥ 1% in Indian SARS-CoV-2 genomes mapped to the primers or probes binding sites. A total of 15 primers or probe binding sites had cumulative variant frequency of ≥ 1% in the SARS-CoV-2 genomes. These included primers or probe sites which are widely used in India and across the world for molecular diagnosis as well as approved by national and international agencies.

This highlights the need for sequencing genomes of emerging pathogens to make evidence based policies for development and approval of diagnostics. This is the most comprehensive analysis of genomic variants in genomes of SARS-CoV-2 isolates from India and their potential impact on efficacy of molecular diagnostics.

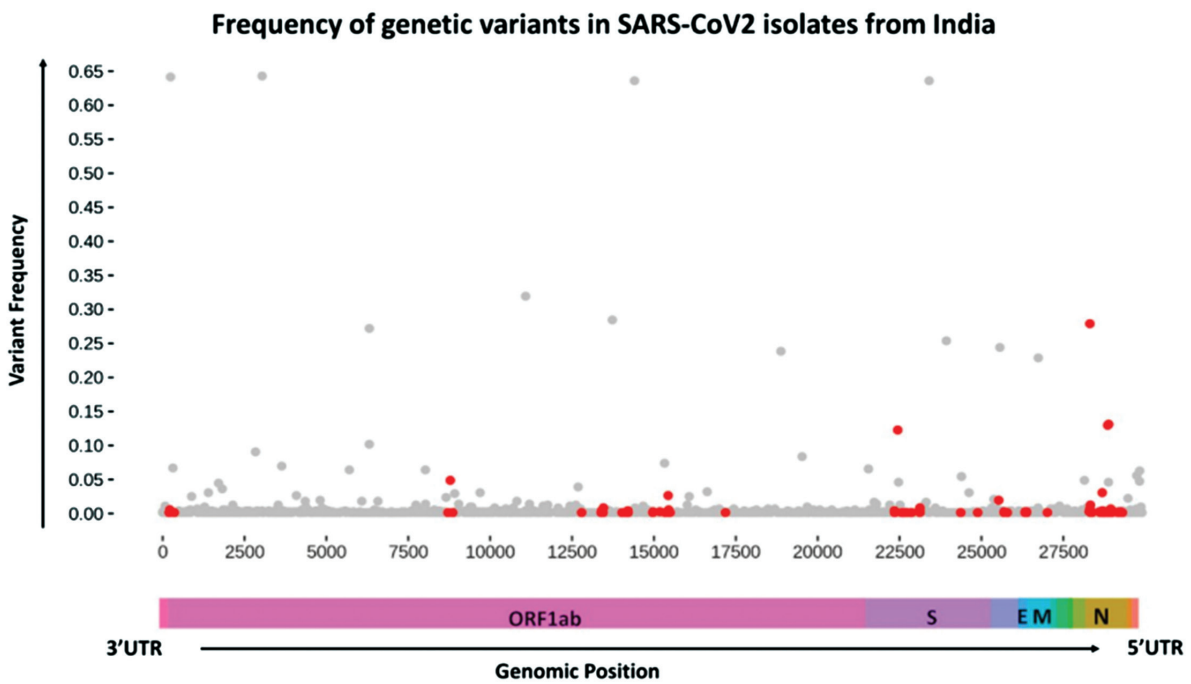


Figure : The frequency of genetic variants in SARS-CoV-2 isolates from India.
The variants mapping to oligonucleotide primer/probe sites are marked in red and others in grey. The panel at the bottom depicts the SARS-CoV-2 genome with genomic annotation.

CSIR Researchers Identify 73 Novel Variants of COVID-19 Strain in Odisha

Researchers from CSIR-Institute of Genomics and Integrative Biology (IGIB), New Delhi and Institute of Medical Sciences and SUM Hospital, Bhubaneswar have identified 73 novel variants of the COVID-19 strain in Odisha. The researchers say that knowledge of the detailed character of the novel coronavirus will provide insights into treating and curing patients.

The research team validated the most-advanced COVID-19 sequencing technology. This could be a potential high-sensitivity assay for the detection of SARS-CoV-2 with the additional advantage of enabling genetic epidemiology of SARS-CoV-2.

Besides, the study will help understand the vulnerability of the strains, new therapeutic targets and new mutations in eastern India, especially in Odisha.

COVID-19 Surveillance Based on T-Cells

CSIR-IICB is working on surveillance based on T-Cells against coronavirus in the population. T cells are grouped into two sub-types, CD4+, and CD8+ cells. CD4+ are helper T cells that help the activity of other immune cells by releasing cytokines. The cytokines prime the maturation of B cells, which become plasma cells and produce antibodies to neutralize the pathogen. CD8+ cytotoxic T cells, on the other hand, directly kill infected cells.

Once the adaptive immune system has vanquished the invader, a pool of long-lived memory T and B cells are made. These memory lymphocytes remain dormant until the next time they encounter the same pathogen. This time, though, they produce a much faster and stronger immune reaction. Memory is the key feature of the adaptive immune system, enabling long-term protection. Doing sero-surveillance using T-Cell will give further insight into the disease apart from ongoing antibody measurement. T-Cell surveillance will prepare the country to face another epidemic much better.

CSIR-CFTRI sets up COVID-19 Testing Laboratory

A COVID-19 testing laboratory was inaugurated on 10 August 2020. The lab was setup by CSIR-CFTRI at the Government Ayurveda Hi-tech Panchakarma Hospital at Brindavan Extension. The lab has a testing capacity of 100-200 samples per day.

CSIR-CIPLA Partnership in Nation Building

An Alliance of Science with Social Responsibility

D Shailaja[1] and Dr Shekhar C Mande[2]
[1] Head, Business Development, CSIR-IICT
[2] DG-CSIR & Secretary DSIR

The other day, while CIPLA Foundation (CF) and CSIR-Indian Institute of Chemical Technology (CSIR-IICT) joined hands to promote mask making among MSME's it brought back fond memories of association between the two great organizations, dating back to the genesis of both the organizations. The joint partnership between CIPLA and CSIR In the 1920's, when there was a growing need to promote publicly supported R&D in Science and Technology, it was Abdul Khwaja Hamied who proposed to start a Technical Research Institute. These efforts did not bear immediate success. However, Abdul Khwaja Hamied went on to start the Chemical, Industrial and Pharmaceutical Laboratories, now abbreviated and better known as CIPLA.

Hamied renewed his efforts to convince the British Government for public support to R&D, and was eventually successful when he joined hands with Arcot Ramaswamy Mudaliar and convinced the Government to start the Council of Scientific and Industrial Research (CSIR)[1]. Hamied then continued to guide CSIR in his capacity as the member of CSIR's Governing Body for next several years until his death in 1972.

Abdul Khwaja Hamied's son, Yusuf Hamied, later tied up with AV Rama Rao of CSIR to make AZT to make HIV drugs affordable. This made the price drop by six times, making it affordable[2]. Moreover, India was then requested to provide the drug to many sub-Saharan and African countries to provide the affordable drug manufactured by

> *CIPLA Foundation has agreed to partner with CSIR for mass production of the CSIR designed face masks under the project name "SAANS". The project addresses the issue of availability of scientifically validated, high quality, low cost face mask for community setup and free distribution of one lakh face masks to rural populace.*

CIPLA. Thus, the CSIR-CIPLA collaboration continued to bring glory to Indian S&T and Industry together.

