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## Public Health

Pandemic Diaries:  
Lessons for global south from India's second wave



# HEALTH TECH TRENDS TO WATCH OUT FOR

### STRATEGY

Interview

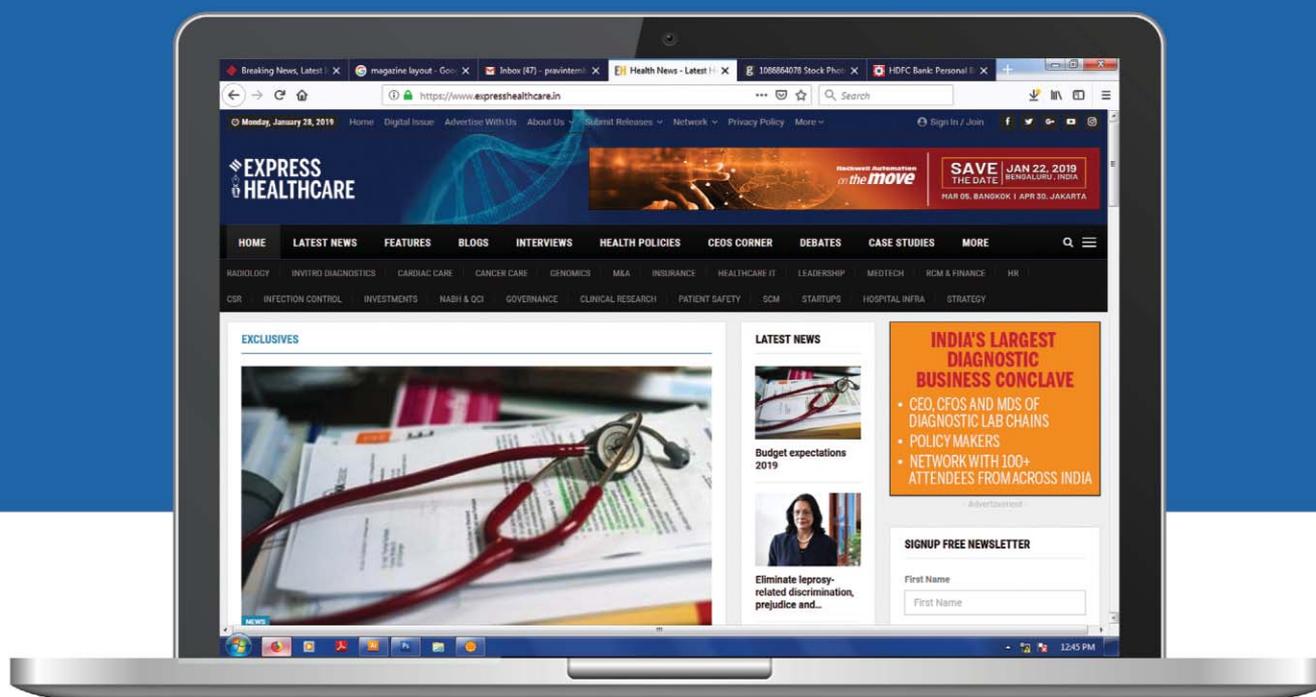
Women bring a mix of empathy and a "detective" brain to science

**Dr Sunita Maheshwari**

Chief Dreamer and Loop Closer, The Telrad Group

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## CONTENTS



# PANDEMIC DIARIES: LESSONS FOR GLOBAL SOUTH FROM INDIA'S SECOND WAVE

The second wave of the COVID-19 pandemic engulfed India more as a tsunami in past few months. As numbers begin to taper, there are several learnings which can be of critical importance for other economies to contain and manage the pandemic. Reflecting upon the experiences of the second wave, Swetha Kolluri, Head of Experimentation, UNDP Accelerator Lab, India presents 10 lessons from the hotbed of the pandemic, extracted from the pages of the Lab's Pandemic Diaries | P-10

### DIAGNOSTICS

27 | TESTING AND IMAGING: CAN WE EXPAND INFRA-STRUCTURE AND SERVICES TO MEET MARKET DEMAND?



### STRATEGY

P28: **INTERVIEW**  
**DR SUNITA MAHESHWARI**  
Chief Dreamer and Loop Closer, The Telrad Group



**ASHWINI PRAKASH**  
Managing Partner India, Asia Pacific Lead-Pharma, Healthcare, Life Sciences and Consumer products, Stanton Chase India



### HOSPITAL INFRA

30 | THE IMPORTANCE OF AIR COMPRESSORS



32 | POST-COVID TRENDS IN HEALTHCARE FACILITY MANAGEMENT



### CANCER CARE

34 | CHANGING SCENARIO IN ONCOLOGY: CONFERENCES TO WEBINARS

### HEALTHCARE TRACKER

P38: **INTERVIEW**  
**MR RAHUL SALI**  
Country Head, Bayer Radiology, India

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# Healthcare haves and have nots

**T**he haves vs have-nots divide has widened during the COVID-19 pandemic and vaccines are the most visible sign of this. The lack of access to COVID-19 vaccines continues in India, even as positive cases in states like Kerala and Maharashtra show alarming single day spurts. The third wave is inevitable and indeed some districts and states could already be part of this wave.

Even as health ministry data puts India's cumulative COVID-19 vaccination coverage at over 45.6 crore, only about 10 per cent of India's adult population (above 18 years) of 94 crore is fully vaccinated.

Again, health ministry data reveals that as of July 30, more than 48.03 crore (48,03,97,080) vaccine doses have been provided to States/UTs, through all sources and a further 71,16,720 doses are in the pipeline. Of this, the total consumption including wastages is 45,27,93,441 doses. More than 2.92 crore balance and unutilised COVID vaccine doses were available with the States/UTs and private hospitals to be administered.

Even though 25 per cent of vaccine production is reserved for private hospitals, according to a reply by Congress Rajya Sabha MP Mallikarjun Kharge on July 20, as per health ministry data, from May 1 to July 15, 2021, just about seven per cent of COVID vaccinations were recorded from private centres. The inference is that vaccines are available in the private sector but there are no takers beyond a certain number due to the price.

While the government is tapping the corporate sector to deploy their CSR funds to fund vaccinations of their employees and communities around their establishments thru private health



**Will India @ 75 still been a nation crippled by deepening fault lines?**

centres, this underlines the haves vs have-nots divide.

A PIL filed by the Jan Swasthya Abhiyan (JSA) alleges that just 30 per cent of patients in India get treated in government/public health centres. The PIL points out that since implementation of the Clinical Establishments Act has been patchy, the majority 70 per cent of patients approaching the private sector is being over-charged. The Supreme Court has issued a notice to the Centre seeking a response on JSA's PIL for healthcare mismanagement.

The August edition of Express Healthcare, timed with our 74th Independence Day, focuses on how IT enabled systems are empowering healthcare personnel to do more with less. For instance, remote monitoring technologies allow the almost immediate ramping up of COVID ICU bed strength, without endangering the lives of ICU staff. Similarly, IoT ML, AI are harnessing the data from such systems to aid clinicians make more informed decisions. But will these systems and technologies create a more equitable and accessible healthcare facilities to all patients in Independent India? Or will India @ 75 still been a nation crippled by deepening fault lines? And will our healthcare sector rise to the challenge of make healthcare more affordable for all Indians? As we mark our 74th Independence Day, let us reflect on reducing these fault lines. Because a virus has once again proved that in health, a virus can be a great leveller. No one is safe until everyone is safe is the bottom-line.

VIVEKA ROYCHOWDHURY *Editor*  
 viveka.r@expressindia.com  
 viveka.roy3@gmail.com



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When it comes to nourishing this sector, experts prescribe a regular diet of Express Healthcare. The magazine has been the source of a healthy dose of expert information, incisive category analysis and remedies for industry ailments since 20 years, thereby earning the trust of industry professionals. It's no wonder then that the finest in the field trust the foremost in the field.



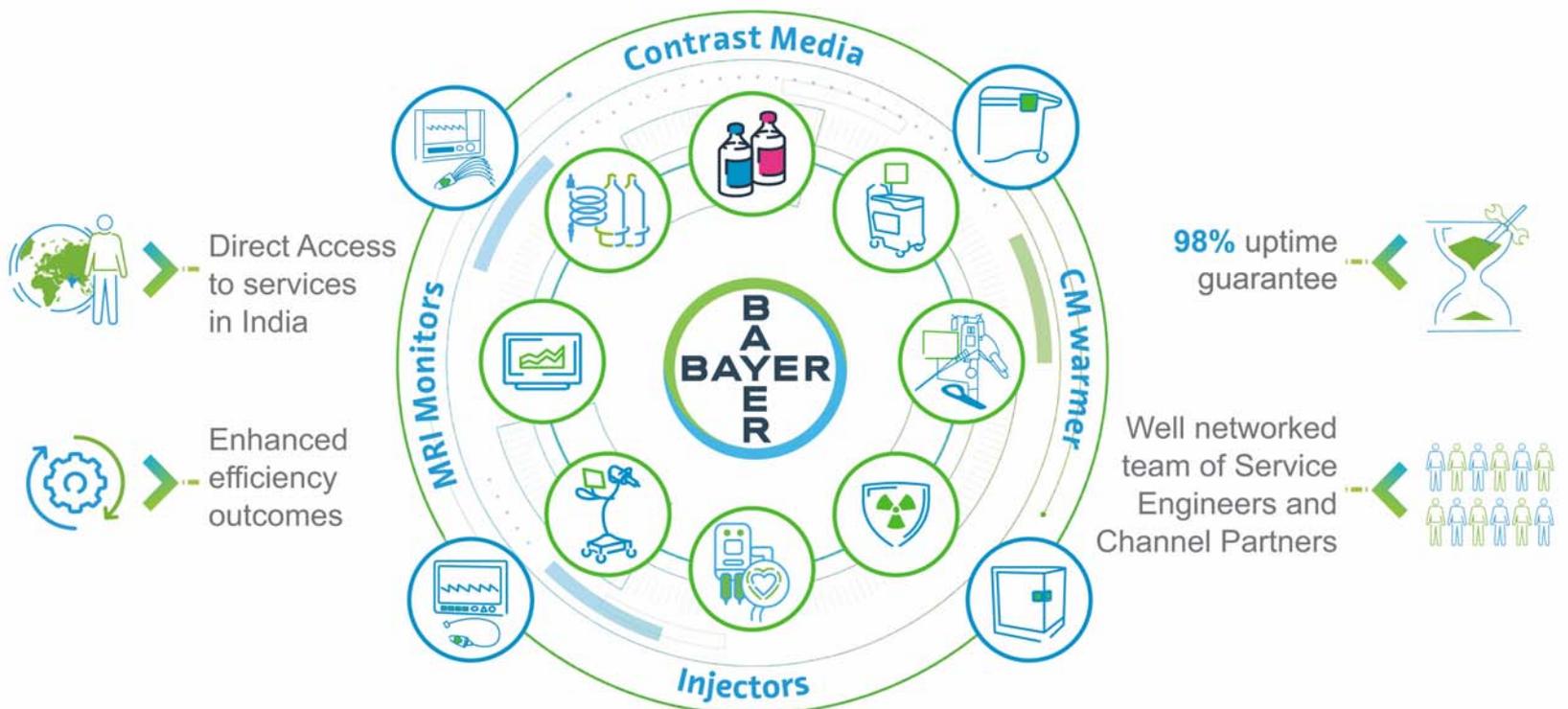
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## Pandemic Diaries: Lessons for global south from India's second wave

The second wave of the COVID-19 pandemic engulfed India more as a tsunami in past few months. As numbers begin to taper, there are several learnings which can be of critical importance for other economies to contain and manage the pandemic. Reflecting upon the experiences of the second wave, **Swetha Kolluri**, Head of Experimentation, UNDP Accelerator Lab, India presents 10 lessons from the hotbed of the pandemic, extracted from the pages of the Lab's Pandemic Diaries

### Central focus: Containment strategies

#### Overcome optimism bias

**W**e often don't wake-up until a crisis hits our homes, and when it does, it is usually sudden, rapid, and overwhelming. This is because we often share optimism bias which makes us believe easily that negative events are less likely to affect us or the worst is over; inducing complacency and resulting in unpreparedness. Optimism bias was shared by large parts of the general population in India. Vast areas of the subcontinent displayed lackadaisical behaviour and unwillingness to learn from the emerging facts and past experiences, resulting in rampant COVID-oblivious celebrations and lifestyle. However, Dharavi, Asia's largest slum in Mumbai, fared better than many other less densely populated areas in the country, and one of the factors attributed for the outcome is a stronger and continued adherence to COVID-appropriate behaviour and administrative measures since the first wave. It is important to remember that COVID effects are not short-term that will end in one or two years. The pandemic will not end for anyone until it ends for everyone. 1

#### COVID appropriate

**behaviour is non-negotiable** Awareness is a necessary but not a sufficient condition for behavioural change, which was predominantly evident in India's second wave. The bigger challenge is not to spread awareness but to enforce COVID appropri-



ate behaviour. It is the collective responsibility of the Governments, public influencers, and people to ensure maximum adherence to COVID appropriate behaviour<sup>2</sup> based on the evolving understanding of the disease. For instance, we learned that cloth masks were not as effective in the second wave, we needed to double mask, and maintain good ventilation while staying indoors.

#### Avoid super-spreader events

India's second wave peak is over four times the first wave. This spike is largely attributed to numerous super-spreader events. There needs to be a uniform and unbiased implementation of curbs on large gatherings of any kind irrespective of the influence of the organiser. Developing countries that are operating in inadequate or broken health systems can at least avoid super-spreader events and adopt COVID-appropriate behaviour in the interest of

public health.

#### Important to balance lockdown and livelihood

Complete lockdown seems an effective solution to control the spread of COVID. This is feasible when countries are able to provide adequate social protection to its citizens, especially the poor and vulnerable. However the public finances of most developing countries have several limitations that don't allow for generous social protection programs.

Rising expenditure on account of pandemic response at the same time contraction of tax revenues impose double-edged stress on public exchequer. This is further aggravated by the loss of employment, broken supply chains, falling demand by households and shrinking economies during the pandemic.

Partial lockdowns where supply chains are less affected, essential services are continued and activities not involving

crowding can be adopted. Governments need to delicately balance lives, livelihoods, and their sustainability while focusing on the needs of vulnerable populations.

### Central focus: Scientific research and technology

#### Backing epidemiological research and tracking variants of concern

While Testing-Tracking-Treating was being practiced widely, identifying and tracking variants of concerns is equally important. Mutations in SARS-Cov-2 virus may affect virus's properties, such as how easily it spreads, the associated disease severity, or the performance of vaccines, therapeutic medicines, diagnostic tools, or other public health and social measures.

Genetic sequencing with appropriate sample size is an important strategy to track mutations in advance. But countries in the global south are challenged by resources to establish and maintain sequencing facilities, research funds for genomic research, tools and skilled manpower to conduct analysis. Low cost technologies and free platforms like Oxford SP33 could help fast-track efforts and standardise analysis across the world. Cooperative global efforts are needed to track and respond to new SARS-CoV-2 variants and strengthen our capacities to confront emerging threats in the years to come.

#### Leveraging digital technology and data analytics

Unlike any other pandemic in the past, today the world has the

power of digital technologies and data analytics to monitor the evolving situation of a pandemic. It is therefore vital for countries to invest in streamlining data reportage and management. Disaggregated datasets show how geographies experience COVID differently. Data is crucial to all stakeholders involved in crisis mitigation to ascertain optimum utilisation of limited resources across geographies. Real-time monitoring of developing crisis and predictive power is vital to avert a full-scale tsunami.

