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## Inside this Issue:



## Latest Updates in World

# Laboratory preparedness for SARS-CoV-2 testing in India: Harnessing a network of Virus Research & Diagnostic Laboratories

Coronaviruses (CoVs) are a group of enveloped viruses with non-segmented positive sense RNA belonging to the family Coronaviridae and the order Nidovirales. On the basis of phylogenetic clustering, they are classified into three different genera: alpha, beta and gamma. While alpha and beta types have mammalian hosts, gamma type CoVs have avian hosts. Alpha- and beta-CoVs are widely distributed in humans and other mammals including bats and cause mild respiratory infections1 . However, two beta coronaviruses causing severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) were responsible for widespread epidemics with a case fatality rate of 10 per cent for SARS2 and 35 per cent for MERS CoVs3 . The World Health Organization (WHO) reported cases of pneumonia of unknown aetiology in Wuhan city, Hubei province of People's Republic of China, on December 31, 20194 . On January 7, 2020, Chinese authorities officially announced that the illness was caused by a novel CoV. The WHO has named the disease as COVID-195 , and based on its similarity to SARS-CoV (2002-2003), the CoV Study Group of the International Committee on Taxonomy of Viruses (ICTV) has named the virus as SARS-CoV-26 . A viral genome sequence was released in public domain on January 10, 2020 (Wuhan-Hu-1, GenBank accession number MN9089477 ), followed by four other genomes deposited on January 12, in the viral sequence database curated by the Global Initiative on Sharing All Influenza Data (GISAID). The novel beta coronavirus shows 89 and 82 per cent nucleotide identity to bat CoV, CoVZXC21, and SARS-CoV (2002-2003), respectively8 . Since its emergence, the disease has rapidly spread to neighbouring provinces of China as well 53 other countries through international travel9 .

Infection is spread through droplets or prolonged contact with infected patients10. Virus isolate is the gold standard for establishment and standardization of assay performance. Since SARSCoV-2 virus isolate was not available earlier, based on the genetic sequence of SARS-CoV-2 and closely related SARS-CoV (2002-2003), the WHO shared protocols (E, N, RdRp and S genes) for screening and confirmation of probable cases11. Here, we briefly describe the efforts made by the Government of India (GoI) towards reducing the risk of emergence of COVID-19 in India. We also provide a detailed description of the role of a well-established countrywide network of Virus Research and Diagnostic Laboratories (VRDLs) which could be rapidly enabled to scale up testing capacity for SARS-CoV-2 in different parts of India

An outbreak of respiratory illness of unknown aetiology was reported from Hubei province of Wuhan, People's Republic of China, in December 2019. The outbreak was attributed to a novel coronavirus (CoV), named as severe acute respiratory syndrome (SARS)-CoV-2 and the disease as COVID-19. Within one month, cases were reported from 25 countries. In view of the novel viral strain with reported high morbidity, establishing early countrywide diagnosis to detect imported cases became critical. Here we describe the role of a countrywide network of VRDLs in early diagnosis of COVID-19.

**Methods:** The Indian Council of Medical Research (ICMR)-National Institute of Virology (NIV), Pune, established screening as well as confirmatory assays for SARS-CoV-2. A total of 13 VRDLs were providedwith the E gene screening real-time reverse transcription-polymerase chain reaction (rRT-PCR) assay. VRDLs were selected on the basis of their presence near an international airport/seaport and their past performance. The case definition for testing included all individuals with travel history to Wuhan and symptomatic individuals with travel history to other parts of China. This was later expanded to include symptomatic individuals returning from Singapore, Japan, Hong Kong, Thailand and South Korea.

**Results:** Within a week of standardization of the test at NIV, all VRDLs could initiate testing for SARS-CoV-2. Till February 29, 2020, a total of 2,913 samples were tested. This included both 654 individuals quarantined in the two camps and others fitting within the case definition. The quarantined individuals were tested twice - at days 0 and 14. All tested negative on both occasions. Only three individuals belonging to different districts in Kerala were found to be positive. Interpretation & conclusions: Sudden emergence of SARS-CoV-2 and its potential to cause a pandemic posed an unsurmountable challenge to the public health system of India. However, concerted efforts of various arms of the Government of India resulted in a well-coordinated action at each level. India has successfully demonstrated its ability to establish quick diagnosis of SARS-CoV-2 at NIV, Pune, and the testing VRDLs.

Source: http://www.ijmr.org.in/temp/IndianJMedRes000-1553019_041850.pdf

## ***Latest Updates in SRMS***

As we all know that the world grapples with Covid -19 pandemic and after the prime Minister of India announced the 21day lockdown .Shri Ram Murti Smarak Trust has started distributing 600 Boxes of prepared food daily in this lock down period and establishing Rahat Camp from 26.03.2020.