The trusted partnership continued further with Dr S Chandrasekhar, in the year 2016 for the development of process know how on total synthesis of Eribulin, an approved drug for treatment of patients with metastatic breast cancer.

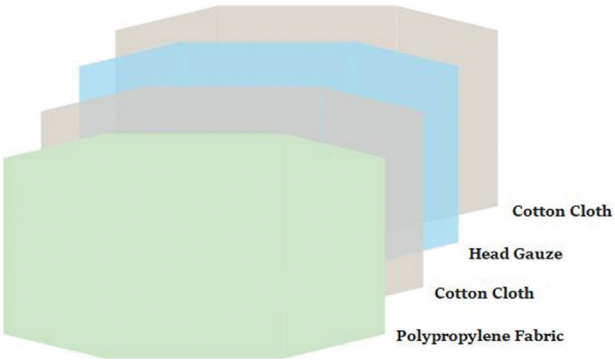
During the current unprecedented situation of challenging times with corona virus, CSIR swung in to action to fight the COVID by pursuing focused R&D on new & repurposed drugs, vaccines, diagnostics and hospital assisted devices. While, CSIR partnered with several industries in these efforts, CIPLA was one of the first to partner with CSIR to work on the repurposed drugs for treatment of COVID-19. Together they successfully launched the generic version of Favipiravir drug in the market known as CIPLENZA in July 2020 which has increased access to the drug.

Apart from carrying out R&D projects and developing technologies and products, CSIR has taken up an initiative to deploy the CSIR offerings under scientific social responsibility (SSR) in villages as the virus is spreading rapidly across the country. A new sustainable model of partnering with social entrepreneurs - start up's/ MSMEs, self-help groups and social/voluntary organizations - was conceived with a scope of income generation to the stakeholders and free distribution of the offerings to rural population for COVID mitigation.

CSIR was on the lookout for collaboration with interested corporate partners to execute the projects and pursue the common goal with complementing strengths under their corporate social responsibility (CSR) activity. CIPLA, through CIPLA Foundation, has supported the facemasks project as they have been shown to reduce the spread of COVID infection.

Realizing the need for a scientifically validated reusable, washable and affordable non-medical face mask, CSIR has come up with a novel design of four layered, high quality face mask with alternative coextruded polymer and cotton layers that renders antimicrobial and optimum barrier properties. The hydrophobic outermost layer provides 95-98% bacterial filtration efficiency[3] rejecting respiratory droplets of up to $\leq$0.3 micron size and the layers add a tortuous path of travel. Additionally, compliance to parameters such as breathability, reusability[4] (30 washings or 2-3 months), comfort, adequate fit and above all cost competitiveness were taken in to consideration while designing the mask.

CF has agreed to partner with CSIR for mass production of the CSIR designed face masks under the project name "SAANS". The project addresses the issue of availability of scientifically validated, high quality, low cost face mask for community setup and free distribution of one lakh face masks to rural populace particularly to the school children and the elderly in 5-6



mandals of rural parts of Telangana in phase I. A pack of two masks will be distributed to 50,000 people for personal protection from COVID up to 2 months with convenience of washings. CSIR & CF have expansion plans for "SAANS" project in phase II for further scale up through knowledge transfer to like-minded partners of CF located in different parts of the country for wider dissemination and reach-out of the project's benefits.

The generous support of CSR funding by CF as seed grant for execution of the SAANS project reflects the trust in the partnership. CSIR in turn shall provide the knowledge and depute expert scientists and help linking with respective state government departments as and when required for successful execution of the project. The unique multi-stakeholder collaborative approach will leverage the innovative and affordable technology-driven solution to safeguard lives, empower communities and improve quality of hygienic life in rural India for effective mitigation of COVID.

Thus, the CSIR-CIPLA collaboration continues in S&T and also towards fulfilling social responsibility. There is a need for more such Industry-R&D institute partnerships to catalyze socio-economic development in rural India and pave the path towards building an Aatmanirbhar Bharat.

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Source: https://covid19csir.urdip.res.in/blogs/

CSIR MEDIA COVERAGE

एनबीआरआई ने लॉन्च किया हर्बल सैनिटाइजर 'जर्मिविड'

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इंडिया साइंस वायर

नई दिल्ली, शनिवार,

अगस्त 08, 2020

का सिल 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 में 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।

STAR OF MYSORE

DC opens Lab set up by CSIR-CFTRI at Govt. Ayurveda Hi-tech Panchakarma Hospital on KRS Road

Mysore/Mysuru: The new CSIR-CFTRI **COVID Testing Laboratory**, which has been set up at the Government Ayurveda Hi-tech Panchakarma Hospital at Brindavan Extension on KRS Road was inaugurated by Deputy Commissioner (DC) Abhiram G. Sankar this morning.

Speaking after inaugurating the Lab, the fifth one in Mysuru District, the DC said that there was a need for a COVID Testing Lab locally and added that the new Lab would be helpful to test the samples and give the reports at the earliest as it would help in preventing the increasing COVID-related deaths in the district.

'Mega labs' to boost COVID-19 testing

CSIR plans to use advanced genome sequencing device

JACOB KOSHY
NEW DELHI

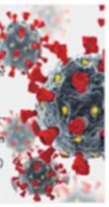
The Council of Scientific and Industrial Research (CSIR) is working on developing "mega labs" to ramp up testing for COVID-19 as well as improve the accuracy rate.

The labs will be repurposing large machines, called Next Generation Sequencing machines (NGS), which are normally used for sequencing human genomes, to sequence 1,500 to 3,000 viral genomes at a go to detect the SARS-CoV-2 virus.

Used optimally and with appropriate modifications, these machines can substantially detect the presence of the virus even in several instances where the traditional RT-PCR (reverse transcription polymerase chain reaction) tests fail.

Genome study | A look at how Next Generation Sequencing works

- Next Generation Sequencing (NGS) involves scanning the entire virus genome
- This can help identify more places where the SARS-CoV-2 virus differs from related viruses and can also help develop new diagnostic tests
- Two lineages of the virus, never seen before in Indian genomes, were also found
- The sensitivity (ability to confirm those who have virus as 'positive') of NGS was 97.53%



This is primarily because the RT-PCR test identifies the SARS-CoV-2 virus by exploring only specific sections, whereas the genome method can read a bigger chunk of virus genome and thereby provide more certainty that the virus in question is indeed the particular coronavirus of interest.

It can also trace the evolutionary history of the virus and track mutations more reliably. Unlike the RT-PCR that needs primers and probes – a key hurdle in operationalising such tests on a mass scale early on in the pandemic – the NGS only needs custom reagents.

Meanwhile, India's COVID-19 death toll reached 47,148 on Wednesday, with 948 new fatalities. The country now has the fourth highest death toll in the world, surpassing the U.K.'s figure of 46,791.