### Central focus: Public health management

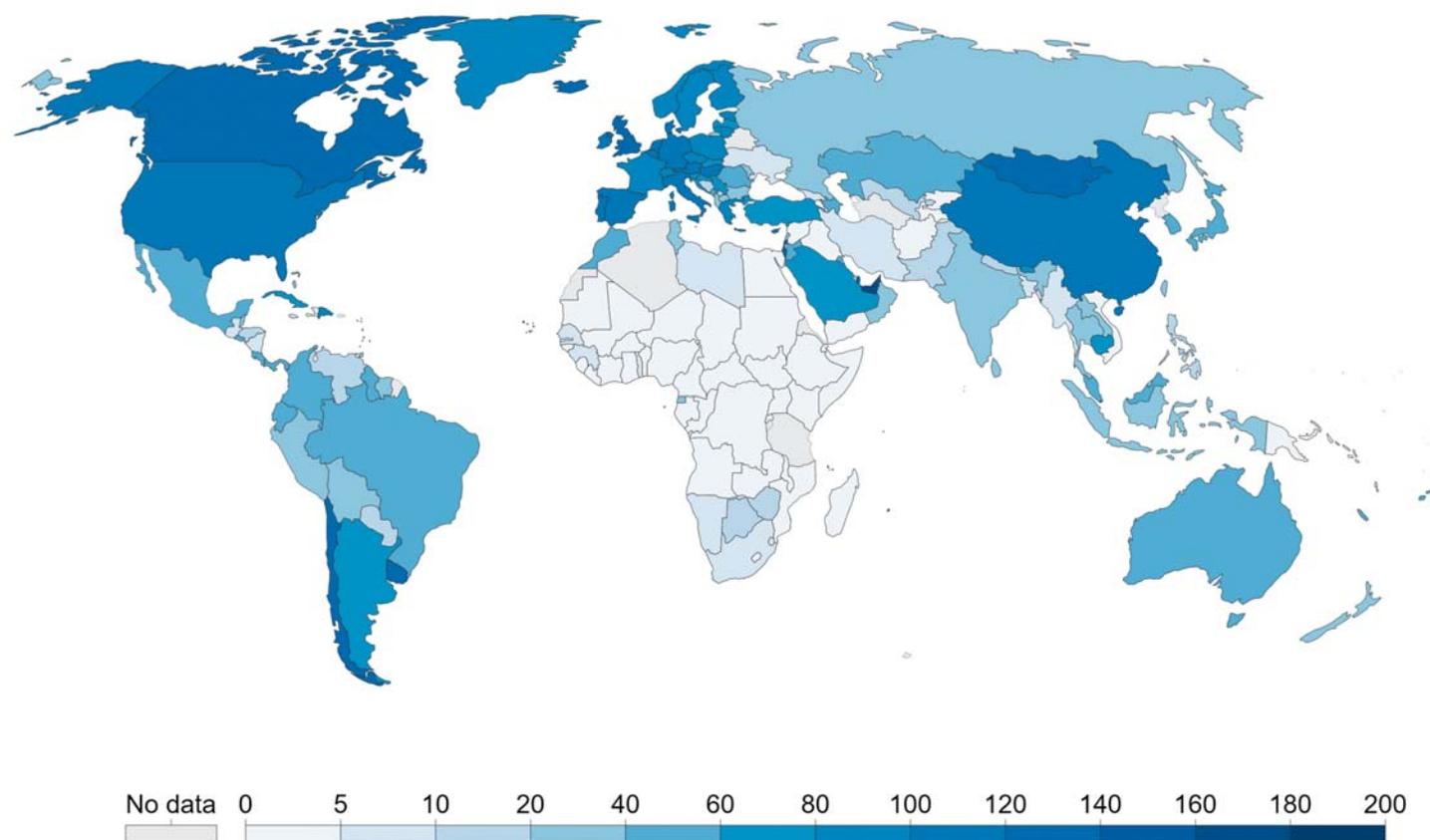
#### Upgrading emergency logistics and distribution channels

While every nation needs to conduct assessment of essential COVID resources and ramp-up supply and distribution network to combat shortages of life-saving drugs, monitoring devices, and health services, the Indian experience pertaining to oxygen supply presents a case-in-point with new learnings.

Oxygen supply networks are vital. The importance of oxygen support for COVID patients was well known. In India, while oxygen production capacities rose by over 10 times in the last one year and industries were leveraged to produce medical oxygen to meet the growing demand, the increased oxygen production capacity didn't automatically lead to timely supply, as supply and demand geographies were separated by large distances. To supply oxygen from plants, the availability of trucks, cryogenic

## COVID-19 vaccine doses administered per 100 people

For vaccines that require multiple doses, each individual dose is counted. As the same person may receive more than one dose, the number of doses per 100 people can be higher than 100.



Source: Official data collated by Our World in Data – Last updated 21 July 2021, 11:20 (London time) OurWorldInData.org/coronavirus • CC BY

containers and even portable cylinders is essential. Every component in the oxygen supply chain needs to be adequately available and efficient for the network to work in distant and remote areas.

### Non-profit telemedicine channels supporting home quarantine

Most developing countries are far behind WHO recommended doctor-to-population ratio of 1:10004 and inadequate health infrastructure to face the pandemic. Given the scenario, it is important to actively promote medically guided home quarantine leveraging the telemedicine channels. Point-of-care devices including thermometers and oximeters should be actively provided through shared economy to continuously monitor patient's health. Wellness counselling and psychosocial support in such distressing times should also be extended to reduce panic

and tackle mental health which is a much neglected area in developing countries.

### Central focus: International collaboration

**Expand vaccination coverage**  
Vaccination is an effective strategy to prevent fatalities and reduce severe cases due to infection. Despite inventing several COVID-19 vaccines world over, their distribution and access is highly inequitable with developing countries at a greater disadvantage as shown in the map.

As the largest manufacturer of vaccines, India had initiated vaccine diplomacy by exporting more than 66 million vaccine doses to 95 countries during the first quarter of this year. More than 16 per cent of these doses were given as grants to developing countries. However this strategy was paused due to second COVID-wave, which pushed India to prioritise and

service in-house needs first. This has a very strong impact on global vaccine situation.

There are few crucial take-aways from the Indian experience. While adequate and efficient supply of vaccines is an important challenge, ensuring equitable distribution of vaccines to vulnerable populations and addressing vaccine hesitancy need to be addressed simultaneously. Vaccination is an important strategy to tackle COVID, but it is not a silver bullet for global south. There are still uncertainties around supply of vaccines, efficacy on certain age groups (like children) and effectiveness on emerging variants of the virus<sup>5</sup>. Given the uncertainties, we still need to continue with prevention measures in the short-term to stop COVID-19 transmission.

### Foster cross-border learning and reflection

In an interconnected global

world with rapid exchange of information and knowledge, one would expect that countries and organisations learn swiftly from each other to tackle the pandemic. Contrarily, we have seen cities tackling the pandemic as if they were dealing with it for the first time. Learnings across time and space in the interconnected world did not happen as expected. While scientific research and our knowledge continues to play keep-up with the evolving pandemic, the knowledge on COVID management practices is not being captured and relayed actively. Even the learnings and good practices from previous waves were not carried forward to the subsequent waves. As exhaustion dominated reflection and course-correction in public health systems, lack of learning and absence of foresight emerged as important chal-

lenges during the pandemic.

The Global South needs to learn from the experiences and good practices of previous waves or counterparts, to encourage scientific thinking and approaches, to be prepared and updated, to guide policy, decision making, and execution to counter this evolving public health crisis.

### (The views expressed in the blog are personal)

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# HEALTH TECH TRENDS TO WATCH OUT FOR

Amid all the challenges, technology-enabled solutions will be key to accessible healthcare for all as it offers opportunities to streamline processing and improving overall patient experience

**By Kalyani Sharma**





## Healthcare industry: Overview

Healthcare has taken centerstage in the backdrop of the COVID-19 pandemic. It has placed an enormous strain not only on the domestic but also global healthcare sector's workplace, infrastructure and supply chain. On the positive side, it is also accelerating change across the ecosystem

diseases (leading to more demand for healthcare services), several government initiatives, and a large medical infrastructure in pipeline (over \$ 200 Bn to be spent by 2024). Moreover, there has been a steady growth in government and private expenditure on healthcare with government spending set to increase to 2.5 per cent of GDP by 2025, up from 1.6 per cent in 2020-21.

smarting the human race. But the silver lining to the COVID cloud is that this has also been a time of accelerated innovation. Be it medicines, vaccines, adopting new technologies, adapting and updating healthcare practices. Indeed, the daily learnings of the past months will help us survive and thrive, not just against SARSCOV-2 but also other new emerging disease threats

one doctor and three nurses per 1,000 people.

Amid all the challenges, technology-enabled solutions will be key to accessible healthcare for all as it offers opportunities to streamline processing and improving overall patient experience. There has been a greater proliferation of technology-enabled healthcare solutions in the country due to COVID,

ket size for RPM Devices is anticipated to hit the USD 1.8 Bn mark by 2026 from USD 920 Million in 2020, at a CAGR of 10.64% over the next five years, reveals data."

Studies conducted by the National Center for Biotechnology Information (NCBI) have shown how RPM considerably helps in improving clinical outcomes in patients with cardiac failure, atrial fibrilla-

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## Panelists



### Dr. Shailesh Jhawar

Director - HOPES,  
Sr. Consultant - Critical Care &  
Cardiothoracic Anaesthesia,  
Apex Hospitals



### Dr. Vaishali Shelgaonkar

Associate Professor & HOD,  
Dept. of Anaesthesia Indira Gandhi  
Government Medical College, Nagpur



### Dr. Avinash H R

Asst. Professor,  
General Medicine,  
ESIC Hospital



### Mudit Dandwate

CEO & Cofounder,  
Dozee

### Moderator



### Viveka Roychowdhury

Editor  
Express Pharma &  
Express Healthcare

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and increase in acceptance as well adaptation of new innovations in a short period.

As per invest India, "Indian healthcare sector is expected to rise to \$ 372 billion by 2022 at a CAGR of -16 per cent. The healthcare sector has several growth drivers such as increased life expectancy (70 years by 2022), rising access to insurance coverage (20 per cent Indians are currently covered), better health awareness (particularly amongst the younger generations), growing lifestyle

The private sector has emerged as a vibrant force in India's healthcare industry-accounting for almost 74 per cent of the country's total healthcare expenditure."

### How Remote Patient Monitoring (RPM) is shaping the future of healthcare: Express Healthcare's webinar series

The COVID-19 pandemic is turning out to be a long drawn out battle, against a foe that seems to be adept at out-

into the next few decades.

At the forefront of this battle, are our medical and paramedical staff, fighting a war, often racing against time, against an invisible foe, often without bullets, or adequate armour. To compound matters, most countries, including India, are running short of healthcare personnel. According to the Ministry of Health and Family Welfare, India has one medical doctor for every 1404 people and 1.7 nurses per 1,000 people. This is lower than the WHO benchmark of

targeting various segments of the population. One such timely intervention has been Remote Patient Monitoring (RPM), a solution which is especially important considering the significant infrastructure and healthcare professionals' shortage in the country.

As per the report by Mordor Intelligence, "India's remote patient monitoring (RPM) market is expected to see a CAGR rate of 6.4% from 2020 to 2025 as per the latest report. Also, the global mar-

ket size for RPM Devices is anticipated to hit the USD 1.8 Bn mark by 2026 from USD 920 Million in 2020, at a CAGR of 10.64% over the next five years, reveals data."

Studies conducted by the National Center for Biotechnology Information (NCBI) have shown how RPM considerably helps in improving clinical outcomes in patients with cardiac failure, atrial fibrilla-

tion, ventricular arrhythmias, respiratory disorders. This, quite obviously, brings in a host of good news for the healthcare industry. Enhanced patient outcomes is one among them that will be observed as we start implementing Remote Patient Monitoring significantly across the country."

Express Healthcare, in association with Dozee, recently organised a webinar to understand the need of adopting new technologies and its positive impact on the currently

burdened healthcare system.

Dozee is the pioneer in contactless, continuous remote patient monitoring in hospitals & at home, delivering unparalleled patient safety & maximizing utilization of ICU beds. The webinar focused on the Dozee Pro RPM solution, which is contactless vitals monitor for hospitals that features an AI-powered triage system. This enables the continuous and accurate monitoring of a patient's heart rate, respiratory rate, and other clinical parameters like sleep apnea, myocardial performance metrics without coming in contact with the patient. The solution allows a hospital to quickly ramp up ICU facilities as per patient load, by converting a bed into a step-down ICU in 2 minutes flat, allowing doctors to remotely monitor patients outside the ICU. This has made a huge difference in ICUs and COVID care centres across the country.

Three healthcare experts namely Dr Vaishali Shelgaonkar, Associate Professor & HOD, Dept. of Anaesthesia Indira Gandhi Government Medical College, Nagpur; Dr Shailesh Jhawar, Director - HOPES, Sr. Consultant - Critical Care & Cardiothoracic Anaesthesia, Apex Hospitals and Dr Avinash H R, Asst. Professor, General Medicine, ESIC Hospital, who have already implemented solutions from Dozee participated in a panel discussion along with Mudit Dandwate, CEO & Co-founder as Dozee and Viveka Roychowdhury, Editor, *Express Healthcare* as a moderator. The panelists shared their experiences, the implementation journey, the challenges, as well as the lives saved, the impact on their hospital ecosystem and healthcare management practices.

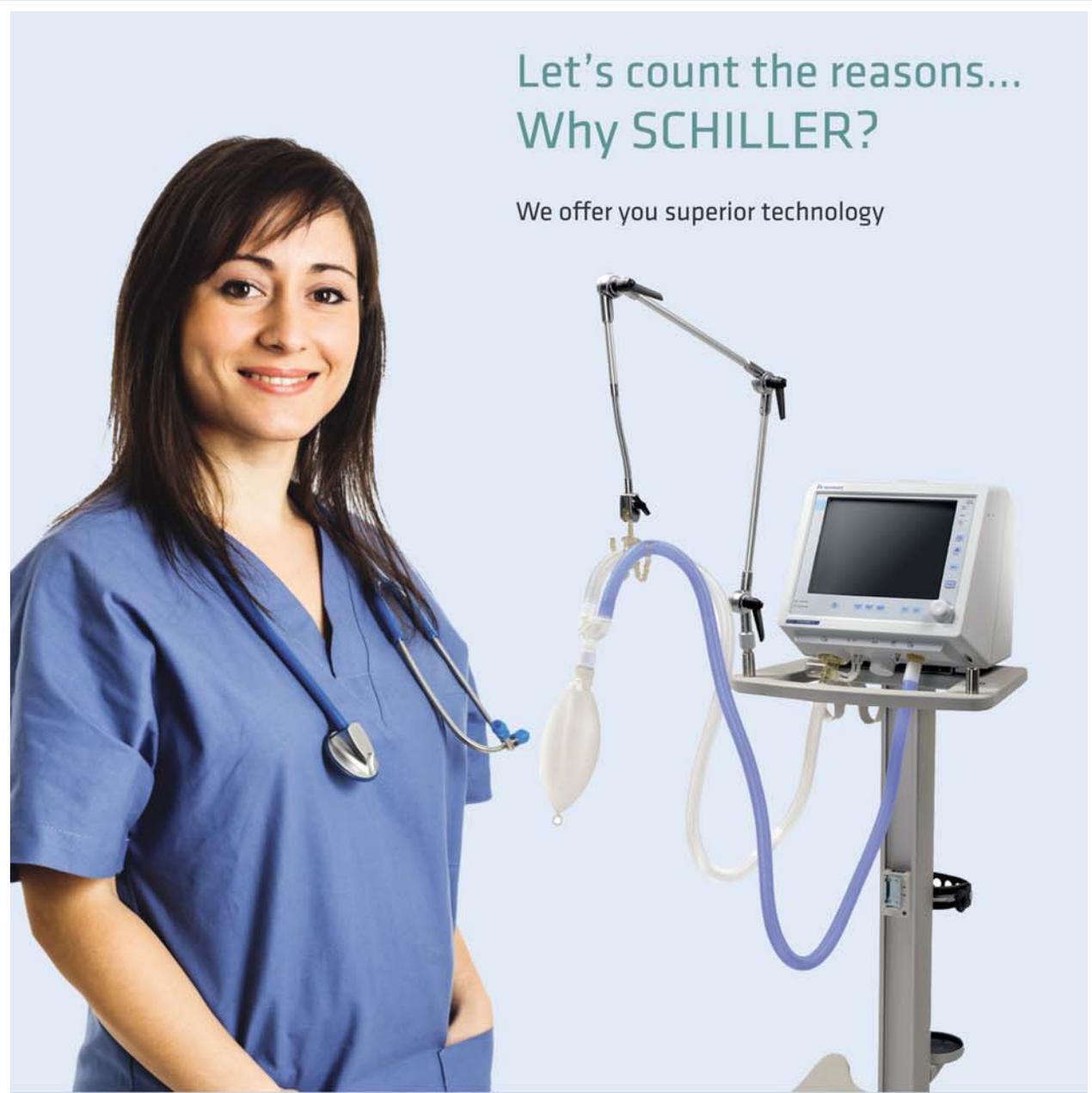
Sharing her Dozee implementation journey, Dr Shelgaonkar said, "The entire healthcare system is under pressure since March 2020. The country has 2 million hos-

pital beds and only 100,000 ICU beds. Coupled with the shortage of trained nursing staff, it was impossible to keep an active watch on the health of all the patients continu-

ously, especially outside the ICU during these challenging times. We adopted Dozee RPM in July 2020 to help us manage patients who require continuous monitoring while

safeguarding our staff. Dozee is playing a crucial role in monitoring over 150 patients at a time and has helped the timely transfer of over 200 patients to the ICU."