Also SRMS Trust decides to distribute raw material to cook food for 1000 families of homeless people which are mainly factory worker ,construction labour and daily wager whose earning have dried up because of total shutdown.

## ***Student Arena***

## ***Corporates Against Coronavirus***

As the world is facing the Covid-19 pandemic (caused by Coronavirus) and all the countries have come together to fight against it. Unfortunately because of it, the condition of the countries' economy and healthcare system are not sufficient enough to stand against the it.Many of the people including the common men, actors, politicians and businessmen have come forward to help the nations with their money, knowledge or power to stand through the crisis.
Some of the renowned companies are also contributing to help by making the essential equipments such as masks and fulfilling other healthcare needs going against their field of expertise. Following is some summarised information about some of the world class companies helping in saving lives :
In UK, the initiative is taken by some companies which include Ford, Airbus and McLaren, which are assisting two domestic manufacturers in ramping up production of existing machines by sourcing parts and assembling components as well as helping withtesting and training. One of those ventilators is a lightweight portable machine from Smiths Group that normally costs around £5,000 each and is typically found in ambulances.

The consortium is also working on a modified version of a design by Penlon, an Oxfordshire-based company that makes anaesthesia machines for operating theatres. Other initiatives, include the supply of "non-invasive" breathing aids for patients with less severe symptoms, which can reduce the need to put patients completely on ventilators.Continuous positive airway pressure (CPAP) machines are design developed by University College London, medics at University College London Hospital and the Mercedes Formula One engine maker has been approved by regulators.Tesla CEO Elon Musk announced that the electric car company had bought hundreds of ventilators from China and shipped to the US. Musk said that the company's factory in Buffalo, New York, will open "as soon as humanly possible" to produce more ventilators there.Dyson, the company known for its vacuums, said it has received an emergency order from the United

Kingdom for 10,000 ventilators, according to CNN. The company has already designed a new ventilator and plans on creating an additional 5,000 to donate internationally .This new device can be manufacturedquickly, efficiently, and at volumeApple CEO Tim Cook said that we've been able to source 10M masks for the US and millions more for the hardest hit regions in Europe.Ford, GE, and 3M are partnering to build ventilators and protective equipment.
Inditex, owner of the retail store Zara, announced that it will donate masks to coronavirus patients and health officials in Spain.The maker of Absolut Vodka and Jameson Irish Whiskey said it is converting facilities to produce hand sanitizer at all its US distilleries.In France, Luxury conglomerate LVMH, the parent company of Louis Vuitton, turned its perfume factories into hand sanitizer manufacturers.Fashion designers Brandon Maxwell and Christian Siriano are using their staff to make personal protective equipment like face mask and glows.Unilever will donate soap and sanitizer to the world economic forum's emergency task force.Prudential donated over 150,000 N95 respirators and face mask. Prudential Financial has donated 153,000 face masks including 75,000 N95 respirators for the healthcare workers in New Jersey according to a press release. Company has also committed $1.5 million in funding for local business and community support, both in the us and internationally.

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## ***DevOps***

DevOps is a set of practices that automates the processes between software development and IT teams, in order that they can build, test, and release software faster and more reliably. The concept of DevOps is founded on building a culture of collaboration between teams that historically functioned in relative siloes. The promised benefits include increased trust, faster software releases, ability to solve critical issues quickly, and better manage unplanned work.
At Atlassian, DevOps is the next most famous portmanteau (combining of two words) next to Brangelina (Brad Pitt and Angelina Jolie), bringing together the best of software development and IT operations. And like our jokes, it requires some explaining. At its essence, DevOps is a culture, a movement, a philosophy.

### Who's doing DevOps?

Chef is the company behind the Chef Automate platform for DevOps workflows. Tens of thousands of developers use Chef to test, automate, and manage infrastructure. At the forefront of the DevOps evolution, the Seattle-based company has been releasing products like Chef, InSpec, Habitat, and Chef Automate to advance new ways of developing and shipping software and applications. To experiment with and refine its own DevOps practices, Chef relies on the Atlassian platform.

History of DevOps
The DevOps movement started to coalesce some time between 2007 and 2008, when IT operations and software development communities got vocal about what they felt was a fatal level of dysfunction in the industry.
They railed against the traditional software development model, which called for those who write the code to be organizationally and functionally apart from those who deploy and support that code.