CONTINUED ON ▸ PAGE 8

THE HINDU

HEALTH

Coronavirus | CSIR moots 'mega labs' to boost COVID-19 testing

A health worker holds swab samples for COVID-19 Real-Time Polymerase Chain Reaction (RT-PCR) test, in Gurugram. | Photo Credit: PTI

Jacob Koshy

NEW DELHI: 12 AUGUST 2020 20:25 IST
UPDATED: 12 AUGUST 2020 22:51 IST

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Today's PPE kits could be tomorrow's roads, fuel — CSIR's plan to tackle Covid plastic surge

With Covid pandemic requiring single-use PPE kits and other plastics, there has been a surge in plastic waste. CSIR is looking at ways to reduce this waste and establish safety protocol.

MOHANA BASU

10 August, 2020

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CSIR-IICT strives for self-reliance in pharma sector

Department of Pharmaceuticals will come forward to support CSIR-IICT in developing and transferring indigenous technologies for some of these materials

By India Science Wire | Published: 10th Aug 2020 6:16 pm

Hyderabad: In the wake of the novel coronavirus outbreak, the pharmaceutical industries and the academic institutions are more eager than ever to collaborate. In an important development, Indian Institute of Chemical Technology (IICT) and Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers have joined

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Today's PPE kits could be tomorrow's roads, fuel — CSIR's plan to tackle Covid plastic surge

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MOHANA BASU 10 August, 2020 5:24 pm IST

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CORONA RESEARCH SNAPSHOT

Data shows similar COVID-19 spread pattern around the globe in initial phases

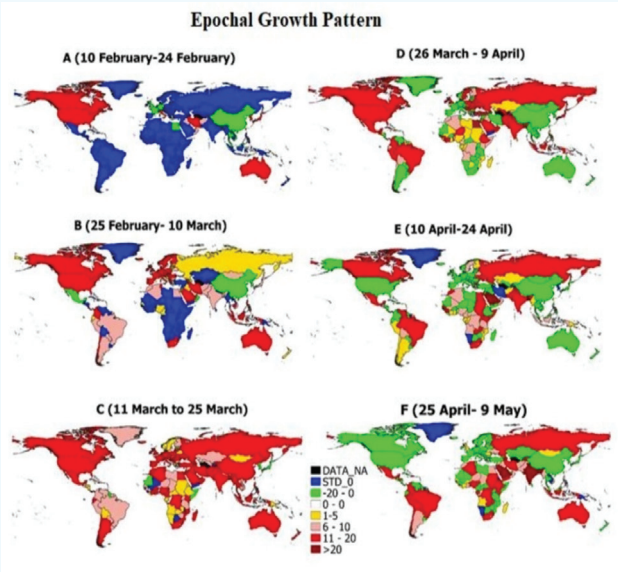
The emergence of SARS-CoV-2 has given rise to an unprecedented effort by the world scientific community to understand the various aspects of the epidemic. Most of the spread data studies either provide only local estimates, or are focused on clinical studies or are primarily concerned with presentation of primary data. A comprehensive multi-scale study of the spread and growth of the epidemic was lacking. The researchers of CSIR-National Institute of Science, Technology and Development Studies (NISTADS) and Institute of Frontier Science and Applications, Bengaluru examined if there exists some intrinsic dynamics in the epidemiology of COVID-19 which results in high spatial and temporal coherence in the spread and growth of the disease across the world.

Based on the results, it was concluded that COVID-19 has a strong intrinsic dynamic of time scale of about 40 days, which makes the epidemiology very similar across the world in spite of the regional variations in immunity, lifestyle and healthcare practices. The results provide further insight into the spatio-temporal coherence in the global structure of SARS-CoV-2 transmission and spread, and certain measure of relative roles of global *vs.* local transmission in its severity, and how effective control measures can be in specific contexts.

The results also provide an important evidence supporting effectiveness of social distancing and lockdown. An interesting and important feature of the spread of the disease is its spread like a global front of nearly uniform intensity or severity across the globe, especially in the early phases. This study is being considered as the first estimate of intrinsic dynamics of SARS-CoV-2 transmission and COVID-19 natural history based on a well-documented public domain global dataset on the epidemiology at both global and regional levels.

The resulting estimates provide important inputs for interpreting surveillance data, evaluating interventions, and setting public health policy. The study is published as a preprint in *The Lancet Infectious Diseases*.

Source: Preprint at *The Lancet Infectious Diseases*; DOI: 10.2139/ssrn.3618307; 2020



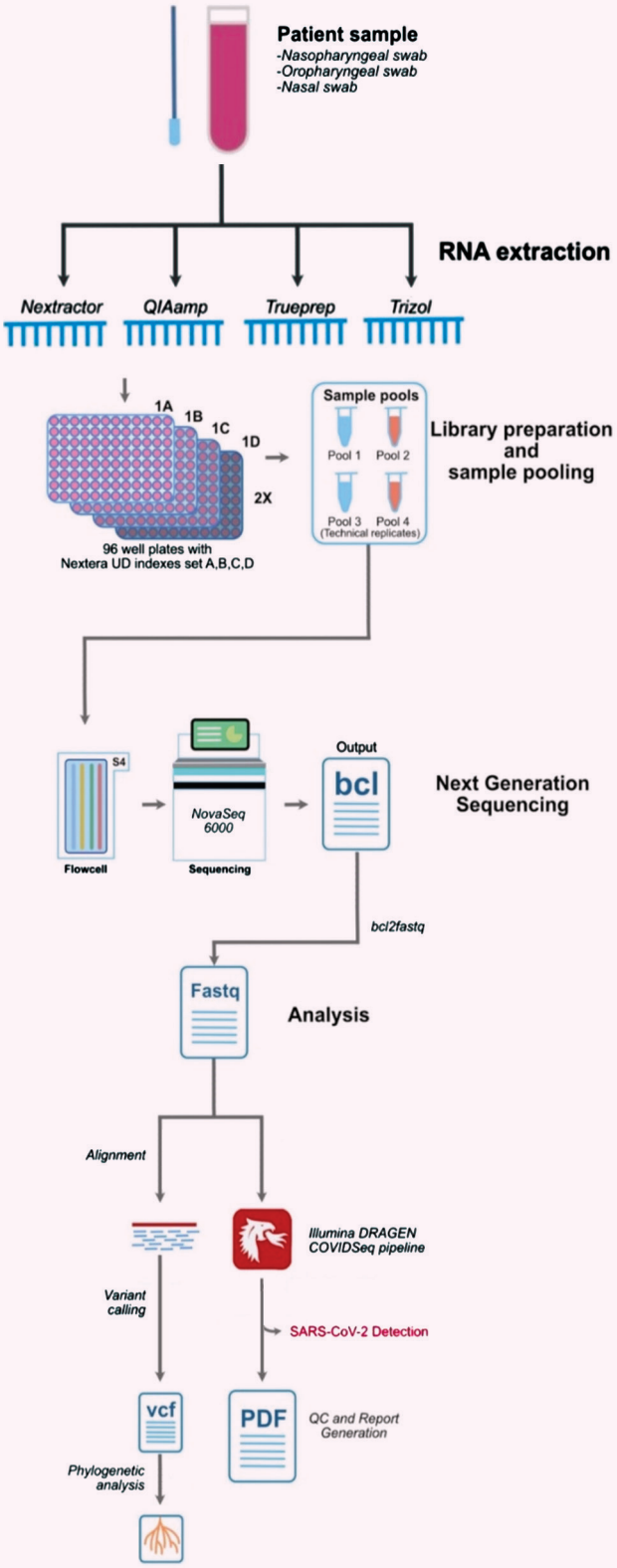
Normalized epochal (%) linear trends in daily new cases of COVID-19