Explaining about the training of staff, she added, "Initially, we pulled all four branches who were already accustomed to handling some kind of critical patients. We



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started with them. The nursing staff which was working in various ICUs were simultaneously asked to train other nurses. Doctors were training doctors and we were training around almost other 600 medical officers from district health administration as well as non-core branch doctors so that they can help us in managing COVID pandemic. We did not have any break to arrange for training plus manage the patients. It was on job training."

Dr Jhawar while sharing his experience with Dozee mentioned, "Issue with our healthcare setup is that we are volume-based country and still with that volume, the value proposition is not lost. The problem with critical care is difference in trajectory to every patient's journey of illness which at the right point of time you need the right intervention. At the right points, if the trajectory is aligned with improving outcomes patients get better. And, to pick up those right points is very important. And that's why, remote patient monitoring is the way forward. In our case, we had to triage our hospital into different levels. So multiple ICUs had to be created (some ventilated, some with high flow oxygen patients and some with recovering patients). In a corporate setup, there is a

limit on expansion. So, when we were in the process of expansion, Dozee team, who was already in touch helped us with the execution process within three days."

Highlighting the important parameters of a valuable technology, he added, "In my point of view, there are 3 things that are very important: Firstly, technology should not be additive in nature, Secondly, it should not be very expensive

patients. Moderate patients need to be monitored continuously so that we can pick them early change the treatment regimen. This helped us in saving lot of patients in our hospital. Dozee monitored HDUs reduces human errors and also exposure and also will help in monitoring of post-covid symptoms."

Highlighting the challenges faced by Dozee as a start-up, Mudit Dandwate said, "For

future plans, he said, "Currently, we have about 220 hospitals across the country who use this technology and in about 12 months we are planning to partner with close to 1000 hospitals across India. In terms of future, we will continue to build up and improve the product offerings that we have. Currently, we have heart rate, respiration, blood pressure, oxygen saturation, myocardial performance & sleep

ward, Dr Avinash said, "Remote care monitoring is the future in the management of all infectious disease especially COVID waves to come."

"Our dream of 5 trillion economy and universal health coverage can only be achieved by appropriate resource utilization, empowering more and more people at local level and enable them with whatever available", added Dr Jhawar.

Sharing her views on the future of remote monitoring system, Dr Vaishali mentioned, "I think such kind of technology has a bright future. We have volumes of patients and as compared to them doctors and nurses are definitely less. Also, we need humans to monitor these monitors and hence to tackle such a huge no of patients such type of monitoring technology is mandatory. The pandemic has taught us about how to go for changes in healthcare management."

Post the panel discussion, the panelists and speakers answered questions from the audience.

A recording of the webinar can be viewed at <https://www.expresshealthcare.in/healthcare-videos/webinar-videos/how-remote-patient-monitoring-is-shaping-the-future-of-healthcare/430443/>

[kalyanisharma03@gmail.com](mailto:kalyanisharma03@gmail.com)  
[kalyani.sharma@expressindia.com](mailto:kalyani.sharma@expressindia.com)

## Sharing his views on technology adoption in hospitals, Dandwate added, "Technology is worthless if nobody is going to look at it. We try to work with people who are forward looking and understand that it is not a competitor but a force multiplier"

in terms of infrastructure, Thirdly, it should be readily deployable. Any technology with all these parameters is a valuable technology."

Sharing his experience with Dozee, Dr Avinash mentioned, "Since December, 2019, patients were pouring in and we faced multiple challenges of manpower, exposure to healthcare workers and others. When we met dozee team, we converted 50 out of our 200-bed hospital into Dozee HDU that helped in monitoring moderate pa-

timely delivery, installation, training and transfer, our operations and customer success team worked really hard and went from city to city for smooth running of the system."

Sharing his views on technology adoption in hospitals, Dandwate added, "Technology is worthless if nobody is going to look at it. We try to work with people who are forward looking and understand that it is not a competitor but a force multiplier."

Talking about company's

apnea. These are the set of parameters that you can monitor on Dozee. Our R&D team is working to also test ECG which will be integrated on the same set of platform along with temperature sensor. We work very closely with the clinicians to improve patient outcome, nursing efficiencies and as engineers our job is to find solutions that can augment their practice even more and we can improve this entire ecosystem. That's the idea going ahead as well."

Talking about the way for-

When it comes to nourishing this sector, experts prescribe a regular diet of Express Healthcare. The magazine has been the source of a healthy dose of expert information, incisive category analysis and remedies for industry ailments since 20 years, thereby earning the trust of industry professionals. It's no wonder then that the finest in the field trust the foremost in the field.

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# Technology intervention in providing seamless remote care

**Dr Rajesh Gupta**, VP-Clinical Transformation & Products, MyHealthcare shares his views on digitisation and digitalisation of healthcare sector



**J**ust in a matter of few years, we have witnessed large scale technology-based transformation in the way we used to travel, shop, transact with banking systems, eat, and communicate. The healthcare sector has lacked the use of digital platforms in managing care delivery and engaging with patients. Over the past year, the COVID pandemic has witnessed a complete transformation, where digitisation and digitalisation of healthcare has become front and centre.

Hospitals embraced the digital revolution with the use of telemedicine and post the first wave of the COVID-19 pandemic, we witnessed healthcare institutions working towards an omni channel care delivery process - where digital platforms are now seen as one of the primary channels for the management of healthcare services and care delivery to patients at their homes.

However, to manage the complete healthcare needs, almost every healthcare organisation has now realised the value of using digital technology in creating a complete care ecosystem for its patients. The ecosystem included hospital services, e-Pharmacy, diagnostics, and home care services such as home isolation monitoring.

*Continued on Page 20*

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# Technology in healthcare: Trends that are trending

Jatin Mahajan, MD, J Mitra & Company highlights tech trends in healthcare to watch out for

Technology has had a far-ranging impact on the healthcare industry in the past two decades. And this has received further impetus in the past 18 months driven by the complications of the corona pandemic. Artificial Intelligence (AI), Machine Learning (ML), Internet of Medical Things (IoMT), big data, and blockchain are aspects that have been driving these technological developments within healthcare, positively impacting the quality of life considerably. Other trends catalysing extraordinary results are Telemedicine, Virtual Reality (VR), Mobile Health, Cloud Computing, Nanotechnology, 3D Printing, and Predictive Analytics. So, what do all these trends translate into?

## Technology has been impacting healthcare primarily on these critical fronts

1. Making it more affordable and cost-effective
2. Making it mobile and closing the gap between patient and diagnostic / treatment (from wearables to portable medical devices)
3. Catalyzing better quality of diagnostics/treatments (increased efficiency of all medical devices and introduction of newer techniques)
4. At the forefront of precision medicine (robotics)
5. Impacting quality of life and helping people live longer

All future trends are moving in these directions. Some of the critical trends for the next few years will be:

**Wearables and Smart Devices:** Several wearable devices now constantly monitor a patient's vital parameters. These wearables include embedded (into patient's bodies)

medical devices such as pacemakers & cochlear implants; and those worn on the surface of a person's body, including glasses, watches, sensors, and even clothing. These wearable devices enable healthcare workers to have real-time information on patient data while they remain at home.

**Telehealth & Telemedicine:** Telehealth will further bridge the gap between rural and urban communities. One of the significant benefits of telehealth over in-person alternatives is that it reduces contact between patients, healthcare workers, and other patients. The corona pandemic has provided an impetus to the use of telehealth resources. Telehealth's growth appears likely to continue even after the pandemic is over.

**Virtual Reality:** It is already impacting healthcare in many ways: from training doctors to helping individuals overcome phobias. In addition, several potential uses for Virtual Reality could transform the way we view and treat chronic diseases. According to research published by Deloitte, there are three main usage areas for Virtual Reality in medicine: as a tool for diagnostics, treatment, and therapies, and as an educational resource. More specifically, Virtual Reality has already demonstrated significant benefits in making treatments more effective, reducing costs associated with patient care, providing better access to specialists, and accelerating the development of new drugs. In addition, Virtual Reality is an exciting trend in healthcare and is being used for training surgeons and providing therapy after traumatic events such as terrorist attacks or natural dis-



asters in many countries.

**Voice-controlled Assistants:** Technological advances enable medical professionals to leverage digital tools, including speech recognition systems. In healthcare settings, this may include components designed to optimize patient care or reduce clinician workloads. These tools can be used for clinical documentation and data management or as a voice assistant that streamlines daily workflows.

**Robotic surgery:** It is playing a very significant role in healthcare. It is a new technique for minimally invasive surgery where the surgeon uses a robotic device with attached instruments to perform surgical procedures. The robot requires no skin incision, which reduces blood loss and wound complications immensely. In countries like Canada, France, Germany,

and Australia, Robotic Surgery is considered the standard treatment for prostate cancer - and the trend is fast pervading other organs and diseases.

**Artificial Intelligence (AI):** It has transformed the healthcare space and become the absolute game-changers. AI can analyse and decode data in far complex and distinct combinations than a human mind, providing exceptionally potent data for efficient and precise diagnostics. Within AI applications, medical imaging has become the leading and most popular field. Other AI applications of intelligent and automated healthcare systems include image-guided therapy, tailor-made data-driven preventive medicine, closed-loop drug delivery, life-support systems, and robotic surgery.

With the help of AI, complex and chronic diseases like cardiovascular diseases, various types of cancer, diabetes, Alzheimer's, echocardiography, neurology screening, in-vitro fertilization, and genomics interpretation can be analysed and effectively interpreted.

**Internet of Medical Things (IoMT) and Machine Learning (ML):** IoT has disrupted the healthcare industry by intelligently connecting devices, systems, and objects used by billions of people worldwide to utilize and leverage data and enable more timely, specific, and contextualized decisions.

IOTs impact on the Healthcare segment is humongous. Across the world, the healthcare industry is transforming itself into a system that is well-coordinated, user-centric, and more efficient. IoT as an evolving technology is driv-

ing game-changing and life-enhancing solutions across the healthcare segment. IoT catalyses the automation of processes, and the advantages are endless.

## In conclusion

AI, IoT, and ML have changed the way medical services are delivered. The future of IoT is very bright in the healthcare segment, with an estimated 20 billion connected devices and growing exponentially day by day.

In healthcare, technology has grown exponentially over the years. We have moved from illness-focused patient care to a more holistic and unified preventive mindset driven by the diagnostics revolution based on technological trends. Technology has impacted the diagnostics industry in many ways. For example, physicians can diagnose a patient through their phone instead of being limited to only seeing them physically in person. Mobile Technology saves both time and cost for hospitals and doctors while also improving access for patients requiring immediate care, especially in rural and resource-scarce settings. With the increased use of technology, there are more ways to diagnose health problems than ever before. Doctors and medical professionals constantly upgrade their knowledge and adjust their practices to keep up with all these innovations that make diagnosis and treatment faster and easier.

Ultimately, the best way to predict the future is to create it by fostering innovation. The merger of medicine and engineering and the blurring of the distinction are the most significant trends driving technology in healthcare.

# Healthcare tech trends to watch out for

**Shivajyoti Bhattacharjee**, Vice President - Healthcare and Life Sciences, Cybage Software highlights top five trends that he believes will stick around for years to come



Advances in the fields of Artificial Intelligence (AI), Machine Learning (ML), IoT and Big Data Analytics have already established on the tech trends radar. However, over the past year, technological innovation has blurred the lines of imagination. The digital transformation that was likely to take years to have its grip in healthcare witnessed rapid progress in a matter of months. In my opinion, below are the top five trends that I believe will stick around for years to come.

Wearables and IoMT devices based on Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) the healthcare industry is extending immersive and high-quality care to patients via digital therapeutics offering. VR today is helping patients combat depression, cancer, autism and even visual impairments. Be it medical training or critical procedure simulations or creating patient awareness and even anxiety reduction, AR and VR based therapeutics have significantly improved a patient's treatment lifecycle through reduced pain perception and lower anxiety levels. AR/VR based therapeutics are used throughout a patient's treatment lifecycle. In addition, 5G readiness across

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telecom operators will provide the backbone of rendering these advanced therapeutic solutions in real-time.

Telehealth is rapidly connecting patients and healthcare providers in a digitally connected world. This care delivery medium brings with it on-demand healthcare without having to step into clinics, hospitals, and urgent care facilities in times of emergency follow-ups and treatments. Telehealth is creating virtual and accessible follow-up paths for patients, physicians and providers. It is leading to reduced physical appointments. Telehealth is aggressively being adopted by both physicians and patients, building a true virtual healthcare platform.

Big Data and Analytics are at

the center of optimising the work of physicians. The breakthrough developments are driving a massive evolution of evidence-based medicines by measuring, analysing, and using the captured data. It is helping patients adjust their treatment techniques and even alert their physicians in case of an emergency. Healthcare analytics has the potential to help patients significantly reduce the cost of treatment, avoid preventable diseases, and improve their quality of life.

Data Science and Artificial Intelligence (AI) are redefining the healthcare industry by improving quality of care, patient outcomes and decreasing costs for hospitals, insurance and payers. Rapid improvement in Data

Science and Predictive Analysis using AI, Machine Learning, and Deep Learning has given physicians access to deeper insights. These include gathering information about ancestry and family history, detecting patients with high risks, diagnosing problems effectively and improving the accuracy of disease detection. AI is helping Life Sciences in drug discovery, genomics, precision diagnosis in cancer and radiology inference.

Cloud computing solutions are helping healthcare organisations be more integrated and interconnected when it comes to storing information digitally, safely and securely. The healthcare industry requires diligent management of an incredibly large quantity of data in multiple

formats from numerous sources. Data ranging from patient records (EHR/EMR), social and medical information, and information about organisations need to be stored in an integrated way that acts as a single source of truth. This is only possible with a Cloud platform that ensures safety and scalability. With the complexity of the Healthcare systems, Cloud is the best bet as it possesses an increased processing power to run data-intensive analysis. Data virtualisation and its associated new platforms and tools is another area where Cloud will play a major role going ahead in reducing redundancy of health records and reports.

Having more than 26 years of delivering excellence, Cybage

has been at the forefront of building the best-in-class technology solutions for the Healthcare industry. Our proven expertise in Care Delivery, Wellness Management, and Life Sciences has enabled the world's leading healthcare organisations to create safe care platforms and services. Our solutions are targeted towards Clinical Workflow, Clinical Trials, Digital Health, Population Health, and Interoperability. Cybage has built several synchronous telehealth platforms that assist Live Video Conferencing, VOIP calling and Online messaging; created guideline-based apps to help physicians share precised decisions with patients and secured several Cloud-based platforms for risk mitigation.

## Technology intervention in providing...

*Continued from Page 17*

Comprehensive device integration coupled with real-time, on-demand video calls and AI based tools such as real-time vitals monitoring with vital alerts to the command centre for any outlier vital parameters - all of this available through a centralised care ecosystem makes remote patient management more effective. With the dire shortage of healthcare workers such as doctors and nurses,

physical patient monitoring at home is not scalable, the COVID 19 pandemic made this even tougher.

The digital revolution in healthcare sector with services such as tele radiology, tele-ICU the remote patient monitoring will see significant traction in the years ahead. A country such as ours where there is a significant shortage in terms of access to healthcare, remote care services will be a game changer and will help deliver effective pri-

mary care to regions where doctors are not available.

The rapidly growing mobile internet penetration with 4G networks and with 5G networks coming soon, the effectiveness of digital healthcare ecosystems and platforms will see a significant boost. Just to give a sense of natural adoption - post the first wave of COVID 19, 25% to 30% of the patients continued to use telemedicine for their first consult with a doctor and follow up with a physical

consult if needed. Post the second wave of COVID 19 this has grown to - 40%.