Developers and IT/Ops professionals had separate (and often competing) objectives, separate department leadership, separate key performance indicators by which they were judged, and often worked on separate floors or even separate buildings. The result was siloed teams concerned only with their own fiefdoms, long hours, botched releases, and unhappy customers.Surely there's a better way, they said. So the two communities got together and started talking – with people like Patrick Dubois, Gene Kim, and John Willis driving the conversation.What began in online forums and local meet-ups is now a major theme in the software zeitgeist, which is probably what brought you here! You and your team are feeling the pain caused by siloed teams and broken lines of communication within your company.

You're using agile methodologies for planning and development, but still struggling to get that code out the door without a bunch of drama. You've heard a few things about DevOps and the seemingly magical effect it can have on teams and think "I want some of that magic."

The bad news is that DevOps isn't magic, and transformations don't happen overnight. The good news is that you don't have to wait for upper management to roll out a large-scale initiative. By understanding the value of DevOps and making small, incremental changes, your team can embark on the DevOps journey right away. Let's look at each of these benefits in detail.
Infrastructure as code allowed us to perform 10x more builds without adding a single person to our team.

### What's in it for you?

#### Collaboration and trust

Culture is the #1 success factor in DevOps. Building a culture of shared responsibility, transparency and faster feedback is the foundation of every high performing DevOps team.Teams that work in siloes often don't adhere to the 'systems thinking' of DevOps. 'Systems thinking' is being aware of how your actions not only affect your team, but all the other teams involved in the release process. Lack of visibility and shared goals means lack of dependency planning, misaligned priorities, finger pointing, and 'not our problem' mentality, resulting in slower velocity and substandard quality. DevOps is that change in mindset of looking at the development process holistically and breaking down the barrier between Dev and Ops.

#### Release faster and work smarter

Speed is everything. Teams that practice DevOps release more frequently, with higher quality and stability.Lack of automated test and review cycles block the release to production and poor incident response time kills velocity and team confidence. Disparate tools and processes increase

OPEX, lead to context switching, and slow down momentum. Through automation and standardized tools and processes, teams can increase productivity and release more frequently with fewer hiccups.

**Accelerate time to resolution**

The team with the fastest feedback loop is the team that thrives. Full transparency and seamless communication enable DevOps teams to minimize downtime and resolve issues faster than ever before.If critical issues aren't resolved quickly, customer satisfaction tanks. Key issues slip through the cracks in the absence of open communication, resulting in increased tension and frustration among teams. Open communication helps Dev and Ops teams swarm on issues, fix incidents, and unblock the release pipeline faster.

**Better manage unplanned work**

Unplanned work is a reality that every team faces–a reality that most often impacts team productivity. With established processes and clear prioritization, the Dev and Ops teams can better manage unplanned work while continuing to focus on planned work.Transitioning and prioritizing unplanned work across different teams and systems is inefficient and distracts from work at hand. However, through raised visibility and proactive retrospection, teams can better anticipate and share unplanned work.

AutomationInvesting in automation eliminates repetitive manual work, yields repeatable processes, and creates reliable systems.Build, test, deploy, and provisioning automation are typical starting points for teams who don't have them in place already. And hey: what better reason for developers, testers, and operators to work together than building systems to benefit everyone?

Teams new to automation usually start with continuous delivery: the practice of running each code change through a gauntlet of automated tests, often facilitated by cloud-based infrastructure, then packaging up successful builds and promoting them up toward production using automated deploys. As you might guess, continuous delivery is not a quick and easy thing to set up, but the return on investment is well worth it.

Why? Computers execute tests more rigorously and faithfully than humans. These tests catch bugs and security flaws sooner, allowing developers to fix them more easily. And the automated deploys alert IT/Ops to server "drift" between environments, which reduces or eliminates surprises when it's time to release.

Another of DevOps' major contributions is the idea of "configuration as code." Developers strive to create modular, composable applications because they are more reliable and maintainable. That same thinking can be extended to the infrastructure that hosts them, whether it lives in the cloud or on the company's own network.

True, systems are always changing. But we can create a facade of immutability by using code for provisioning so that re-provisioning a compromised server becomes faster than repairing it – not to mention more reliable. It reduces risk, too. Both development and operations can incorporate new languages or technologies via the provisioning code, and share the updates with each other. Compatibility issues become immediately apparent, instead of manifesting in the middle of a release.

"Configuration as code" and "continuous delivery" aren't the only types of automation seen in the DevOps world, but they're worth special mention because they help break down the wall between development and operations. And when DevOps uses automated deploys to send thoroughly tested code to identically provisioned environments, "Works on my machine!" becomes irrelevant.When we hear "lean" in the context of software, we usually think about eliminating low-value activities and moving quickly – being scrappy, being agile. Even more relevant for DevOps are the concepts of continuous improvement and embracing failure.

A DevOps mindset sees opportunities for continuous improvement everywhere. Some are obvious, like holding regular retrospectives so your team's processes can improve. Others are subtle, like A/B testing different on-boarding approaches for new users of your product.