Courtesy: Nishad et al. Preprint at The Lancet Infectious Diseases

COVIDSeq can provide high throughput detection and genetic epidemiology data

Researchers of CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB) have used COVIDSeq protocol involving multiplex-PCR and barcoding, sequencing of samples for high throughput detection of genetic epidemiology of SARS-CoV-2. The very high rates of COVID-19 spreading need high throughput methods for diagnosis, surveillance and genetic epidemiology. The researchers analysed 752 clinical samples in duplicates, and total of 1536 samples with the COVIDSeq process. These results were verified by the RT-PCR process. Further, the researchers found that the assay was capable of detecting SARS-CoV-2 in 21 samples and the 16 inconclusive and pan-sarbeco positive suggested that the COVIDSeq can also be utilized as a confirmatory test. In the epidemiological study, two lineages of SARS-CoV-2 B.1.112 and B.1.99 were found for the first time in India. Further, the study revealed 1,143 unique single nucleotide variants and added 73 novel variants observed for the first time. The researchers are claiming that this would be the first report of COVIDSeq approach for diagnosis and genetic epidemiology of novel coronavirus. The study is published as a preprint on bioXriv.

Source: Preprint at bioXriv;
DOI: 10.1101/2020.08.10.242677; 2020

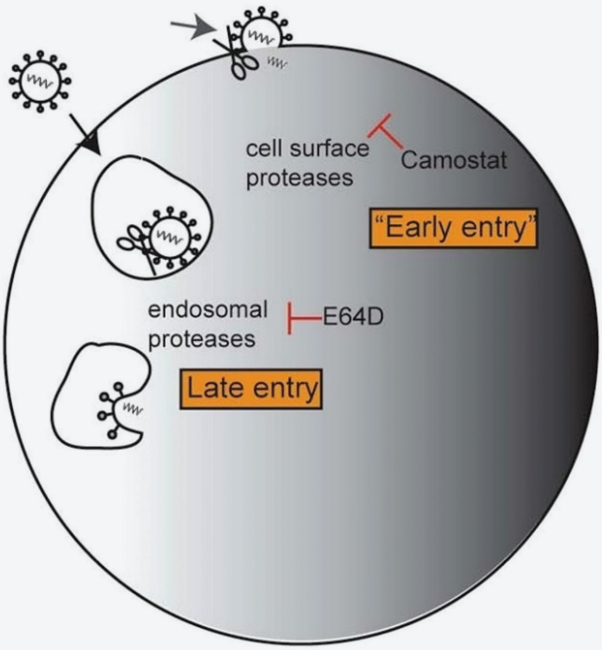


Schematic of the steps involved in the process.
(Courtesy: Bhoyar et al.; Preprint at bioXriv; DOI: 10.1101/2020.08.10.242677; 2020)

A protein produced by human immune system can inhibit COVID-19

A collaborative team of The Institute of Virology at University of Bern, Germany and Swiss Federal Food Safety and Veterinary Office, Switzerland and USA has found a protein produced by human immune system which is capable of inhibiting SARS-CoV-2. The protein named LY6E prevents the older generations of coronaviruses from infecting the cells. Earlier, it had been discovered that LY6E increases the infectivity of flu causing influenza viruses but later it was found that it also prevents coronavirus infection. The experiments were done on mice and the results were confirmed. The researchers are moving towards more advanced steps to develop therapy regarding this discovery. The results are recently published in the journal *Nature Microbiology*.

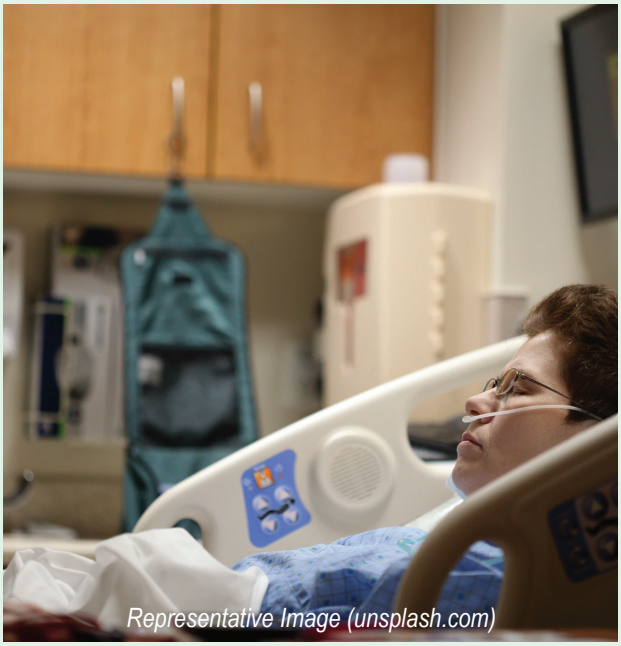
Source: Pfaender *et al.*; *Nature Microbiology*; DOI: 10.1038/s41564-020-0769-y; 2020)



Schematics of cell entry routes of CoVs and intervention by selected compounds.

(Figure Courtesy: Pfaender et al.; Nature Microbiology; DOI: 10.1038/s41564-020-0769-y; 2020)

A workable model for tackling obstetric challenges in low and middle income countries



Representative Image (unsplash.com)

In a collaborative effort, a team of researchers from Topiwala National Medical College & BYL Nair Charitable Hospital, Mumbai has proposed a workable model for providing a descriptive account of challenges and administrative preparedness for establishing and sustaining safe obstetric services in times of the COVID-19 pandemic. The model incorporates the international (WHO, RCOG, ACOG) and national (ICMR) recommendations and guidelines at an academic, tertiary care COVID-19 hospital in India. The researchers have provided the services to over 400 women and based on the data, a model has been established for the same. The researchers claim that the model can be useful to low and middle income countries. The details of the research are published in *International Journal of Gynaecology & Obstetrics* after peer review.

(Source: Mahajan *et al.*; *International Journal of Gynaecology & Obstetrics*; DOI: 10.1002/ijgo.13338; 2020)

Understanding intrinsically disordered proteins in SARS-CoV-2 can play a vital role in fighting COVID-19 pandemic

Researchers of the Indian Institute of Technology-Mandi (HP), in collaboration with Virginia Commonwealth University and the University of South Florida, USA have explored the viral proteome of SARS-CoV-2 called Intrinsically Disordered Protein Regions (IDPRs) using computational tools. After COVID-19 infection, the infected cells used to start producing toxic viral proteins leading to various clinical conditions or symptoms. Intrinsically disordered proteins of viruses are important because these proteins play very vital roles in various biological processes. Understanding the structures and functions of the intrinsically disordered viral proteins is important to know about the viral pathogenesis. The details of the results have been published in the journal *Cellular and Molecular Life Sciences*.