The digital care ecosystems also help in building a patient longitudinal history with clear trends of key clinical parameters seen together with clinical interventions and medicines administered. Combine this with the power of data driven care, we should be able to deliver quality healthcare to a wider pool of patients.

In the months ahead, we

should aim to enhance remote care offerings by using technology solutions such as Optical Character Recognition (OCR) to include devices such as digital thermometers, pulse oximeters and critical care clinical devices. This will help doctors and hospitals manage their patients post hospitalisation and also be able to deliver cost effective home care solutions.

Data driven connected care will be the future of care delivery.

When it comes to nourishing this sector, experts prescribe a regular diet of Express Healthcare. The magazine has been the source of a healthy dose of expert information, incisive category analysis and remedies for industry ailments since 20 years, thereby earning the trust of industry professionals. It's no wonder then that the finest in the field trust the foremost in the field.

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# Data science: Programming the future of healthcare

**Dr Vibhuti Agarwal**, Senior Director-Product Management, Innovaccer throws light on transitioning of healthcare into health-tech and role of data in the process

Change has been how we have managed to exist in the timelines ever since the onset of the first breath of humankind. Life has always been about embracing the change that streamed the existence of us, all the while continuing with altered and manipulated yet enhanced DNA models of our ancestral heritage. These changes were relatively innocuous.

India, known for its traditional medicine, played an essential role in global healthcare and its need back then. With unique recognized systems - Ayurveda, Unani, and Siddha among the other few dominating the medical care supported by some conventional equipment led to more symptomatic treatments. Forthwith the introduction of Western medicine in India during the 16th century, which led to the setting up of medical departments with surgeons, enhanced the human resources with strengthened solutions.

The industrial revolution in the late 1700s, early 1800s brought about the onset of the concept of machines that could ease humans' work. It was closely followed by the antibiotic's revolution in the early 1900s, empowering physicians with several devices and more potent drugs to fight the diseases. Soon after, the years between the 1900s-2000s saw the discovery of DNA and its structural study at the hand of advancements in computer technology, the rise in genome sequencing, and IoT medicine. These ultimately led to the advent of modern medicine and healthcare practices we see developing today.

Throughout history, the dependence on technology has been evident, changing things for the better and enhanced. Each era differed from the subsequent much like the various

phases of human life. It started as a fetus, developing and nurturing into the nascent stage, child, adolescent, adult, transitioning into old age, only to be reborn as something new. Technology has been the precipice of unprecedented change in human history.

The transitioning of healthcare into health-tech has been the most profound one. Out of all the niches that technology has explored, the most successful and useful one has been healthcare. One such integration is data science and how it can be leveraged into servicing the care industry.

## The benefits that count

By integrating Data Science with the patient journey, we can improve the whole experience of the patient, from the detection to diagnosis to treatment and care, providing timely responses.

It has been estimated that the healthcare industry accounts for about 30% of the world's data. Statista reports that around 2,314 exabytes of data are generated yearly, which amounts to a 15X increase since 2013.

This increase in the health data volume combined with improved processing/storage processes has been instrumental in the growth of data science in healthcare. Leveraging the simple or complex ML models, data scientists are identifying unique patterns and drivers that are resulting in cost-saving and improved efficiencies in addition to magnified patient care, appointment management, patient triage, and medical imaging and diagnostics.

Data has ameliorated operational efficiency and customer experience by streamlining workflows across verticals using robotic process automation, retaining and appending



Technology has been the precipice of unprecedented change in human history

customers through customer churn, utilizing chatbots-providing the right and fast services to business intelligence-leveraging data insights allowing healthcare providers to gain more visibility into financial operations, automating compliance reporting, analytics, and helping organizations make more data-driven decisions.

Pharmaceuticals are benefited furthermore and can utilize AI support for drug discovery, providing enormous reach in population health outcomes, reducing the time for the production of drugs, delivering vaccines, and optimizing the supply chain management. Besides these, data science has been improving clinical trial processes, reducing the risks

for patients by automated monitoring of data and identifying any issues and inconsistencies while the trials are ongoing.

## Strengthening the policy framework to regulate healthcare IT to protect patient privacy

Data privacy should be a primary concern for the healthcare industry because a patient's record holds their most sensitive information. Care establishments stock up highly confidential and classified data. Thus, establishing a defined framework of rules and regulations is essential to protect patient privacy.

However, as of now, India is still lacking this foundation. There are currently no firm data protection laws for patient information privacy in place. Although certain acts do promise a favorable future, such as "DISHA-The Digital Information Security in Healthcare Act," we still have a long way to go before any adept data protection policies and their compliance measures will be set up. When that happens, data analytics can play another role in strengthening and regulating the policy framework.

HIPAA Compliance is one such example of the integration of Data Analytics with healthcare. The Health Insurance Portability and Accountability Act (HIPAA) is the national standard policy for protecting and managing the patient's health data in the US. This policy was introduced to simplify the flow of healthcare information and ensure that all Personal Health Information is guarded and kept confidential. All medical information is collected, stored, and safeguarded under its guidelines.

The other Data Protection laws, such as General Data

Protection Regulation (GDPR) in the European Union and California Consumer Protection Act (CCPA), safeguard the data. Still, they also create complexities for healthcare organizations when linking datasets. This is why compliance is as essential as a framework for proper operationalization.

## Improving health outcomes and ROI for healthcare provider

The 30% of the world's data that healthcare accounts for can transform into an estimated \$300 billion in annual cost savings, among other opportunities for healthcare improvement. However, this can only occur when the industry leverages data science to identify areas for improvement and promote evidence-based care. We need to move forward and away from outdated technology. Proper integration of data science and healthcare can take the care enterprise decades into the future, in mere years.

**The United States healthcare industry has defined the quadruple aim, which establishes four goals for every care organisation:**

- ◆ Enhance the patient experience.
- ◆ Ameliorate population health.
- ◆ Reduce costs.
- ◆ Improve the work-life of healthcare providers.

The achievement of these requires high levels of organizational coordination and commitment to both consumers (patients) and providers (staff members). This is where the integration of data science comes into play. This field of technology excels in automating and streamlining organizational,

*Continued on Page 23*

# How no-code solution will revolutionise the healthcare industry

**Gautam Nimmagadda**, Founder & CEO, Quixy shares his views on the role of no-code solutions in management of various issues of healthcare industry

Digitisation is the way forward, and it is seen in all the walks of life that we come across every day. Fast processing and quick turn-around time are concepts that have attained a new meaning in the way the world functions today. The no-code approach to workflow automation and application development works as fuel to the need for speed, efficiency, and transparency in the business processes in the current times. With the use of an intuitive app development environment powered with visual drag-and-drop controls, the no-code platforms help business users with limited or no software development skills develop comprehensively customized solutions that help them in their regular business processes. The no-code idea is mainly aimed at bridging the gaps that are left with the sole use of commercial one-size-fits-all off-the-shelf (COTS) software solutions that are hard to tailor to one's unique needs or even customized ERP software solutions that can only be tweaked through coding. One of the industries that is in dire need of a solution like the no-code alternative is the healthcare industry, and there is a good reason why it needs it now more than ever before.

## The pressure healthcare is facing in COVID-19

We have seen the country reeling under the pressure of COVID-19 and seen how the healthcare industry, in particular, has had to face the brunt of the pandemic on the frontlines. While the world stayed at home, the healthcare industry has been working in overdrive for more than a year now. As the pandemic hit, the number of patients being admitted to hospitals all across the globe rose exponentially, increasing the pressure on hospitals. They,

however, emerged as fighters and put in their blood, sweat, and tears to make sure they could save lives.

The pandemic was nothing short of a Tsunami of patients for the hospitals that served COVID-19 patients both in the private as well as the public sectors. There were dysfunctional hospitals all across the country that were set up as COVID-19 centers to effectively deal with the rising numbers of patients in the country and for the isolation of citizens traveling back from abroad. The sudden surge in the number of patients had hospitals struggling for staff and resources, let alone time. The situation called for innovation and a quick solution to sort the administrative tasks related to treatment. This is something that increased the need for the use of Digitisation in the healthcare industry.

## Getting healthcare workers all the aid they can get

In a situation of life and death where patients need to be prioritised, and the available healthcare workers are already under duress, they naturally need to get all the aid and agility that they can get. It is in such times that concepts like no-code solutions work like magic. The no-code concept is an app-building and business process management solution that puts the power to digitise in the hands of those that do not have any knowledge of coding or software development. This is a solution that not only helps in the creation of customised applications or automated business processes but also helps in extending the positives of existing software systems, all without the use of a single line of coding.

From the way in which no-code works, it is evident that it is the need of the hour for the healthcare industry, through the



entire chain of stakeholders, including the diagnostic centers as well as the hospitals, irrespective of whether they treat COVID-19 patients or not. Going digital and saving time as well as effort in the provision of healthcare is a major boost to service quality which is why no-code solutions in the healthcare sector are becoming increasingly essential despite hospitals and other healthcare service providers already using other software solutions. There are users of the no-code solutions that vouch for its value, and pharmaceutical companies like Vance & Health have increased efficiency in procurement functions by 30%.

The automated solutions that work all alone or as a booster shot for existing COTS or enterprise resource management systems help take the burden off the staff by providing seamless and transparent workflow systems. The added dose of Digitisation also ensures cutting down of the time taken in starting treatment.

## How no-code can be of use to the healthcare industry

The healthcare industry has multiple stakeholders, and the management of all the resources that ease the functioning of the industry can be extremely complex. Just as the

COVID-19 pandemic showed us, there needs to be a system in place for medium and large hospitals to get their administrative tasks out of the way without losing out on efficiency and precision so that more time and effort can be diverted to the main function of the business which is treating the patients. Among a couple of ways in which no-code solutions can work in healthcare organizations, these are the most effective and resourceful.

### Patient management and enhancing patient experience:

With the help of an app building and business process management tool like a no-code solution, hospitals can make sure that their patient database is streamlined and the patients as well get a comprehensive and one-stop user experience. Building elements like dashboards for reports, medical history, appointments, billing, and other patient-related information can become a reality while keeping all of it absolutely customized.

**Operational functions:** Functions like management of inventories, procurement functions, reminder systems, and checklists is also possible when hospitals want to create a hassle-free and precise system. Having access to a system that allows to customize the entire data management process helps in weeding out the chance of human error or foul play in the most practical and sensitive manner.

**Human resource management:** Scheduling shifts, sorting payments, and keeping track of leaves is something that is important in any business function but is more so in the healthcare industry. Hospitals can use the no-code solution to effectively ensure that there is no shortage of staff and that the business functions work smoothly

even in the face of a pandemic. When the management of staff functioning is logged with precision, it is possible for the management to make sure that employee satisfaction is also taken care of. This is an essential aspect in the highly stressful times that all frontline workers are going through, owing to the COVID-19 outbreak.

### Reduction in time, cost, and effort:

The most important return of investment that automated systems or Digitisation offer is the reduction in time, cost as well as efforts in the administrative processes of the hospital. As a result, a positive patient outcome is achieved by the hospitals, where they are able to increase their processing capacities, and no patient has to be turned back owing to a lack of administrative resources.

**Government initiatives:** Governments are putting in place new and innovative healthcare initiatives which need extensive surveys and real-time data to be transferred in a quick and efficient manner. With the help of a customized and automated system, the process can be expedited, and the benefit of the initiatives can reach the beneficiaries sooner.

It can be concluded that in an era of Digitisation and automation where the world is progressively moving towards adopting more and more customizable systems, the no-code solution is here to stay! It comes with the promise that no matter how small your need for quick customization to an automated process is, it can be done within a snap.

No-code is practically ideal for an industry like healthcare which needs and will be needing all the help it can get to go paper-less as well as to cut down on processing time in the times to come.

# How healthcare industry can leverage the contact centre solutions for better customer satisfaction

**Amit Gandhi**, Founder, NovelVox highlights the importance of contact centre solutions for increased flexibility in healthcare sector

With technological advancements and increased Internet penetration, the use case of technology has imprinted itself on every aspect of healthcare, and even Contact center solutions are not untouched by it. If one may recall the first wave of covid, getting through to the right contact center personnel was very difficult, as even in the healthcare industry, the number of call center agents got depleted considerably to answer the queries of distraught patients. However, things were not the same during the arrival of the second wave. Even as it wreaked havoc across the country, the situation would have been worse if patient contact solutions had not been upgraded with better connectivity and adoption of technology voraciously to meet the needs of the patients or their kin.

Currently, contact centre solution providers offer a vast number of valuable solutions to transform the patient experience, be it handling emergencies or making remote working

possible or winning the trust of the patients and their kin.

## **24x7 availability for patients**

The availability of the solution on a 24X7 basis has now become synonymous with healthcare industry and bots are playing a more important role than ever. Bots not just manage the queries but help the patients or the caller to connect with the right department on need per basis. This integration of bots has changed the whole scenario within the contact center solution domain where hospitals can manage the work load in a far more efficient manner than ever before.

## **Integration of video**

With technology it has become convenient for both doctors and patients to connect via video calls, check the symptoms and share the prescription within minutes with utmost precision. Though Emails, SMS and other means have become the norm of the day, technology has further enabled the upgrading of tele-



consultations to video consultations. The new age video technology has allowed people to avail healthcare facilities even during the covid times from any city or town with internet connectivity while adhering to all the covid guidelines.

## **Mobile assistance**

Mobile apps have put in more flexibility in terms of services provided, and simultaneously added a whole new dimension

Healthcare analytics has the potential to help patients significantly reduce the cost of treatment, avoid preventable diseases, and improve their quality of life

as patient calls no more get missed despite contact service agents being at home or on the move. Also, in the instances of tests & diagnosis, if a sample collection agent is within a designated area he can be updated in real time for new appointments and the caller can connect with him, leading to a convenient experience for both of them.

## **Win patients trust**

With adoption of new-age technology, the patients are developing more trust factor for the healthcare system as doctor on demand has become the new norm. Even if one is travelling,

they can book an appointment and get the consultation at any time of the day. This eventually adds up to the trust level of patients seeking medical assistance.

Today, a doctor does not need to worry about consultation as connected software systems share data about a patient's need and his or her medical history, allowing them to have the ability to make informed decision and save time in asking the same questions over and over again. By pre-assessing the issues, doctors just need to make the right diagnosis and provide adequate remedial solutions.

## Data science: Programming...

*Continued from Page 21*

management, and administrative responsibilities.

The achievement of the Quadruple aim will ultimately lead to a decrease in the prevalence of any such chronic diseases and care management, boost the population's health, reduce medical costs, and improve the work-life of the healthcare

providers to optimize the performance of the healthcare system.

One of the significant dimensions for a better health system is to empower healthcare providers by enabling them to focus on delivering the proper care at the right point in time. The sights that are present on a scene for a medical provider are often daunting, adding to the pres-

sure that is ever-present on them. Hence, the technology needs to step up to reduce physician burden by truly becoming their 'assistants,' enabling physicians to outsource the repetitive or mundane tasks to these 'assistants.' At the same time, they focus only on delivering the care.

Data Science in the healthcare sector is an essential aspect that transforms this in-

dustry. It upgrades the existing medical system into an advanced stage, enhancing the speed of treatment and prognosis. It can provide insights into the health conditions and detect various kinds of diseases providing timely results. It can provide the right help at the right time, reducing the death rate, predicting deadly diseases, and also helping in making improved and ad-

vanced health policies that could work for the betterment of our future.

The best part about the healthcare system is its ability to save people, relieving them of their debt of borrowed air or even time. Data Science in Healthcare is a blessed companionship looking forward to upgrading the life of those around with the right technology in hand.

# Digi-healthcare trends to watch out for in the next days, while understanding the era of remote care

**Dr Kirti Chadha**, Group Head Medical Affairs, Metropolis Healthcare talks about top trends in digital healthcare space that are crucial for better diagnosis

Necessity is the mother of invention - a fact made clear by the innovative, automated, and creative solutions by so many organizations and now so many laboratories have devised to overcome COVID 19 challenges. However, we need these digital, automated analytical breakthroughs not just in tackling the pandemic but in both diagnostic verticals of healthcare - pathology and radiology as well as in overall medical management. Healthcare chatbots, telemedicine, digital pathology and AI algorithms, healthcare apps are all here to stay.