We have agile development to thank for making continuous improvement a mainstream idea. Early adopters of the agile methodology proved that a simple product in the hands of customers today is more valuable than a perfect product in the hands of customers six months from now. If the product is improved continuously, customers will stick around.

And guess what: failure is inevitable. So you might as well set up your team to absorb it, recover, and learn from it (some call this "being anti-fragile"). At Atlassian, we believe that if you're not failing once in a while, you're not trying hard enough.We challenge our teams with big, hairy, audacious goals and make sure they have the autonomy and the resources to meet them. We hire smart, ambitious people and expect them to fail sometimes.

In the context of DevOps, failure is not a punishable offense. Teams assume that things are bound to go pear-shaped at some point, so they build for fast detection and rapid recovery. (Read up on Nexflix's Chaos Monkey for an excellent example.) Postmortems focus on where processes fell down and how to strengthen them – not on which team member f'ed up the code. Why? Because continuous improvement and failure go hand in hand. DevOps has evolved so that development owns more operations – and that's how Chef works. We can't just throw it over the wall anymore. Our engineers are responsible for QA, writing, and running their own tests to get the software out to customers.

**Measurement**

It's hard to prove your continuous improvement efforts are actually improving anything without data. Fortunately, there are loads of tools and technologies for measuring performance like how much time users spend in your product, whether that blog post generated any sales, or how often critical alerts pop up in your logs.

Although you can measure just about anything, that doesn't mean you have to (or should) measure everything. Take a page from agile development and start with the basics:

How long did it take to go from development to deployment?

How often do recurring bugs or failures happen?

How long does it take to recover after a system failure?

How many people are using your product right now?

How many users did you gain / lose this week?

With a solid foundation in place, it's easier to capture more sophisticated metrics around feature usage, customer

journeys, and service level agreements (SLAs). The information you get comes in handy when it's time for road mapping and spec'ing out your next big move.
All this juicy data will help your team make decisions, but it's even more powerful when shared with other teams – especially teams in other departments. For example, your marketing team wants shiny new features they can sell. But meanwhile, you're seeing high customer churn because the product is awash in technical debt. Providing user data that supports your roadmap – even if it's light on features and heavy on fixes - makes it easier to build consensus and get buy in from stakeholders.
Source: https://www.atlassian.com/devops

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# ***Faculty Arena***

## ***Immune Engineering***

Over the past decade the focus of many bioengineers and clinicians has been shifting towards "immune engineering" approaches that include but are not limited to engineered biomaterials for vaccines, immunotherapy (immune-modulation), cell and gene therapy, immune microenvironment engineering, and systems immunology. These research areas embrace a comprehensive list of translational immunology-associated problems including chronic infections, autoimmune diseases, aggressive cancers, allergies, etc. The purpose of the Immune Engineering SIG is to bring together emerging ideas and provide a venue for professional interaction to a large number of academic and industrial research groups and scientists working in these areas.
IME brings the engineering design and fabrication component. Several laboratories have created synthetic (non-biological) vaccines that have been shown to be effective in stimulating the immune system against certain types of cancers (lymphoma) and pathogenic bacteria strep. The fact that these synthetic nanoparticle vaccines are non-biological and do not require additional chemicals to activate them removes many of the complications sometimes encountered in viral-based, or adjuvant-activated vaccines. This approach can be extended to other cancers and pathogen types (potentially HIV, staph, malaria). IME will also seek to engage the systems and computational bioengineering necessary to understand, as well as fluid mechanics and transport expertise to understand fluid and cellular movement through tissues to the lymph system. Hiring in this bioengineering theme in IME, combined with existing efforts at the University of Chicago, will revolutionize approaches to developing more potent therapies for the human immune system.
**"Genetically engineered immune cells are saving the lives of cancer patients. That may be just the start."**
The doctors looking at Layla Richards saw a little girl with leukemia bubbling in her veins. She'd had bags and bags of chemotherapy and a bone marrow transplant. But the cancer still thrived. By last June, the 12-month-old was desperately ill. Her parents begged—wasn't there anything?
There was. In a freezer at her hospital—Great Ormond Street, in London—sat a vial of white blood cells. The cells had been genetically altered to hunt and destroy leukemia, but the hospital hadn't yet sought permission to test them. They were the most extensively engineered cells ever proposed as a therapy, with a total of four genetic changes, two of them introduced by the new technique of genome editing.
Initially, it was unclear if the treatment had worked but within weeks Layla started to show signs of recovery. A bone marrow transplant followed, to ensure the disease had been eradicated, and tests show her to be cancer-free. She is now home with her parents and eight-year-old sister Reya.

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