Source: *Cellular and Molecular Life Sciences*; DOI: 10.1007/s00018-020-03603-x; 2020

Genome architecture of SARS-CoV-2

(Figure Courtesy: Giri et al. Cellular and Molecular Life Sciences; DOI: 10.1007/s00018-020-03603-x; 2020)

CORONA INNOVATIONS

Hands-free door handle attachment to control COVID infection

Materialise, a global provider of 3D printing services, has released files for a 3D printed hands-free door handle attachment to control the coronavirus transmission. Door handles receive a lot of physical contact throughout the day, especially in public places such as offices and hospitals. This makes them a hotspot for microbes to get a ride on our palms and fingertips. The 3D printable add-on allows users to carry out the lever action required to pop open most modern doors using their elbows.

The file for the 3D printed hands-free door handle attachment is available to download for free. The assembly comes in two parts and will require four screws and four nuts to secure it. In this handle attachment palm and fingers are not but wrist is involved.

Source: https://3dprintingindustry.com

3D printed hand sanitizer holder

For those who have no choice but to touch door handles, an engineer specializing in surgical 3D printing in Saudi Arabia has designed a 3D printable wrist clasp to hold a bottle of sanitizer for easy access.

Engineer Moath Nabeel Abuaysha has developed this design to cleanse hands. The wrist attachment allows users to lather up their palms in antiseptic gel at a moment's notice without actually having to hold and potentially contaminate the bottle. It also acts as a constant reminder to practise proper hygiene at such a critical time.

Source: http://www.3dscanningservices.net

VIRAL RNA Extraction Kit for COVID-19 testing

PHASE Scientific, a biotech company, launched the PHASIFY VIRAL RNA Extraction Kit as part of its global effort to help detect and control the COVID-19. Because SARS-CoV-2 is a RNA virus, PHASIFY VIRAL kit is developed to purify and concentrateon the viral RNA in patient viral transport media samples. Conventional solid phase extraction technologies have performance limitations that result in poor sample quality. The concentration of SARS-CoV-2 RNA in patients' (especially early stage) samples is relatively low. It induces low PCR detection sensitivity, high false negatives occurrences and necessity for repeated confirmation testing.

PHASIFY VIRAL Kit concentrates target molecules by 10-100x, making them easier to detect. It can make any diagnostic test more affordable, faster, easier and more accurate. It's easy-to-use design requires no additional specialized equipment such as magnetic racks and vacuum pumps for operation.

Source: https://www.prnewswire.com

Quarantine booths to ease burden on hospitals

Winsun, an architectural 3D printing company based in China, has developed 3D printed quarantine booths. In Wuhan, the lack of hospital beds quickly became a pressing issue for the medical staff as the number of patients increased exponentially in the first few weeks of the spread.

Using solid urban construction waste, the company has fabricated small individual quarantine booths to distribute the stress on the hospital's facilities. The interiors of rooms are 3D printed and these booths have their own water and electricity supplies. According to Winsun, the printed walls are 3x stronger than traditional concrete walls. Originally, these small houses were intended for the tourism sector as they are easily deployable in any location. But in COVID situation, such construction eases the burden on hospitals.

Source: https://www.3dnatives.co

Kiosks — Foot-operated handwash

Image credit: Twitter

KSR Bengaluru Railway station of South Western has installed Kiosks which is a touch-free, foot-operated handwash capable of dispensing both water and soap. The Ministry of Railways tweeted saying "Our safety is in our hands!"

Contactless Android POS device

In response to COVID-19 crisis, Paytm has come up with the country's first pocket Android POS device for contactless ordering & payments and introduced 'Paytm All-in-One Portable Android Smart POS'. The ergonomic smart POS device weighs only 163 grams, 12 mm thick, and has a 4.5-inch touch screen. The device is integrated with a powerful processor, all-day battery life, and an inbuilt camera to scan QR codes and instantly process payments.

Source: blog.paytm.com

GoCo Bags

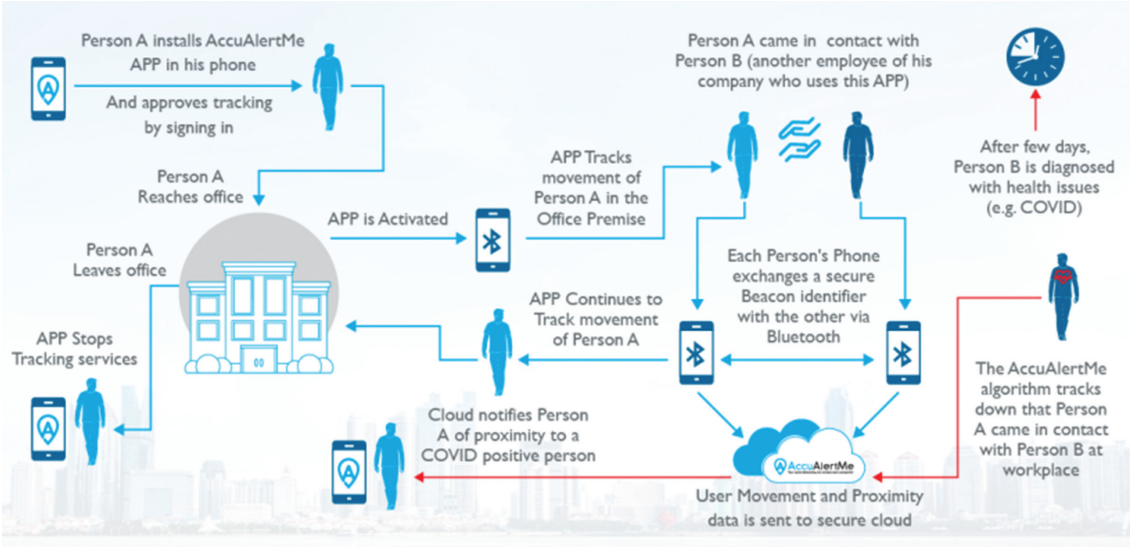
Delhi-based IoTfy startup has created Go Corona UVC Bags — GoCo bags, which are UVC & IoT (Internet of Things) powered disinfection bags. IoT & multifocal UVC LED enabled bag can be operated via mobile app without touching, using a button on the bag or the Android App. The bag is foldable, easy to carry and lightweight with reflective surfaces with a tray at the bottom for 360-degree disinfection of items kept in the bag within minutes.

Source: gocobags.com

AccuAlertMe — Contact alert system

Harman, a Samsung company has come up with a workplace tracking system — AccuAlertMe. AccuAlertMe is an employee movement tracking and secure contact tracing platform which offers a secure, scalable and comprehensive framework for safe return to work. AccuAlertMe records the employees' entry and exit information, movement coordinates, and proximity data while within the office premises, which in turn helps employees to comply with social distancing protocols.