The laboratory lies at the heart of not only patient care but the research that unfolds year after year and has been giving our patients a multitude

of options. Today, patients have multiple treatment options to choose from due to these tools & technologies. From mapping the human genome atlas, digital pathology & AI in Immuno oncology to mass spectrometry & next-generation sequencing - each holds an important role against disease diagnosis, prognosis, predictive marker scoring and monitoring in a patient's healthcare cycle.

The global digital pathology market is projected to reach USD 1,054 million by 2025 from USD 553 million in 2020, at a CAGR of 13.8% during the forecast period. The growth of this market is majorly attributed to the increasing adoption of digital pathology to enhance lab efficiency, the rising prevalence of cancer, and the grow-



ing application of digital pathology in drug development & companion diagnostics. When Metropolis started digital pathology way ahead of its time years back linking all our national & international experts, we had not even imagined the benefit it would give us during the raging pandemic. We never stopped functioning

for even 1 day or 1 minute & even our "at risk senior experts" rendered diagnoses safely using WSI.

The goal of any diagnosis is to get it right the first time but the magnitude of evidence-based knowledge pathologists need to learn, process & apply is impossible to keep up as an individual. Therefore, clinical decision support (CDS) tools are quickly gaining entries in labs pre-equipped with Total Lab Automation (TLA), Middleware and can help transform top-quality, static reference information into real-time, dynamic, actionable knowledge in test reports.

Medical IoT is a rapidly growing field that uses wearable devices, monitors, and integrated applications for healthcare needs. With AI and

machine learning technology, medical IoT can offer enhanced versions of traditional medical devices. Virtual reality (VR) and augmented reality (AR) technology offer a wide range of practical uses in healthcare such as surgical training and planning, enabling both surgeons and patients to get more comfortable with procedures. The expected annual growth of AR and VR in healthcare has been projected as 30.7% between 2017 and 2025.

As pathology rushes into the modern era, let us continue to explore the solutions powering the future of diagnostic medicine-from connecting widely distributed and remote teams to putting the pathologist at the center of a natural and intuitive experience there are ample stars lit in this sky.

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CASE STUDY

# Technology driven healthcare delivery

**Jesintha Louis**, Director-Partner Success & Cloud Solutions Specialist, G7 CR Technologies India talks about positive impact of technology in healthcare delivery

Patient-driven Health care brings the shift in the healthcare industry with more emphasis on preventive aspects paving the way to healthcare technologies that allows transparent, collaborative and AI/ML powered data points for both prescriptive and predictive analysis.

At G7 CR Technologies, we support over 20+ Health-tech companies on the Cloud, who offer technology solutions that pretty much cover the breadth of healthcare solutions. Some cater to direct consumer and other supporting some of the critical aspects of Hospital management.

Cloud offers the scale and breadth of services to healthcare tech companies to build platforms and tools to further enhance and support our healthcare infrastructure from various aspects.

### Preventive healthcare solutions

A healthcare tech startup client of ours uses AI & Computer vision by analyzing the face to identify the body constitution and thus delivering personalized and

preventive healthcare. The startup extensively uses graphical intensive machines to run their model and scale as needed. While another customer of ours continues to service Customers across the globe with the convenience of booking a preventive testing package at the comfort of our homes with build-in analytical capabilities to track your vital and live a healthy, balanced life.

### Adherence/ OPD services

Furthermore, we have Customer with large adherence platforms that have & continue to help Countries across the Globe combat diseases like Tuberculosis that require tracking, monitoring and analyzing adherence for patients from any corner of the world without smartphone or other digital assets and execute such a large-scale project at the lowest cost possible.

Other solutions include Telemedicine combined with a smart bot, a full-blown Smart hospital management system, solutions to process & save DICOM files to India's largest academic network of doctors host-



Cloud offers the scale and breadth of services to healthcare tech companies to build platforms and tools to further enhance and support our healthcare infrastructure from various aspects

ing on Cloud and marketplace for all healthcare requirements.

The range of services utilized by our clientele ranges from simple virtual machines for computing to machines designed especially for clinical research, fully managed and most cost-effective storage systems for DICOM files, data & analytical services, and automation.

While cloud brings in the benefits of cost-effectiveness, unlimited scale, and platform capabilities on AI/ML & DevOps, the key is to leverage the services well to maximise the cloud potential. That is where we step in as an expert extended

team to provide support services around cloud deployments and carry out feature tests to further speed up the enhancements. We have had the opportunity to carry out Cloud optimization services helping our clientele reduce their Cloud spend between 15 % - 45%. Thus, enabling our customers deliver healthcare solutions that are cost effective.

Based on our experience working with health tech customers, we have grown to learn that data is the key driver of new advancements in the health care industry and while there is a lot of catching up to do for India, specifically in capturing the data

in digital format. Cloud enabled and cost-effective applications will pave the way for a new era of health care by building on the data to further enhance the quality, infrastructure and access to health care in India.

Our customers continue to onboard more & more hospitals who are looking to migrate their manual patient record keeping process to cloud-based digital platforms allowing easy accessibility. We are also working on a couple of analytics projects to build models and datasets that are able to provide deeper insights further enhancing the quality of healthcare.



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HEALTHCARE LEADERS

# Impact of smart EMR system in Mayom Hospital

A case study on impact of Navia smart EMR integrated with Navia QM and Navia e-consult in Mayom hospital

Launched Navia Smart EMR integrated with Navia QM and Navia e-consult in the Mayom Hospital, a multispecialty 125-bed ultra-modern hospital situated in an upscale residential area of South City, Gurgaon in Jul 2019. 1-2 months were spent in training, optimization and integration with existing HIS. The hospital offers health facilities at an affordable cost while maintaining the highest standards of ethical practice and professional competency. The hospital boasts of distinguished doctors from each specialty. Products were fully operational in mid Aug 2019.

**I. Assumptions and base data:** Since platform was fully operational in mid-Aug'19, data from Jul'19 has been considered as base.

**Base line defined as:**

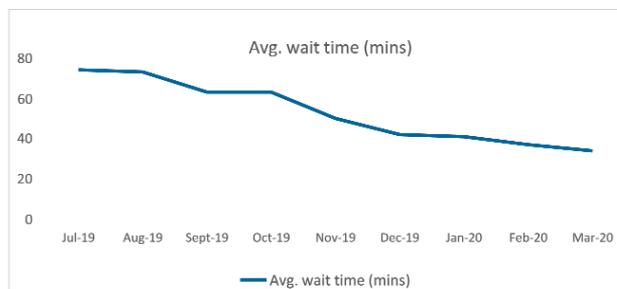
(i) Total patient count, New patient count and Recurring patient count for the month of Jul'19, i.e., before implementation of Navia's products. (Extracted data from manual register maintained by the front office executive)

(ii) Average patient wait time for the month of Jul'19. (Video analysis done to identify average wait time for patients for Jul'19, sample size of 4 OPD sessions considered)

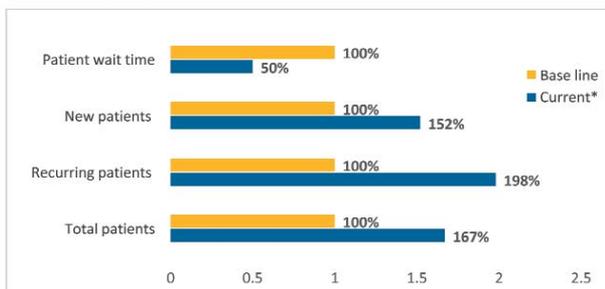
Between Jul' 19 to Mar'20, we realized a 50% reduction in patient wait time in OPDs. This was due to the implementation of an automated token system (Navia QM) which streamlined queue management:

- ◆ Gave a unique token number to each patient
- ◆ Patients had better idea of the wait time and were more alert close to their turn. Also, front office was now able to send delay messages in one click.
- ◆ Doctors and support staff could spend more time with patients instead of spending time

II. (a) Wait time reduction



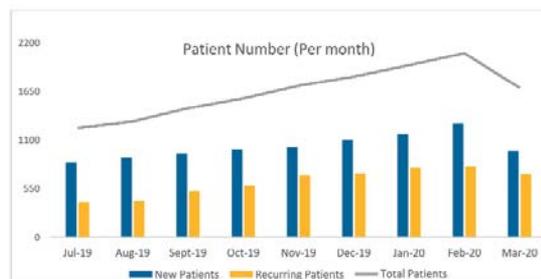
II. Key Findings:



Similar impact has been seen for several of our customers, ranging from private practitioners operating in individual clinics to small and mid-sized hospitals.

\*March'20 not considered as OPDs were affected by Covid-19

II. (b) Increased patient number: Adding to Doctor's topline



KPI	INCREASE FROM BASE	REASON	VALUE
New patients	152%	Improved patient experience led to patients referring the hospital and the doctors to new patients. About 55% of increase in new patients is because of reference given by old patients. (Earlier patient referencing % was close to 25% for the same hospital)	Increased topline or Patient LTV for doctors and Improved patient outcomes due to regular follow-ups
Recurring Patients	198%	- Regular automated follow-up messages sent by Navia basis the follow-up date/time mentioned in digital prescription by doctors - Facilitated easy follow-ups for patients via Navia Video Consultation platform: Navia e-consult - Digital prescription directly on WhatsApp, integration of QMS has improved patient experience	
Total Patients	167%		

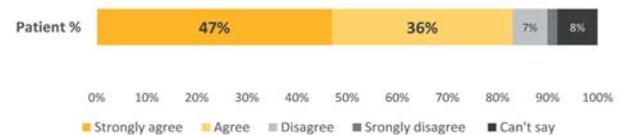
\*March'20 not considered as OPDs were affected by Covid-19

## B. Patient survey on Digital Prescription vs Hand-written prescriptions

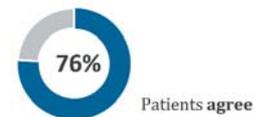
Patient survey was conducted in the month of Feb'20 to find out if they see value in digital prescriptions. Close to 1200 patients who have accessed digital prescription created through Navia's platform participated in the survey.

### I. Key findings:

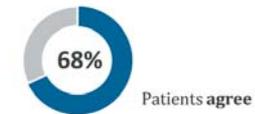
Digital prescriptions are better than handwritten prescriptions:



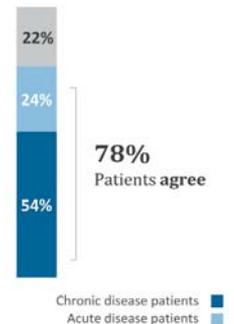
A. Digital Prescription helps in understanding (and hence following) doctor's instructions and directions for medication prescribed



B. In case of follow-up visits/ visit to a new doctor sharing of previous prescriptions and medical history becomes very easy



C. Helps in organising and storing medical records without any hassle:



Between Jul' 19 to Mar'20, we realized a 50% reduction in patient wait time in OPDs. This was due to the implementation of an automated token system (Navia QM) which streamlined queue management

in searching for the next patient.  
◆ Another reason contributing to the same was the reduction in number of walk-ins while increase in pre-booked appointments due to the simplification of the appointment booking process

**Value created:**

- (i) Improved Patient experience
- (ii) More patients per doctor due to streamlining of process and increased pre booked appointments as compared to walk-ins.

## Testing and Imaging: Can we expand infrastructure and services to meet market demand?

**Sameer Bhati**, Director, Star Imaging & Path Lab stresses on the role played by diagnostic sector during COVID and gaps that needs to be filled

Health and healthcare are most important part of humanity from ancient time but from last few decades we forget it completely but current pandemic has once again taught us, without a good health and well-developed healthcare system every progress is meaningless.

Diagnostic always have an important role in patient management but during pandemic, it has become main probe in both preventive and curative healthcare system. RTPCR, RAT, HRCT etc are few probes which are really helpful in managing entire COVID management system and Government taking most of their administrative and vaccination related decisions only on the basis of these diagnostic probes. We can understand this fact from ICMR's monthly report on laboratories status where it indicates every month the numbers of labs are increasing.

According to NITI Aayog's report "Investment opportunities in India's healthcare sector", India's healthcare industry has been growing at a Compound Annual Growth Rate of around 22% since 2016. At this rate, it is expected to reach USD 372 billion in 2022. Healthcare has become one of the largest sector of the Indian economy, in terms of both revenue and employment. In 2015, the healthcare sector became the fifth largest employer, employing 4.7 million people directly. As per estimates by the National Skill Development Corporation (NSDC) healthcare can generate 2.7 million additional jobs in India between 2017-22 with over 500,000 new jobs per year. These projections could not be realized without enhancing our diagnostic capabilities. WHO



**There is a huge gap between demand and supply in both testing and imaging**

once said each dollar spent over healthcare help to contribute 0.77 dollar in economy, so it is very essential to make healthcare sector centre of each policy design."

Despite the significance of diagnostics in patient care system and economy front, this sector is still lagging behind the actual market demands. According to NITI Aayog's report, India's diagnostics market is currently valued at USD 4 billion. The share of the organized sector in this segment is almost 25% (15% in labs and 10% in radiology) and has potential to grow at a CAGR of 20.4% to reach USD 32 billion by 2022. We have about 1.1 lakhs labs in India, out of that 70% are pathology, 30% are radiology but only 1% are accredited.

Government labs: 1288	Private labs: 454	Total No. of Labs: 2742
Real-Time RT PCR for COVID-19:	1664	(Govt: 617 + Private: 1047)
TrueNat Test for COVID-19:	931	(Govt: 623 + Private: 308)
CBNAAT Test for COVID-19:	131	(Govt: 41 + Private: 90)
Other Molecular-Nucleic Acid (M-NA)		
Testing Platforms for COVID-19:	16	(Govt: 07 + Private: 09)

They are also providing services in interventional patient care too i.e., in cardiology, neurology etc. The entire diagnostic industry can be divided in Organized labs, Standalone and Hospital based one but

quality of service always a challenge for them.

There is a huge gap between demand and supply in both testing and imaging. In NITI Aayog's report, they clearly admitted our deficiencies at supply part. According to them, India currently has only 2,700 mammograms installed, less than 5% of the mammograms available in the US. Similarly, India has only 120 PET-CT scanners, with most of them concentrated in the metropolitan cities. Further, only 30% of cancer centres have advanced imaging technologies. 60% of health facilities are concentrated in a handful of large cities across the country. Presently, 30%-35% patients in India undergo surgery compared to 60%-65% globally; 15%-20% of patients in India undergo radiation therapy as against 40%-50% globally.

These gaps could not be filled without a proper planning and perfect execution. In that

Pradhan Mantri Jan Arogya Yojana, etc initiative support to expand our capacity in testing and imaging services.

2. Clinical Establishment (Central Government) Rules, 2019, NABL, NABH etc will ensure the quality and standardization of services.

3. NDHM (National Digital Health Mission), AI, telemedicine, blockchain, home healthcare devices (Oximeter, COVID home kit) etc. help to pace the process of filling demand and supply gap.

4. At the starting of COVID 19 in March 2020, we had only 14 labs for Coronavirus detection but according to ICMR reports as on 13th July 2021 we have total operational laboratories reporting to ICMR:

5. In the process of filling these gaps, we are becoming 4th largest medical device and 2nd largest pharma chemical producer in the Asia and world respectively which is again helping the industry to attract

a huge FDI.

In the light of all these facts we can confidently say that we are in a right track but still many miles need to be covered in order to achieve our true prowess.

## INTERVIEW

# Women bring a mix of empathy and a "detective" brain to science

**Dr Sunita Maheshwari**, Chief Dreamer and Loop Closer, The Telrad Group in an interaction with **Ashwini Prakash**, Managing Partner India, Asia Pacific Lead-Pharma, Healthcare, Life Sciences and Consumer products, Stanton Chase India about the importance of diversity and inclusion in science & Indian healthcare ecosystem

**You are a renowned doctor. Was becoming a healthcare entrepreneur always a plan?**

Never! From 8th grade, I wanted to be a doctor and work in rural India. Being a tech enabled health care entrepreneur did not exist in my thoughts, dreams or plans. I guess you could call me an 'accidental entrepreneur'. My life kept moving down different paths and I went with the flow and made the most of opportunities that came my way. If you asked me when I was young if I would become an entrepreneur, I would have laughed. Today I give lectures to MBA students!



Dr Sunita Maheshwari, Chief Dreamer and Loop Closer, The Telrad Group

**You had a successful career ahead of you in the US. What motivated you to move back to India?**

I always wanted to work in a place where there was great need i.e. India or Africa. That is fundamentally why I went to medical college. So, when I was doing my Paediatrics and Paediatrics cardiology training at Yale University in New Haven and decided to marry Arjun (Dr Arjun Kalyanpur, an AIIMS/Cornell/Yale trained radiologist and co-founder of our entities), I made him verbally commit that we would return to India once done with our training!! When we were finishing our training at Yale we had great job offers at Yale and Duke but I knew if we stayed on and started living the 'American Dream', it would get harder and harder to actually return to India. So, we made the move back early while young, with minimal needs and a willingness to



Ashwini Prakash, Managing Partner India, Asia Pacific Lead-Pharma, Healthcare, Life Sciences and Consumer products, Stanton Chase India

work our way up the Indian healthcare ladder.

**How do you define the Indian healthcare ecosystem? As an entrepreneur how did you**

**craft your way up?**

I would define the Indian healthcare ecosystem as vibrant yet paradoxical. What I mean by that is on the one hand there is a large growing health

care ecosystem which is changing rapidly and adopting new technologies such as robotics, telehealth, artificial intelligence and building high end super speciality driven hospitals and start-ups with tech enabled systems. On the other hand, there is a sub-optimal primary care ecosystem around the country and resource constrained hospitals in rural and remote India.

As an entrepreneur I found certain gaps in India which I felt needed filling, e.g. I built out RXDX healthcare in Bengaluru which is a chain of tech enabled primary care clinics where the General Physician is the Boss unlike in hospitals where the super specialist is King. At our other venture Teleradiology Solutions we take a good diagnosis out to patients and hospitals across the world—using the night day time difference to cover nights in the United States and using the same domain knowledge and processes to cover hospitals in remote parts of India and Africa eg Ramakrishna Mission hospital in Itanagar.

**PE and VC firms have become integral part of the Indian start-up ecosystem? What are your views?**

Of course, money is needed to start or grow a health care enterprise, like any other enterprise. However, I do feel that too much money in health care is not a great idea. When health care enterprises have to make returns for investors, there is a pressure on the doctors and systems to generate more revenue. And how does one generate returns

in healthcare? More tests, more procedures, more pharmacy items, more referrals, more commissions. If a doctor is able to work without considering revenue, either for himself or for the organisation, then he/she is able to practice medicine for the pure joy of making patients better, improving their wellness, positively impacting their mental health. I believe healthcare organisations must be viewed as social enterprises. They need to be sustainable and profitable but the profits can be pumped back into growth or patient value adds.

**What conspired for you to come up with Teleradiology Solutions, which was a huge disruption in the healthcare sector?**

A happy accident! An outcome of a No Job Situation! As I said we moved back to India to work as doctors. Sadly, Arjun could not get a job in Bangalore for over two years. So, he kept going back to Yale to do part time locums jobs and on one of those trips his chairman offered him to work from India. That was one of the first implementations of global teleradiology—from Yale New Haven Hospital to its medical staff Dr AK in Bangalore. After doing it for six months, we realised it was a novel idea and a much needed one. And so decided to turn the idea into a health care 'company'.

**Everyone is facing healthcare crisis created by COVID. How can homecare help minimise the problem?**

One thing that has become clear is that one cannot

manage COVID like just another virus. Fortunately, during this past year, it has become clearer to the medical community how to medically manage it with anti virals, steroids, antithrombotics, oxygen etc.

The good news is all of the above can be administered at home if the patient has the ability to isolate with a family member just outside the door in case of an emergency. The other good news is that now with telemedicine legalised, this assessment and medication can be provided by remote doctors via tele consultations. However, not just a single tele-consultation with a doctor will work with a wily virus like corona. It needs the patient to be longitudinally followed up by the same medical team over the entire course of the disease to readjust medicines prescribed and to monitor for any change in clinical status. "Hospital at

## I believe healthcare organisations must be viewed as social enterprises. They need to be sustainable and profitable but the profits can be pumped back into growth or patient value adds

home" i.e. pre-hospital care-is a solution whose time has come.

**How critical is it to promote DE&I in the field of science? Do you think anything has changed in past few decades?** Diversity and inclusion are essential in any field of life. In the medical sciences things have progressively improved with now 50 per cent of Med school admissions in India are women. Women bring a mix of empathy and a "detective" brain to science which definitely helps.

**Alongside being a doctor and**

**an entrepreneur, what are your other pursuits?**

I feel that the more we all give back, the happier we are and the more impact we can make. So, I also run two foundations: **People four people:** which has installed Over 450 playgrounds in government schools thus far **Telrad foundation:** Over one lakh free reads, 30 rural clinics supported via telemedicine.

I also like to teach, I won Yale's best teacher award. So I set up and have been running a paediatrics cardiology e-teaching program for postgraduates since 2010 (much before corona and zoom sessions!)

**What do you do to unwind and maintain your peace of mind?**

A good nights sleep and daily exercise for 45 minutes are key to my well-being. I also love to dance (nick name is Dancing Doc!) and I find that a great stress buster.

I use humour to defuse stress and conflict. A good joke will sort out anything!

**What advice would you give to the entrepreneurs venturing into healthcare space?**

◆ Have patience (My experience-ten years of one RXDX before scaling to 30; 10

years after Singapore ministry approval we win an Indian state tender for teleradiology)

◆ Get into it for the long haul-things take time, success doesn't come overnight, being around long enough leads to brand recognition which is important in healthcare as well as patients need to 'trust' (My experience: Did not take funding, ploughed back profits into our entities for growth, no exit plan, so kept growing)

◆ Be clear on the purpose and way (My experience: We wanted to create impact so the robin hood model works for us-charge American/Singaporean hospitals for teleradiology services, do free or low cost for Indian charitable hospitals; Practicing clean medicine was important to us-so we focus on ethical sustainability at RXDX) ◆ Health care is God's work. Aim to do good for your patients and staff-the rest will follow.



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## INTERVIEW

# The importance of air compressors

**Dr Jairam Varadaraj**, Managing Director, Elgi Equipments Limited, explains Express Healthcare about his company's energy-efficient compressors that ensure reductions in energy consumption and lower energy costs for all its customers

### Why is it important to have air compressors in oxygen plants to fight against COVID-19?

Air is a critical element in the oxygen-generation process. Air compressors are imperative to ensure a steady supply of compressed air, which provides oxygen delivery across oxygen-generation plants. Reliability and compressor uptime are rather critical, as any disruptions cause interrupted oxygen supply. Moreover, as we all know, this would be detrimental to the lives of the COVID-19 patients. Quintessential, therefore, is a right-sized, highly reliable air compressor, one that guarantees the best-in-class performance.

Let me explain the process from start to finish. Firstly, the compressed air from the air compressor passes through refrigerated driers to rid it of moisture. The temperature of the air entering the driers should be within limits to ensure moisture-free air. Therefore, it is critical that the compressor delivers the right quantity and quality of air at low temperatures. The air also passes through a pre-filtering mechanism to remove any residual oil. To ensure the life of these filters and the overall quality of the air, the oil-carry over from the compressors should be low. Filtering the air further through fine filters and carbon towers ensures the removal of any oil vapours, thereby achieving the necessary oil-free air standards. The compressed air is then passed through the PSA system with two towers filled with Zeolite Molecular



**We've supplied our Global (EG) Series, and Encapsulated (EN) Series screw air compressors to oxygen-generation plants at several hospitals across the nation, along with maintenance services, wherever it has been required**

Sieves (ZMS) interlinked with valves wherein ZMS adsorbs nitrogen and other residual gases, and oxygen flows out of the system.

When one tower is in the production cycle in the PSA system, the other tower is in the regeneration cycle. Nitrogen is bled out through silencers, and the tower is depressurised. The two towers switch between the production and regeneration cycle, which is achieved by opening and closing valves, controlled by the PLC with a defined process to achieve oxygen purity. The oxygen is finally stored in a

stainless steel product receiver, which inhibits oxidation and corrosion.

The oxygen stored in the product receiver then flows through a sterile filter to maintain purity. The entire system might appear simple from a technology perspective. However, it does involve engineering complexity right from the timing of the valves, to the safety of the pressure vessels, to routing of pipelines to avoid pressure drops, to the quality of valves (stainless steel is the preferred choice). An interlock mechanism controls the purity of oxygen,

measured with the help of a digital metre to make the system fool proof. The oxygen purity achieved by the PSA systems is in the range of 93 per cent.

**Which hospitals/healthcare providers does ELGi have been catering to? Also, can you tell us about the particular services/products offered to them?**

We've supplied our Global (EG) Series, and Encapsulated (EN) Series screw air compressors to oxygen-generation plants at

several hospitals across the nation, along with maintenance services, wherever it has been required. A few installations that immediately come to mind are AIIMS, New Delhi; Ram Manohar Lohia Hospital, New Delhi; Dr Shri Appasaheb Hospital, Thane; PCMC AKURDI Hospital, Akurdi Gaon, Pune; Sri Sai Multispecialty Hospital, Vasai, Mumbai; Military Hospital, Secunderabad; Rajiv Gandhi Institute of Medical Science (RIMS), Adilabad, Telangana; Saraswathy Multispecialty Hospital, Madipakkam, Chennai, Tamilnadu; and Medical College and Hospital, Murshidabad, West Bengal.

**What makes Elgi Equipments different from other players in the market? Further, do you cater to international markets too? Elaborate on the same.**

Well, "Always Better" is our brand promise, and our definition of "Always Better" is closely coupled with us always being the customer's choice. How do we do this? By developing products with the best Life Cycle Cost (LCC), guaranteeing the best in industry uptime, and providing customers with the world's best warranty periods. Finally, we are committed to drive cost leadership through technology.

At Elgi, we focus on building energy-efficient compressors that ensure reductions in energy consumption and lower energy costs for all our customers. Today, the world's electricity consumption has been accelerating and,

according to recent estimates, stands at approximately 25 trillion kWh. Out of this, 42 per cent of electricity generated power industries worldwide, and 28 per cent of this 42 per cent power industrial electric motors. Air compressors consume approximately 10-12 per cent of the electrical energy. With a typical air compressor ranging between 11 and 250 kW running for 8,000 hours for five years with 70 per cent loading, approximately 90 per cent of the cost incurred by the customer is the energy cost. The initial investment cost and the maintenance cost stands at five per cent each.

We also focus on ensuring zero downtime for our customers via a relentless focus on quality, reliability and highly responsive service. With this, our compressors stay up and

running and help customers achieve their productivity goals while keeping the cost of ownership low.

Internationally, we offer customers a complete range of compressed air solutions from oil-lubricated and oil-free rotary screw compressors, oil-free reciprocating compressors, and centrifugal compressors to dryers, filters and downstream accessories. Today, we have direct presence in over 26 countries and a global footprint spanning over 120 countries worldwide. Our manufacturing facilities in India, Italy and the USA power a over 400 products' portfolio. Over the years, our expansion plans have comprised several acquisitions worldwide, including Rotair SPA in Italy,

Pulford and Advanced Air in Australia, Pattons Inc, and more recently, Michigan Air Solutions in the USA.

**How has COVID-19 impacted your manufacturing units as well as the revenues in comparison to the pre-pandemic times?**

During the pandemic, we've been laser-focussed on keeping our employees safe and ensuring business continuity. We've reorganised our assembly lines to ensure stringent adherence to social distancing protocol. We've also deployed the necessary PPE and other preventive measures ranging from plastic dividers and screens between workstations, face shields for all workmen, daily disinfection of workspaces, tools, fixtures, machines, and

HMI panels between shift changeovers. Facilities for sanitisation of face shields and dispensers of sanitisers are also made available on each shop floor.

We've initiated two-shift operations in the assembly line to reduce the number of people working on the shop floor during a single session. Technology has also been a critical enabler in ensuring continuity during the pandemic-caused lockdowns - right from ensuring remote customer inspection through real-time video streaming using intelligent digital solutions and customised software and hardware to support global supply chains and operational timelines.

In terms of revenues, we ended the pandemic hit FY21 with marginal growth in our consolidated revenues at Rs

1,924 crores (against Rs 1,829 crores in FY20). The internationalisation of ELGi's business helped us in FY21 as the bulk of the growth came from North America, Europe and Australia.

**What is the next big thing that you are planning for the company's growth?**

Last year, we had a little bit of pause to take stock of what is going on and see how we can use this time a little bit more productively to bring sharper alignment to our long-term plans. We decided to break our goal down into smaller milestones. Hence, we looked at building a strategic business plan with a revenue target of \$400 million to be achieved by FY26. We are confident that we will accomplish this, and we're heading in the right direction.



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# Post-COVID trends in healthcare facility management

**Rupal Sinha**, CEO IFMS, Quess Corp reviews the use of emerging technologies in cleaning, disinfection, ventilation, and bio medical waste management in healthcare facilities

The onslaught of the mutated variant of the COVID-19 virus in the second wave has warranted constant efforts to continue the upgrade in protocols as a preventive tactic against the pandemic.

## The rise of home healthcare delivery

The demand from patients is increasingly driving the healthcare experience in terms of long distance care for non-acute cases, with enhanced technology enablement to meet expectations and address shortfalls in home healthcare delivery. Remote patient monitoring programs, digital portals offering self-service functions, and messaging services have been on rise.

Statistics show that during the pandemic, even the middle-aged, elderly and senior citizens were compelled to adopt digitised platforms for medical assistance, generating the need for healthcare professionals to facilitate online appointment booking, consultations, e-prescriptions, door-step delivery of medicine and so on, leading to several benefits of telemedicine and virtual care, including the reduced risk of spreading contagion and enabling healthcare practitioners to conduct more patient consultations per day.

## Patient-centric post-pandemic SOPs

Besides medical services, non-medical roles and services in healthcare such as house-keeping, biomedical, general engineering, biomedical waste management, patient attendants, ambulance drivers and technicians, para medical staff, dietary catering, security, clerical and a host of other healthcare assistance activities are being executed with strong emphasis on “infection control” and



Specially designed IOT-driven smart cleaning systems, steam and UVC cleaning and sanitising of washrooms, ICUs, and infection prone areas are part of the new normal ensuring maximum bacterial and viral eradication. The use of UVC robots is on rise to ensure that patient rooms, operational theatres and infection prone areas are sterilised before use, safeguarding against the spread of infection

“patient-centric” focus as a base line in training.

In the case of JCI, NABH, NABL and ISO accredited healthcare facilities, regular internal audits and periodic external audits and re-certifications are mandated to enforce accurate infection control and safety protocols. Documented standard operating procedures (SOPs) and

systems are perused and mapped with the “on ground” service delivery. Stringent guidelines of the hospital infection control committee (HICC) and pollution control norms are followed as deviations could lead to mishaps, arising from insufficient prevention measures, thus inviting unwanted medicolegal action.

## Tech-enabled facility management as an essential service

The essential role of hygiene, crowd management, security, patient care and building management generally and especially at healthcare facilities has got tremendous enhancement with the high level of technology enablement.

The pandemic environment has recognised cleaning staff as essential service providers, and the emphasis by facility management companies and healthcare clients on the use of colour-coded cleaning materials, green products, smart and robotic cleaning, clean air quality and bio waste handling has enormously increased.

Specially designed IOT-driven smart cleaning systems, steam and UVC cleaning and sanitising of washrooms, ICUs, and infection prone areas are part of the new normal ensuring maximum bacterial and viral eradication. The use of UVC robots is on rise to ensure that patient rooms, operational theatres and infection prone areas are sterilised before use, safeguarding against the spread of infection.

## Air quality control towards curbing contagion

Air quality control plays a vital role in prevention of infection and its spread. A well-maintained and operated system can significantly reduce the spread of COVID-19 in indoor spaces by increasing the rate of air change, reducing internal air re-circulation and increasing the amount of outdoor air exchange.

In the fight against COVID-19 and the efforts to adapt to the new normal, heating, ventilation and air conditioning (HVAC) systems have been revisited to be upgraded with high grade high efficiency par-

ticulate air (HEPA) filters, along with UVC air disinfection installations in central HVAC systems via ducts and air handling units (AHUs). UVC destroys airborne viruses, bacteria and fungal growth within an HVAC system. The re-circulating air in HVAC systems creates redundancy by exposing microorganisms to UVC, ensuring multiple passes to ascertain that the light energy is effective against airborne microorganisms, thus curbing contamination.