Source: services.harman.com



Office of the Principal Scientific Adviser to the Government of India

in partnership with
Armed Forces Medical College

Building Positive Mental Health in Nine Simple Steps

Effective habits for a healthy life

Take simple steps every day to improve mental health and enhance well-being


Get Good Sleep


Exercise Regularly


Avoid Alcohol and Drugs


Practice Meditation


Connect Socially


Reduce Screen Time /Media Exposure


Learn New Skills


Eat Healthy

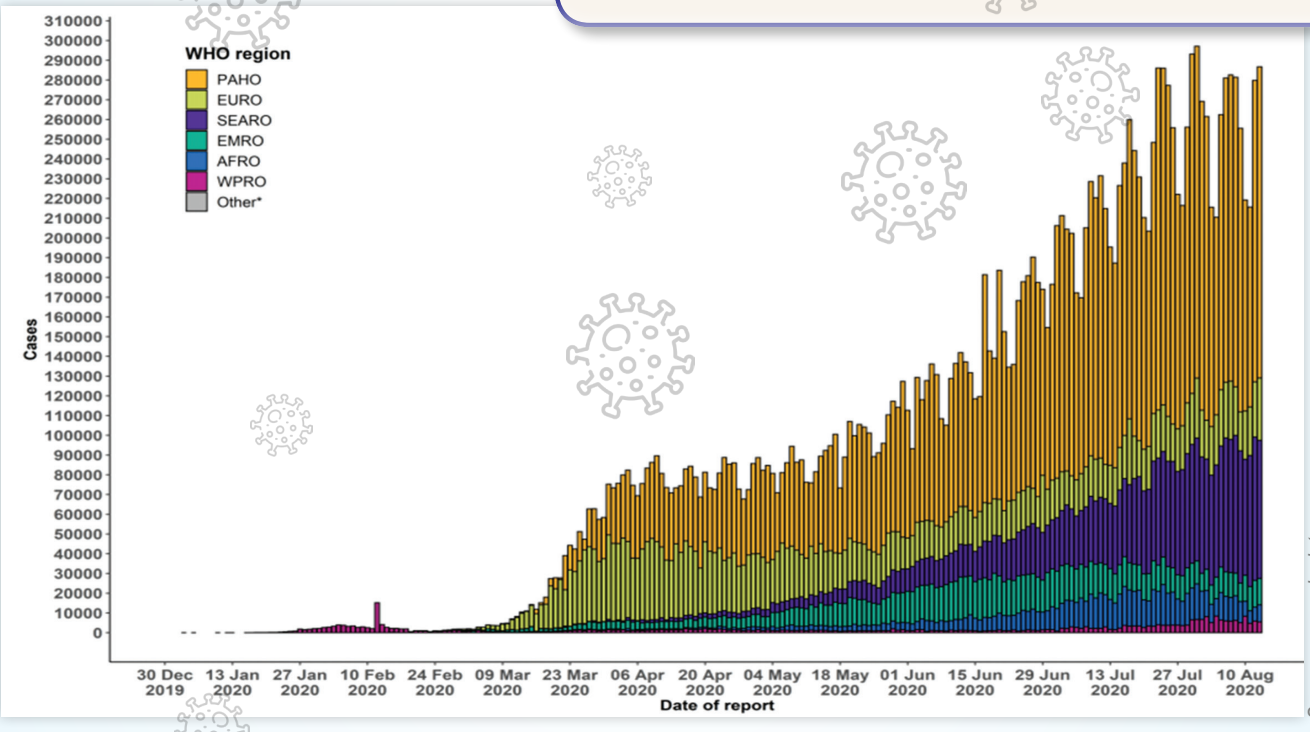

Connect with Nature

COVID-19 Dashboard

Global COVID-19 Cases and Deaths

(Data as of 14 August 2020)

	Worldwide
Total Confirmed Cases	20730456
New Cases	286710
Total Death	751154
Total New Death	6713



Source: www.who.int

INDIA

(Data as of 15 August 2020)

Total Cases	Active (26.45%)	Discharged (71.61%)	Deaths (1.94%)
25,26,192	6,68,220	18,08,936	49,036
65002 ↑	6625 ↑	57381 ↑	996 ↑

TOTAL SAMPLES TESTED UP TO AUGUST 15, 2020
2,85,63,095

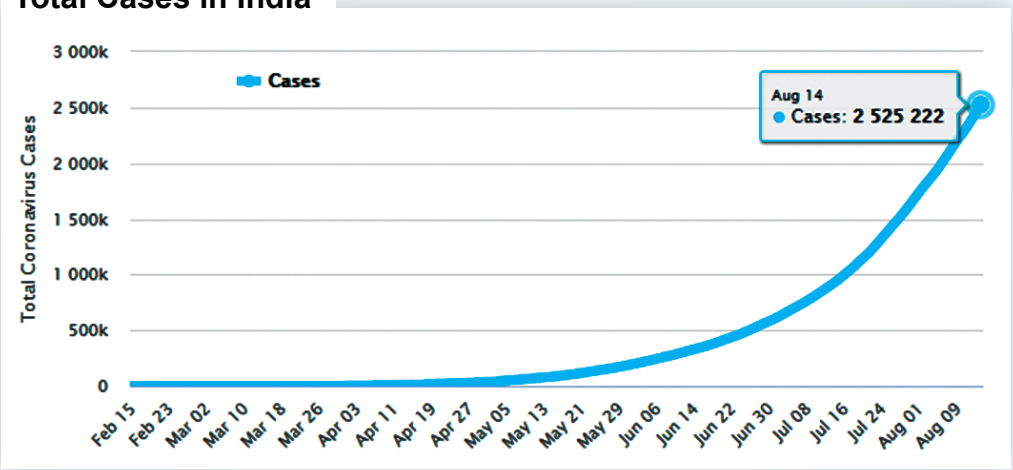
SAMPLES TESTED ON AUGUST 15, 2020
8,68,679

Source: www.mygov.in

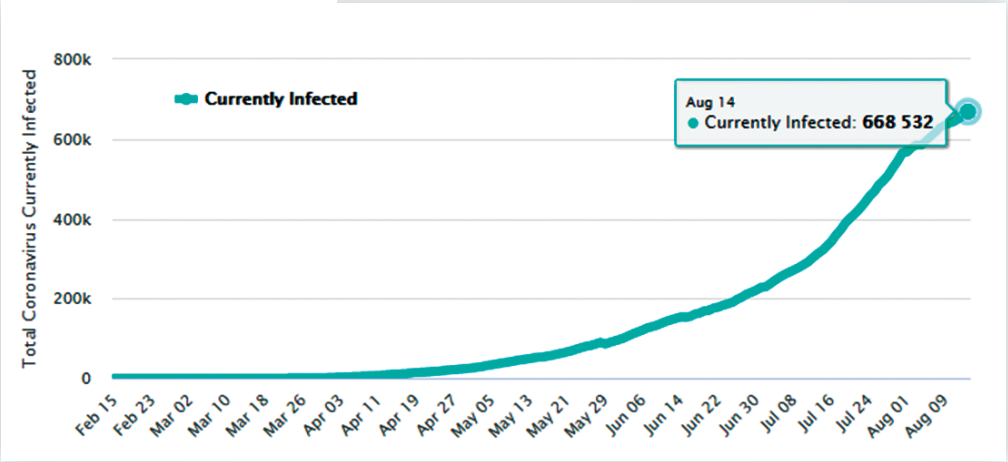
Graph
INDIA

(Data as of 15 August 2020)

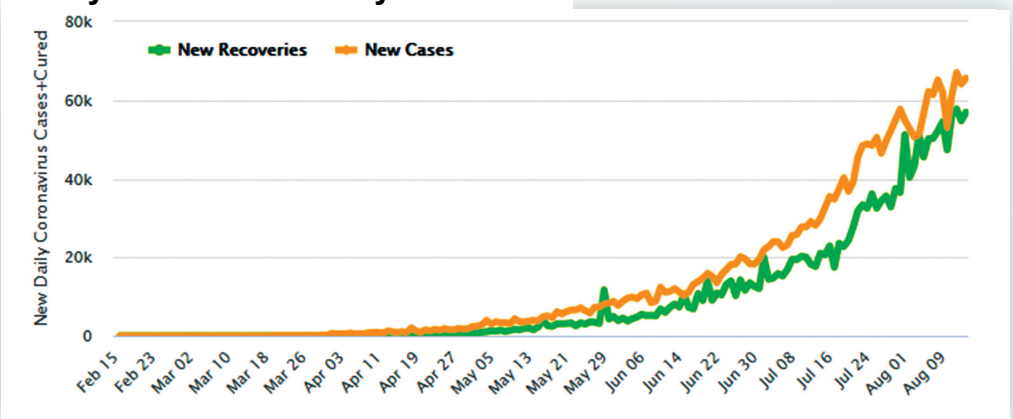
Total Cases in India



Active Cases in India



Newly Infected vs. Newly Recovered



Caring for Your Pets

The Centers for Disease Control and Prevention (CDC) reports that companion animals in the United States, including dogs and other pets, cannot contract or spread COVID-19. Also, the World Health Organization (WHO) says there's no evidence the virus has infected any dogs or cats. However, because animals and people can sometimes share diseases (called zoonotic diseases), the CDC recommends people who are sick or under medical attention for COVID-19 to limit contact with companion and other animals until more is known about the virus.

Here are some tips for making our pets part of our preparedness plan, too.

Tips for protecting your pet

The risk of a pet contracting coronavirus is low, but it's still smart to play it safe. If you have a dog that means you're most likely getting outside for regular walks and fresh air. There's probably a better chance that you're meeting your daily exercise requirements as well.

- Keep your dog on a leash and make sure they stay the recommended 6 feet from animals outside your household.
- Avoid the dog parks or other public places where crowds and animals tend to gather.
- Don't let other people pet your dog to maintain social distancing guidelines.

- Keep cats indoors as much as possible.
- Wear a mask that covers your nose and mouth when you go outside.
- Keep your children from areas that might have dog or cat feces.

Care for my pets if I am infected

- If you have been diagnosed with COVID-19, public health officials recommend you restrict contact with pets and other animals as a precaution until more information is known about the virus.
- Keep your cat indoors if possible to prevent them from interacting with other animals or people.
- Walk dogs on a leash, maintaining at least 6 feet (2 meters) distance from other people and animals, and avoid dog parks or trails.
- Ideally, have another member of your household care for your pets until you are feeling better.
- Just as you would quarantine yourself from the other human members of your home while sick, you should also quarantine yourself from your pets.
- Isolate yourself to a single bedroom/ bathroom and allow a healthy family member to handle your pet's meals, walks, playtime, and snuggle time.
- Petting, snuggling, being kissed or licked and sharing food is not recommended.
- If you are sick with COVID-19 and your pet becomes sick, do not take your pet to the veterinary clinic yourself.

Call your veterinarian and let them know you have been sick with COVID-19. Some veterinarians may offer telemedicine consultations or other plans for seeing sick pets. Your veterinarian can evaluate your pet and determine the next steps for your pet's treatment and care.

"Ideally, have another member of your household care for your pets until you are feeling better."

www.cdc.gov

Why pregnant women face special risks from COVID-19?

Pregnancy suppresses a woman's immune system to a certain extent — however, this does not mean pregnant women are more susceptible to contracting COVID-19 than women who are not pregnant. Rather, if they do become infected, they may have a greater risk of more severe respiratory complications. They also face a similar, higher risk with other conditions like the common cold or the flu.

The third trimester can be most concerning because of the physiologic changes that occur in all pregnancies. As the pregnancy advances and the uterus and fetus get bigger, the diaphragm is constricted and doesn't function as well. Therefore, respiratory illnesses such as COVID-19 can have a greater impact.

It's well known that pregnancy boosts the risk of serious disease from respiratory viral infections. Viral infections can be more severe in pregnant women in part because the entire immune system is geared toward making sure not to create any antifetal immune response. The mother has to compromise her own immune defense in order to preserve the baby's health. At the same time, the immune system is far from inactive in pregnancy, and the really significant immune response to the infection certainly has the potential to cause complications.

In addition, SARS-CoV-2 strikes the lungs and the cardiovascular system, which in pregnancy are already strained. As the uterus grows there is less and less room for the lungs. That's why pregnant women often feel short of breath. And that affects your pulmonary function. To supply the fetus, pregnant women also need extra oxygen and blood to ferry it, up to 50% more by late pregnancy. This may multiply the stress that COVID-19 has been shown to put on the cardiovascular system.

www.sciencemag.org

Why air pollution is linked to severe cases of COVID-19?

Studies are finding increased rates of COVID-19 in areas of high pollution exposure. A study out of Harvard recently found that someone living in an area of high-particulate pollution is actually 8% more likely to die from COVID than others living in

an area with just one small unit less pollution. This study and others have concluded that a small increase in long-term exposure to pollution causes larger increases in the COVID-19 death rate.

Air pollution can cause cellular damage and inflammation throughout the body and has been linked to higher rates of diseases, including cancer, heart disease, stroke, diabetes, asthma and other co-morbidities. All of these conditions also increase the risk of death in COVID-19 patients. PM stands for particulate matter and 2.5 is the size of the particle, which is measured in micons. For perspective, matter that is 2.5 microns is 1/30th the size of a human hair. Because it's so small, it can be inhaled deeply, go all the way to the base of the lungs, and then circulate into the bloodstream. From there it can travel throughout the body and cause widespread damage.

The goal is to find some type of mechanism that can block the impact of air pollution at the cellular level, so that when we're hit with things like COVID-19, hopefully, we're less susceptible to the severe complications of it.

www.scopeblog.stanford.edu

Can boosting interferons, the body's frontline virus fighters, beat COVID-19?

Interferons are molecular messengers that launch an immediate, intense local response when a virus invades a cell. They trigger production of myriad proteins that attack the virus at every stage of invasion and replication, and they alert uninfected neighboring cells to prepare their own defenses. Interferons also help recruit immune cells to the site of infection and activate them when they arrive.

But SARS-CoV-2, the virus that causes COVID-19, disables this defense by blocking the powerful interferons that lead it. Researchers studied SARS-CoV-2 infection in a range of models: human lung and bronchial cells, ferrets, lung tissue from deceased COVID-19 patients, and blood from living ones. In virtually every system, interferon is badly suppressed. As it shuts down interferons, the virus also ramps up production of chemokines, a different set of messenger molecules that summon distant immune cells and trigger inflammation. Findings reported in *Cell* in May (https://pubmed.ncbi.nlm.nih.gov/32416070/).

The University of Southampton and the company Synairgen conducted a randomized, controlled trial of an interferon in SARS-CoV-2 infection. They examined 101 patients hospitalized with COVID-19 and found that those who inhaled an experimental type one interferon made by Synairgen were 79% less likely to develop severe disease and more than twice as likely to reach full recovery after 28 days than the placebo patients. Both findings reached statistical significance. The results show that interferon-beta, a type one interferon already approved in injectable form to treat multiple sclerosis, has huge potential as an inhaled drug, countering the impact of SARS-CoV-2.