## Biomedical waste management and documentation

Another area that is extremely sensitive is bio-medical waste management, from segregation to disposal. The pandemic has made the process more challenging as the outbreak led to an exponential rise in the quantity of biomedical waste generated and the need for its disposal. Revised SOPs have been formulated by the government with stringent norms for onsite waste segregation, storing, transportation and disposal with any deviation leading to termination of licenses.

The waste is transported in a designated closed vehicle, equipped with a GPS tracker. Qualitative and quantitative data in terms of generated and disposed waste is documented and reported to the state pollution control board. According to recorded statistics, there is an increase in the quantity of biomedical waste ranging from 25 to 349 tonnes per day, in the wake of COVID-19.

Through technology enablement that is IOT-driven, with AI to generate valuable data, the healthcare industry can look forward to more efficiency, productivity and better facility management, leading to safe, secure and sterile environments.

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## Changing scenario in oncology: conferences to webinars

**Dr Vishwanath Sathyanarayanan, Dr Santhosh KD, Dr Linu Abraham Jacob** highlights the role of conferences & webinars for better training and knowledge enhancement in oncology sector

According to The GLOBOCAN 2020, the annual cancer incidence is approximately 19.3 million and around 10 million patients die globally due to this dreaded disease. In India, non-communicable diseases (NCDs) is estimated to account for 63% of all deaths, and cancer accounts to around 10%. As per the National Cancer Registry Programme (NCRP) publication in 2020, approximately 1.4 million cases of cancer were projected to be diagnosed in 2020 in India.

Medical Oncology—the specialty which deals with drug treatment of cancer has grown enormously with the development of several newer chemotherapeutic drugs, targeted therapies and immunotherapies. Targeted therapies target a distinct mutation or genetic defect in the cancer cell while immunotherapies enhance the body's immune system to destroy cancer cells. It is rather a herculean task for oncologists to keep themselves abreast with the latest United States Food and Drug Administration (USFDA) approvals of drugs and their indications for various cancers. In the year 2020, the USFDA approved several novel drugs for cancer treatment including expanding the indications for previously approved drugs.

The COVID-19 pandemic has transformed several aspects of our professional lives and most importantly the surge of e-learning which has aggrandized our understanding and updating our

knowledge in cancer. The world's largest conferences in cancer—The American Society of Clinical Oncology (ASCO) and American Society of



Dr Vishwanath Sathyanarayanan



Dr Santhosh KD



Dr Linu Abraham Jacob

These webinars, workshops and Meet the Professor series are a few elements which will keep trainees and practicing Indian oncologists gain a global perspective

Haematology (ASH) which generally host around fifty thousand cancer professionals have turned virtual during the pandemic times. Considering the huge cost involved for cancer professionals to attend these large meetings, the change to the virtual scene, though temporary, has been a blessing for many oncologists from the developing nations who were previously not able to attend ASCO and ASH.

The ready availability of slide sets for better understanding of the speakers' talks and other resources have significantly enhanced and eased the educational growth of oncology professionals globally. With a single click of the mouse, oncologists are able to connect with other oncologists globally during the virtual meetings and discuss potential research collaborations.

The oncologist / patient ratio in India is around 1 in 2000.

India has one of the fastest growing pharmaceutical industries and several novel drugs which were initially manufactured and approved in the US have seen the birth of biosimilars and generics following expiry of the patent. Hence the complicated scenarios of cancer management especially in the field of medical oncology is enormous. The role of Continuing Medical Education (CMEs) in bringing together clinicians to update their practical skills and clinical decision making has been highly productive in the last decade or two. However there have been limitations in bringing the oncology community together physically on a single platform considering the work stress and immense patient related activities.

Virtual learning in India mainly saw the birth since the start of COVID pandemic and it was possible to get the profes-

sionals from different divisions of oncology (medical, radiation, surgical oncology, pathology and radiology) together on a single platform. Cancer management relies on multidisciplinary tumour boards and this virtual platform has only eased the process of discussion and delivering the best possible patient care.

We, medical oncologists along with advisors from top medical schools in the US have put together a virtual educational resource portal for the entire oncology community. CPOEM (Creative Portal for Oncology Education and More) and other CME organizations are such initiatives in this direction. The idea is to have frequent webinars with top notch and highly prolific speakers from across the globe and India to update and educate the practicing clinicians in India. Though early days, such platforms have gained tremendous

popularity with over 150-200 oncology professionals attending every session. Pre-test and post-test questionnaires engage attendees and makes the webinars more thought provoking.

Educating oncology nurses is also the need of the hour and these platforms should also focus to get together the entire pool of oncology nurses in our country to better their education and practical skills which will go a long way in making cancer treatment safer.

DM and DNB (the training programmes in India recognized by the Medical Council of India) trainees in oncology are the future practising oncologists and it is of paramount importance to train them adequately in clinical skills, acumen and knowledge base. These webinars, workshops and Meet the Professor series are a few elements which will keep trainees and practicing Indian oncologists gain a global perspective. This also gives adequate opportunities for trainees to interact with Professors of international repute from various parts of the world.

Lastly, this virtual E learning is here to stay and will help continue continuing medical education for oncologists globally.

### Authors:

*Dr. Vishwanath Sathyanarayanan*<sup>1</sup>, *Dr. Santhosh KD*<sup>2</sup>, *Dr. Linu Abraham Jacob*<sup>3</sup>  
1. Consultant Medical Oncologist, Apollo Hospitals, Bangalore, India  
2. Associate Professor, Department of Medical Oncology and Chief of Stem cell transplantation, Bangalore, India  
3. Professor, Department of Medical Oncology, Kidwai Cancer Institute, Bangalore, India



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## INTERVIEW

# Bayer Radiology: Clear direction from diagnosis to care

Finding a disease early on can have a great impact on treatment. A doctor must know their patient's specific disease, as well as how far the disease has progressed, before they can develop a treatment plan. **Mr Rahul Sali**, Country Head, Bayer Radiology, India talks about Bayer's contribution in the revolutionization of Radiology sector in India

**Bayer globally has 100 years of leadership in Radiology. The company's India operation offers contrast media for Computed Tomography (CT), Magnetic Resonance Imaging (MRI), CT/ MRI devices for precise contrast media administration with informatics solutions. How are you reimagining the space to help radiologists deliver superlative diagnosis and care in India? Please discuss.**

Patient safety and individualized care have always been at the forefront of medical decisions at Bayer. Hence, we are committed to excellence in Radiology, from delivering innovative products to high-quality services. Our comprehensive portfolio, spanning contrast media for Computed Tomography (CT), X-Ray, Magnetic Resonance Imaging (MRI) and respective injection systems, supports the entire patient journey. Our devices provide precise, controlled administration of contrast media and include smart features enabling efficient workflows and individualized care and management.

By catering to local patient needs, we aim to help diagnose numerous conditions and guide procedures such as surgery, biopsy and radiation therapy, as well as help monitor treatment success. With our global expertise in the field, we endeavor to drive further innovation in Radiology that significantly improves efficiency and diagnostic quality, while enabling better patient outcomes.



The rise of digital applications has created more avenues to enable value-driven patient care. By leveraging our network of academia and leading experts, clubbed with our passion for Radiology, we can accelerate the development of digital imaging solutions, including artificial intelligence. These aim to support the complex decision-making process of radiologists while helping patients through early disease management and interventions.

**Medical imaging has become even more vital during the COVID-19 pandemic. How is Bayer Radiology contributing, in terms of solutions and products, to patient diagnosis and care and helping healthcare**

**practitioners during the pandemic?**

Early and accurate diagnosis through reliable medical imaging have always been essential to enable timely care and interventions. Medical imaging played a prominent role during the pandemic, evolving in line with the shifting needs.

As a life science company with significant expertise in Radiology, Bayer has remained committed to providing high-quality services, even during the pandemic, across our portfolio of CT, X-Rays and MRIs and other devices. This has been vital to ensure a continuity of care to patients, even in the midst of the pandemic.

To address the constantly changing demands, multi-stakeholder collaborations

and the sharing of reliable, transparent information to ensure adequate awareness and a strong pandemic response is essential. Leveraging our expertise, Bayer Radiology consolidated relevant information, including from eminent publications, to equip healthcare practitioners (HCPs) with relevant information on the role of imaging during COVID-19, disease characterization and disease management. These findings form an integral part of our comprehensive Radiology Society Recommendations. We also showcase an overview of key evidence-based data in line with this, which is updated every three months and can be found at <https://www.radiology.bayer.com/academy/COVID-19>.

Hygiene and disinfection are also emerging as core needs amid the current times, even for medical devices. Addressing these, we collated key findings and important instructions into a Device Disinfection booklet for HCPs.

**What have been the recent innovations in medical imaging from Bayer Radiology?**

At Bayer, we find it important to 'Think Ahead. Plan Ahead. Stay Ahead'. We aim to be the trusted partners to radiologists, promoting enhanced patient care through high-quality products and services.

Bayer's CT injection systems, for instance, are based on tried-and-tested technology and have an excellent track record. Bayer's

significant, 100-year expertise, comprehensive service networks and expert clinical support ensure customers receive reliable solutions. Expanding our portfolio, we have launched the next big step in CT Injector technology in India - MEDRAD® Centargo, an innovative CT injection system that is internationally recognized for its expert product design. It was recently honoured as a Red Dot Award (2020) winner, validating its beneficial design. With the increasing pressure on radiology departments and equipment, there is an urgent need to use devices that are designed to maximize efficiency and automate workflow.

**Key features of Centargo include:**

- ◆ An integrated barcode reader for contrast data capture
- ◆ Automated documentation for access to contrast and injection information in PACS
- ◆ Smart protocols to calculate individualized injection parameters
- ◆ Advanced scanner connectivity for protocol exchange and device synchronization

The Radimetrics Enterprise platform is another innovative Bayer Radiology product that optimizes radiation dosage management through advanced analytics. This smart solution helps radiology teams worldwide generate quality diagnostic images consistently and efficiently, in line with radiation regulations, thus advancing patient care.

**Bayer Radiology has recently reconfigured its operations in India. How does it pan out?**

Until April 2021, Bayer Radiology was operating as a separate Medical Device and Contrast Media (Diagnostic Imaging) business. Starting May 2021, Bayer has set its own team of Sales and Service engineers under 'One Bayer Radiology' in India. By strengthening the footprint of our Radiology business in India, we can directly reach our customers, which is important to enhance customers' confidence in the business by interacting directly with the company. This move is aimed at enabling the freedom to operate and improve the control of the business to streamline better service.

With this shift, we are also open to new partnering opportunities with leaders in the Radiology globally, to offer enhanced services to Indian customers. We have joined hands with Tema Sinergie and Iradimed for nationwide distribution of their innovative product portfolio.

**How will the new development re-position Bayer in the market, deepen association with its existing customers and build new customers in India? Please outline.**

We aim to enhance the customer experience of our products through a Go-Direct model that will open opportunities for closer partnerships with the medical community. As markets around the world evolve and healthcare institutions explore new business models, having a strong direct presence and reach with consumers allows us to stay ahead of the curve and implement business strategies which will ensure strong sustainable growth despite the unforeseeable challenges due to the COVID-19 pandemic.

With the value-range segment growing fast in other global markets such as Latin America, Middle East and Africa and South East Asia, the India context could also witness positive growth in response to our efforts, especially as we continue to be the market leader in Medical Device value range segment, with 90% of total market share. The direct footprint helps us offer improved service standards for our customers, enabling the local radiology team to have better communication with customers and greater control over service level agreements and delivery. This can better support our key customers' institutions as patient volumes increase.

**What are the interesting products from Bayer in the clinical research pipeline?**

Contrast enhanced imaging has become a permanent fixture in radiology and we believe it is here to stay. With contrast media playing a major role, new techniques will help general novel insights and lead to incremental innovations, such as new indications. However, enhancement rates are not where they should be. If you look at CT imaging, enhancement rates are between 40 and 50 percent or up to 60 percent in highly developed countries. In MR imaging, we also find quite interesting differences - India has an enhancement rate of around 18-20 percent, whereas Germany's is around 40 percent. However, there is still scope with regards to the use of contrast media and training of radiologists and radiographers.

Bayer Global Clinical research pipeline is based on three pillars with research on marketed products being a priority. A current example is a test series on aspects of efficacy and safety of X-ray contrast media. We are looking very closely at potential skin reactions and late reactions. We continuously look into our products and monitor application data so we can update these according to new and improved standards.

The second pillar is focused on new contrast media, for MRI and CT. Their development is in different phases. For example, one project we are currently pursuing involves new compounds, which has a fascinating chemistry base. The Bayer labs have the power to both synthesize and evaluate these new molecules, which can enhance advancements. We are also working on concepts for contrast media for new imaging techniques, called Magnetic Particle Imaging. With a scanner manufacturer, along with other partners, we explored the potential of this technology for diagnostic imaging and have been able to attract third-party funds from the German Federal Ministry of Education and Research. We aim to continue exploring such collaborations going forward.

The third pillar, as a key opinion leader, is to facilitate reliable information sharing, and customer support. We share our lab with our clinical partners, acting as their extended workbench. At Bayer, we wish to collaborate and investigate clinical questions in a pre-clinical setting. We're currently working on some interesting work in this direction, including innovations facilitated by key partnerships.



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# How to control water activity in pharmaceutical packaging

In the terms of the pharmaceutical industry, water activity is an important metric as it tells about how much moisture is available in a pharmaceutical product for reacting with other substances

Numerous studies are carried out at CILICANT to understand the processes behind the challenges faced by formulators and manufacturers when it comes to pharmaceutical packaging. It's only by doing so that we can develop products that tackle issues that cause the degradation of pharmaceutical products successfully.

One area in which we have invested considerably is in studies related to water activity, or equilibrium relative humidity (ERH), as it is more commonly known. As a result, we have discovered that the use of relative humidity regulators is the best desiccant choice where water activity must be maintained within a narrow range.

To understand why, we need to look at the science behind it.

## Defining and determining water activity

Water activity is defined as the ratio of the vapour pressure of water in a given sample (P) to the vapour pressure of pure water (P<sub>0</sub>) at the same temperature. The formula used is:

$$a_w = \frac{p}{p_0}$$

Pure water has a water activity of 1.0, while other substances fall along a sliding scale from this upper limit towards a water activity value of 0.0, indicating complete dryness. When it comes to packaged pharmaceuticals, it's more convenient to express water activity in terms of the equilibrium relative humidity (ERH) of the sealed system. The equilibrium relative humidity expresses the water activity as a function of the packaging environment and the relationship between the two is represented by the following equation:

$$\text{ERH}(\%) = a_w \times 100$$

Next it's important to understand the difference between 'water activity' and 'water content', as they are different concepts. Water (or moisture) content of a pharmaceutical is



typically used to refer to percentage of water molecules in a product, while water activity is a measure of how reactive those water molecules are.

Although there is no direct formulaic approach to plotting the relationship between water content and water activity, the changes in the relationship between water content and water activity is known as a 'moisture sorption isotherm' and can be determined for each pharmaceutical product. As the composition of the product changes so too will the moisture sorption isotherm.

There are several ways to determine the water activity of pharmaceuticals. The dew point or chilled mirror method is the gold standard. Here, specialised instruments measure the temperature at which air (at moisture equilibrium) condenses on a polished, chilled mirror exposed to a test sample of the product. This temperature is referred to as the dew point and determines the estimated relative humidity of the sample. Other approaches involve the use of capacitance hygrometer sensors or resistance hygrometer sensors.

## Water activity and protecting pharmaceuticals

In the terms of the pharmaceutical industry, water activity is an important metric as it tells us how much moisture is available in a pharmaceutical product for reacting with other substances. Unlike moisture content, water activity accounts for the energy levels of this water, which will impact on the shelf-life of pharmaceutical products. Since

pharmaceuticals have different water activity values, by measuring water activity we can evaluate how resistant a pharmaceutical product will be to microbial contaminants. After that, we can assess the best ways to package product in order to maintain a water activity range that is optimal against microbial growth.

Of course, pharmaceuticals come in a combination of formats, such as gel capsules and powder, depending on the most effective delivery mechanism to induce the effects of the medication on the human body. The key is the difference in water activity between the two materials. As moisture moves from a region of high-water activity towards one of low water activity, the disparity can lead to issues, such as the cracking of gel capsules or an increase of water activity in the powder.

Many pharmaceutical packaging solutions incorporate the use of one or more desiccants to regulate moisture levels. Together, these aim to bring about low water activity to protect products against microbial proliferation and other degradation issues due to moisture build-up. However, where the ERH of the packaging environment must be maintained within a specific range, these 'standard' desiccants may cause over-desiccation.