In another paper accepted at *Science (https://science.sciencemag.org/content/early/2020/07/10/science.abc6027)*, researchers looked at blood from 50 COVID-19 patients, finding strikingly depressed interferon activity and elevated chemokines in those whose disease

became severe and critical—but not in those who ended up with mild or moderate disease. Local viral replication, unchecked by interferons, gins up tissue-damaging inflammation, as do armies of immune cells summoned from afar. The result is the out-of-control inflammatory response that ends many lives.

www.sciencemag.org

How bats have outsmarted viruses, including coronaviruses, for 65 million years?

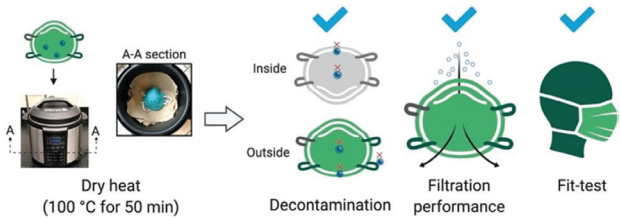
Although the SARS-CoV-2 virus has sickened more than 14 million people, bats contract similar viruses all the time without experiencing any known symptoms. Now, the newly sequenced genomes of six species spanning the bat family tree reveal how they've been outsmarting viruses for 65 million years. The findings are an "excellent starting point for understanding the superstar immune systems of bats," says Laurel Yohe, a postdoc at Yale University, who studies bat evolution and was not involved with the work.

The researchers compared the newly sequenced genomes with those of 42 other mammals, from manatees to people. They found that the bats' closest relatives aren't tree shrews, flying lemurs, or even mice (as has been proposed); instead, they formed their own group early on that may share a common ancestor with the mammals that eventually evolved into horses, pangolins, whales, and dogs.

Further analysis revealed bats have disabled at least 10 genes that other mammals use to mount inflammatory responses against infection. But they also have extra copies and modifications of antiviral genes that may explain their high tolerance for disease. Finally, their genome is littered with DNA pieces derived from past viral infections that got incorporated when the viral genomes were replicated.

www.sciencemag.org

Is there any way to sanitize the N95 masks so that they can be reused?



Chamteut Oh, *et. al, Environmental Science & Technology Letters, 2020.*
DOI: 10.1021/acs.estlett.0c00534

Researchers suggested that only 50 minutes of dry heat in an electric cooker can serve the purpose of decontaminating the masks while maintaining filtration and fit both. This approach could help the wearers to reuse the N95 respirator masks.

According to the study (DOI: 10.1021/acs.estlett.0c00534) published in the journal *Environmental Science and Technology Letters*, "dry heat decontamination generated by an electric cooker (e.g., rice cookers, instant pots, and ovens) could be an effective and accessible decontamination method for the safe reuse of N95 respirators. We recommend users measure the temperature during decontamination to ensure the respirator temperature can be maintained at 100 °C for 50 min".

How to improve ventilation in indoor places to prevent the spread of COVID-19?

Proper ventilation is among the most important precautions to be taken as it is believed that the virus can be transmitted via air also while we are speaking, coughing or sneezing. In the case of indoor places like home, office, etc., it becomes important to reduce the indoor spread of the virus which could be possible by proper air circulation.

Representational Photograph

WHO (World Health Organization) has suggested the following steps to improve the ventilation in indoor public places and these steps should be considered in consultation with heating, ventilation and air conditioning (HVAC) professional:

- Consider using natural ventilation, opening windows if possible and safe to do so.
- For mechanical systems, increase the percentage of outdoor air, using economizer modes of HVAC operations and potentially as high as 100%. Before increasing outdoor air percentage, verify compatibility with HVAC system capabilities for both temperature and humidity control as well as compatibility with outdoor/indoor air quality considerations.
- Increase total airflow supply to occupied spaces, if possible.
- Disable demand-control ventilation controls that reduce air supply based on temperature or occupancy.
- Consider running the HVAC system at maximum outside airflow for 2 hours before and after spaces are occupied.
- Generate clean-to-less-clean air movements by re-evaluating the positioning of supply and exhaust air diffusers and/or dampers and adjusting zone supply and exhaust flow rates to establish measurable pressure differentials.
- Have staff work in “clean” ventilation zones that do not include higher-risk areas such as visitor reception or exercise facilities (if open).
- Ensure exhaust fans in restroom facilities are functional and operating at full capacity when the building is occupied.

COVID-19 MYTH BUSTERS

MYTH

Indian immune systems are so exposed to germs, they're strong enough to protect against COVID-19

Herd immunity will protect people from COVID-19

Coronavirus dies instantly upon coming in contact with copper

FACT

Exposure to pathogens can provide some immune benefits – but not against the novel coronavirus. Evidence overwhelmingly suggests ongoing exposure to coronavirus doesn't build immunity, but erodes it; health workers at the frontlines of the pandemic are contracting COVID-19 at much faster rates than their age-group peers precisely because their immune systems have been worn down by overexposure to the virus.

Herd immunity is a phenomenon that occurs when so many members of a community have immunity against a pathogen that it diminishes to the point that even non-immune people are protected. Unfortunately, there's no evidence that catching and surviving the novel coronavirus leaves patients with immunity to it; in fact, many experts expect the virus to evolve, much like the flu virus does, so that even people who have had COVID-19 may still be vulnerable to repeat infection in the future.

This misconception stems from a study that found the coronavirus can survive for up to four hours on copper surfaces. That timeframe is much lower than the survival rate of the virus on plastic and stainless steel, where it can survive for up to three days, but the claim that the virus dies immediately upon coming in contact with copper is false.

MYTH ✗

FACT ✓

Blood type determines who contracts Covid-19

People with any blood type can contract COVID-19. One very small study suggests people with Type A blood might be more vulnerable to the coronavirus, but that doesn't mean all other blood types are safe, nor all people with Type A doomed.

Homeopathy can prevent, treat, and cure Covid-19

Homeopathy is not effective in preventing, treating or curing coronavirus infection. Systematic reviews of research have repeatedly found zero high-quality studies that speak to the philosophy's effectiveness in treating illnesses. Homeopathy does not ward off or kill viruses.

Vegetarian diets can protect against COVID-19

COVID-19 may have originated in an open-air meat market, but eating non-vegetarian food does not transmit the disease, or put one at a greater risk of getting infected. The virus spreads via contact with an infected person — inhaling droplets when they cough or sneeze or touching a surface where these droplets may have landed and then touching one's own mouth or nose. Proper handwashing, not touching our faces, and social distancing can offer protection against contracting the infection.

Keeping chopped onions in the room purifies the air and kills the coronavirus

Onions do not absorb bacteria or viruses when left in a room, and do nothing to reduce the risk of infections, according to Dr. Wong Jyh Eiin, Nutritional sciences senior lecturer and Council Member of the Nutrition Society of Malaysia. Further, consuming onion that has been exposed to room temperature for more than two hours can cause food-borne diseases due to contamination.

(https://theswaddle.com/)

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