## Introducing ACCUFLIP: a better way to regulate water activity

CILICANT has addressed this issue by creating a new range of products - ACCUFLIP. These moisture-regulating sorbents,

or humidity regulators, are a new type of desiccant designed to maintain a stable ERH within packaging. Unlike traditional standard desiccants that can be too aggressive when reducing moisture, moisture-regulating sorbents maintain the ERH of the packaging at an optimum level, allowing for an optimal shelf-life. Furthermore, these moisture-regulating sorbents can be adjusted to meet the requirements of specified ERH levels, making them highly versatile and ideal for a wide range of pharmaceutical packaging scenarios.

## ACCUFLIP applications

Since humidity regulators can regulate water activity in all forms of pharmaceuticals, the application potential is huge.

For instance, in gel capsules, the water activity of the exterior coating needs to be maintained at a level that prevents the coating becoming brittle as a result of very low ERH, or becoming sticky as a result of high ERH. As moisture-regulating sorbents take up and release moisture as required to maintain a constant ERH, the gel capsules are protected from both high and low ERHs. A standard desiccant would be ineffective in this instance as it would aggressively remove moisture from the environment, potentially leading to a very low ERH and low water activity, resulting in capsule brittleness.

Another application can be seen with dry powder inhalers, widely used for delivering of drug doses to the lungs. It's essential that these devices are packed in an environment with a stable ERH as moisture fluctuations have negative effects on the stability of the product, detrimentally impacting efficacy for end-users. A high ERH here would result in powder particles clumping together making efficient drug delivery to the lungs problematic. Here, moisture-regulating sorbents prevent moisture levels becom-

ing too high or too low, where standard desiccants would over-desiccate and create electrostatic charges, potentially lowering the dose available to lung tissue.

## ACCUFLIP - a new tool in pharmaceutical packaging

Clearly, the importance of a well-regulated water activity in the stability of many pharmaceutical dosage forms cannot be over-emphasised. While traditional, standard desiccants can lower water activity in packaging environments and extend the shelf-life of pharmaceuticals, they can also lead to over-desiccation. In these scenarios, moisture-regulating sorbents, such as ACCUFLIP, provide an effective alternative that helps to keep the ERH of packaged pharmaceuticals at an optimal level for longer shelf stability.

CILICANT always looks at new and innovative ways of solving problems for our clients in the pharmaceutical industries and believe that these desiccants will play a vital role in the pharmaceutical packaging industry as more products requiring strict ERH levels come to market.

To see the full white paper related to this article, visit [www.cilicant.com](http://www.cilicant.com)

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# Mispa Count X - The first made-in-India hematology analyzer

Mispa Count X's performance is based on smart impedance technology and a unique algorithm

**H**ematology is one of the major segments in the IVD market in India which was estimated at ₹1400 crores in the year 2019. The segment is controlled by 3-part hematology analyzer and reagents with a market share of 65 per cent. The three-part hematology market in India is estimated with 12,000 units annually which is dependent only on the import and the major suppliers are from China, Europe, Japan and US. Currently the imported systems are costing from ₹2,00,000 to ₹ 3,50,000 per instrument to the laboratories depending on the country of origin. The recurring cost of these systems starts from 10-12 rupees/test to the laboratories.

Out of the 55,000 laboratories in India more than 40,000 laboratories are in the Tier-II and Tier-III segment covering the rural population with limited access. The penetration of Complete Blood Count in rural areas will help to assess the prevalence of various anemia (which is one of the major concerns in India) among the rural population and its controls which is an objective of the NRHM and an affordable and accurate three-part hematology analyzer is the need of the hour.

As per the statistics, more than 70 per cent of the Indian population lives in the rural area and the benefits of the IVD technology remains underserved to the patients in the rural area. The instrument cost and the recurring cost are the limiting factors in this segment. Our aim is to provide the instrument at ₹ 1,50,000 with a recurring cost less than 8 rupees/test

Mispa Count X is India's first indigenously built 3-part haematology analyser that



**Out of the 55,000 laboratories in India, more than 40,000 laboratories are in the Tier-II and Tier-III segment covering the rural population with limited access. The penetration of Complete Blood Count in rural areas will help to assess the prevalence of various anemia**

promises to revolutionize the diagnostics landscape in India particularly on the backdrop of the affordability aspect it enables.

Established in 1994, Agappe Diagnostics has grown over the years and became a well-known brand name in the Diagnostics Industry in India. Our production capability is 1,20,000 kits per month for our reagent facility and 1250 Instruments per month for our equipment facility. AGAPPE is the second IVD company to receive the ICMED certification in India.

Mispa Count X's performance is based on smart impedance technology and a unique algorithm. In terms of size,

Mispa Count X is a compact system with a minimum requirement needed in terms of laboratory space. Mispa Count X is having HighTech Laser cut Ruby aperture of 70 micron for RBC - Platelet and 100 Micron for WBC. The system can deliver 60 tests/hour and provides 20 parameters along with three histograms that can be viewed on a single screen. To enhance user experience, Mispa Count X has touchscreen interface with onboard real time reagent inventory and 35,000 patient data storage capacity. For robust and precise operations, Mispa Count X has a unique fluidic system using proven PTFE syringes. The fluidic design is conceived to

minimize reagent consumption. Agappe has one of the largest haematology reagent manufacturing facility in Asia-Pacific with a capacity of more than 20,000 Litre per batch. Mispa Count X reagents are formulated to deliver accurate results at most affordable cost per test. The Count X can provide advanced continuity of care for clinical laboratories, regardless of their size.

Agappe aims at providing global standard of care at Indian prices, affordable and accessible to the rural Indian population. We take pride in our innovations we bring forth and always push to introduce the most updated technologies to be mass produced at a

competent price to benefit the masses.

With our Haematology Project, we aim to reach the masses with this instrument that is placed across India penetrating the unreached territories. A purpose to bring down the cost per test to make health care affordable so that it can be considered as a basic right of an Individual without compromising on the quality and the comparability of the test. Our aim is to change the way we perceive Healthcare from the Reactive Approach to a more Pro-Active approach for Diagnosis.

COVID-19 has created a drastic change in the IVD Segment globally. This has created a new trend that emphasizes COVID-19 screening and the related parameters that elevates once diagnosed with the disease. Haematology segment had also seen its demand due to the importance of WBC estimation for the COVID-19 prognosis. The Mispa Count X will play a crucial role in this regard. An indigenous product will be instrumental in this juncture for moulding the modern India. Agappe, with its emphasis on technology development, aims at providing global standards of care at affordable Indian prices and making it accessible to the country's rural population and nearby developing countries. We take pride in its innovations by introducing the most updated technologies, with scaled up manufacturing capacities offering competitive prices. Agappe's vision is to be a leading partner in the nation's efforts to achieve the millennium goals of Health for All by making available technologically advanced, high quality and inexpensive diagnostic tools.

# Powering efficient patient monitoring - New range of B1x5 patient monitors from GE Healthcare

GE Healthcare continues to support healthcare professionals through technological innovations

GE Healthcare's B1x5 series of Patient Monitors, launched in Q4 2020, is a thoughtful innovation that provides accurate and timely medical data, powering enhanced care for patients across care areas. Designed to monitor critical healthcare parameters of patients, this system helps one quickly take charge of patient conditions with the help of National Early Warning Scores (NEWS) and efficiently assess the level of consciousness.

NEWS is a useful, simple physiological scoring system for assessment and risk management of medical emergency admissions<sup>1</sup>. One can monitor essential vital signs (ECG, SpO2, Temp, NIBP, RR) and easily scale to advanced parameter modules like respiratory gases and anesthetic agents, NMT and Entropy™ - up to three advanced parameters simultaneously. These accurate, reliable, and easy-to-use monitors enable simple and intuitive workflow with a choice of 10-, 12- or 15.6 inch touch screen displays.

Early Warning Scores (EWS) is categorized into three classes to understand the severity of risk. The higher score indicates a greater severity of illness and risk of adverse outcome.

Research and analysis across the globe have provided evidence of benefits of EWS.

It is a simple and cost-effective bedside tool for the assessment of severity and prognosis of sepsis caused by Gram-negative bacteremia<sup>2</sup>. A review of 33 EWS found that NEWS was the most effective in predicting patients at risk of cardiac arrest, unanticipated intensive care unit admission or death within 24 hours<sup>3</sup>. The real-time score is able to assist clinical decision making and enable

more actionable and effective individualized care for patients' better health outcomes in target medical facilities<sup>4</sup>. It enables medical staff to recognize an acute illness or deterioration of a patient even before the critical deterioration of vital signs<sup>5</sup>. It measures and classifies cardinal vital signs, which offers an easy way to track and respond to changes in patient's condition.

## The exceptional features and enhancements of B1x5 Patient monitors

B1x5M range of monitors come with Value Software Platform (VSP 3.0). Below are some of the enhancements this range comes with

NMT Measurement
ICU and OR Environment
12 Lead ECG
Trending NIBP
PPV and SPV
Bed to Bed View
EWR
e-Manuals
Full disclosure - Increased to 72 hours

## Dependable and Secure

Built to perform, the B1x5 range of modular monitors can be deployed seamlessly across a variety of care settings and



Bed to Bed View



12 Lead ECG

Date	Time	NIBP	PR
19 Jun	15:51:27	120 / 80 (90)	80
19 Jun	15:46:27	120 / 80 (90)	80

Trending NIBP

patients. Its integrated yet configurable view allows hemodynamics, airway gases, and expanded parameters to be displayed on a single screen. The system can be connected to a centralised server, capturing realtime information about the patient. The mode determines control of vital settings,

including screen displays, limits for alarm raising and parameter defaults.

The B1x5 series of patient monitors are built from quality materials and are rigorously tested to perform in demanding conditions. These lightweight and low-maintenance monitors are designed to

deliver high uptime and can be maintained and serviced remotely. The monitors also resist multiple types of cyberattacks and follow the FDA Draft Guidance for cybersecurity in medical devices. Scalable, flexible, and easy to configure, you can count on them to create a simple and intuitive workflow and deliver reliable, premium clinical performance at any time.

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1. Vanamali D. R, Sumalatha N, Sriharsha Varma. The Role of National Early Warning Score (News) in Medical Emergency-Patients in Indian Scenario: A Prospective Observational Study. *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 13, March 31; Page: 3524-3528, DOI: 10.14260/jemds/2014/2315
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sis in patients with Gram-negative bacteraemia and sepsis 27071911

3. Smith GB, Prytherch DR, Schmidt PE, Featherstone PI. 2008. Review and performance evaluation of aggregate weighted 'track and trigger' systems. *Resuscitation*: 77:170-179.

4. A Real-Time Early Warning System for Monitoring Inpatient Mortality Risk: Prospective Study Using Electronic Medical Record Data. PMID: 31278734 PMID: PMC6640073 DOI: 10.2196/13719

5. The new software release including hospital configurable EWS functionality was developed with agile schedule.

NEW SCORE	CLINICAL RISK	RESPONSE
Aggregate score 0 - 4	Low	Ward - based response
Red score Score of 3 in any individual parameter	Low - Medium	Urgent ward - based response*
Aggregate score 5 - 6	Medium	Key threshold for urgent response*
Aggregate score 7 or more	High	Urgent or emergency response*

<https://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2>

# Enabling seamless breathing - Range of Carescape R860 ventilator from GE Healthcare

The Carescape R860 ventilator is GE Healthcare's solution to address the major concerns of intensivists and modern ICUs with clinical decision support tools (CDST) from where clinicians don't need to look beyond

At GE Healthcare precision health took precedence and innovation focus is meant to elevate care as well as to deliver optimum patient outcome. GE is a holistic healthcare solution provider from diagnostic imaging, contrast media, therapeutic products, digital solutions and pro-

better about the ventilator science that GE Datex Ohmeda does!

The Carescape R860 ventilator is GE Healthcare's solution to address the major concerns of intensivists & modern ICUs with clinical decision support tools (CDST) from where clinician don't need to look beyond.

lung mechanics package as standard and a rich set of modes that can cater to any patients need. Especially of importance is the SBT mode which is akin to auto-cruise mode helping clinicians to time the weaning process and plan extubation without dependency on external devices.

**needed:** Interactive touchscreen slider controls of master timeline in trend views reveal event-centric historical data that lets you take a snapshot into the past. This allows for a deep dive to compare settings, measured values and alarms within a specific period of time. We've also made alarm

Data being the treasure house and provides insights about fact that were not meeting eyes, R860 holds 72 hours of complete dataset with high resolution that can be recalled anytime for troubleshooting. Combining the strength with the High Acuity Critical care suite 'Centricity - Critical Care' will offer end to



ductivity tools. Among various flagship product that redefines the boundary of care, the GE Ventilator Carescape R860 is one, that was ahead of its time when it was launched in 2014. GE's product strength comes from technical knowhow derived from the legacy Datex Ohmeda which has nearly a 100 years old history in anesthesia. Well, that says all, who knows

R860 features some of industry first such as time-line navigation where clinicians can toggle between past, present and future (the CDST) views with a swipe of finger, different non-intimidating views for different caregivers, intelligent alarm management system, integrated drug delivery system and high-resolution information management system. It offers entire

## User benefits

◆ **Menu-free navigation:** The user interface on the CARESCAPE R860 represents a leap forward in touchscreen technology. Intuitively organized and easily accessible, relevant clinical content and therapy controls are not buried in menus, they are at your fingertips.

◆ **Keep your focus where**

management easier to manage by centralizing alarm functions and making patient alarm history easy to find with a single touch.

◆ **Tailored care:** Through useful data to support clinical decisions and convenient workspaces that can be customized for each patient, you can confidently provide tailored therapy with a touch of brilliance. With

end solution regarding patient condition, with intelligence to predict the probable future outcome as scores guiding clinicians to titrate therapy to improve outcome.

R860 sets the trend for how a premium ventilator should be and it is rightfully the leader in high-end ventilator segment commanding more than 40% market share in 2018 & 2019.

# Infertility: 3D ultrasound and a new user-friendly ultrasound system

An introduction to Voluson SWIFT+ by **Manuela Costa**, CNM, **Jean Paul Rouleau**, MD and **Angela Palumbo**, MD, PhD, Centro de Asistencia a la Reproducción Humana de Canarias, Tenerife, Spain and Clinica Quisisana, Rome, Italy

Ultrasound imaging is of paramount importance in Obstetrics and Gynaecology. The annual gynecologic visit is often accompanied by an ultrasound examination, which allows evaluation of the ovarian cycle, uterus, endometrium, ovaries and other pelvic structures as well as diagnosis of adnexal/uterine pathology. In Obstetrics, ultrasound allows precise dating of pregnancy, non-invasive prenatal diagnosis, anatomic evaluation of the foetus and evaluation of foetal growth as well as follow up and timing of delivery in pathologic pregnancies. In reproductive medicine, ultrasound is key to diagnosing causes of infertility, monitoring follicle growth and procedural guidance for treatment.

Over the past 15 years, technology has allowed dramatic improvements of ultrasound devices and image quality and three-dimensional ultrasound has gradually been introduced in clinical practice. While obstetrical 3D scans have initially focused on obtaining "pretty pictures" of the baby, especially the face (figure 1), new applications have more recently emerged, which improve the diagnostic precision of ultrasound examinations.

## Introduction

In Gynaecology and Reproductive Medicine in particular, 3D has gradually emerged as an important, and we would say essential, diagnostic tool. Numerous tools are now available that enable easy acquisition, post-processing and rendering of acquired volumes resulting in improved diagnostic precision. Software packages for evaluation of tubal anatomy with Hysterosalpingo Contrast Sonography (HyCoSy),\* ovar-

ian reserve assessment with automated, rapid and precise antral follicle counts as well as automated follicle monitoring to determine optimal timing for oocyte retrieval for IVF have all helped to enhance efficiency and accuracy in Reproductive Medicine.

Recently, a new system was introduced by GE Healthcare, the Voluson™ SWIFT+ (figure 2), which was designed with the infertility specialist in mind. The new system combines all the advanced features and dedicated reproductive medicine packages with a very user-friendly design.

This paper will focus on the clinical benefits of 3D ultrasound and automation using the Voluson SWIFT+ and includes images highlighting the software packages, technologies, tools and image quality that we routinely use in Reproductive Medicine.

## Benefits of 3D ultrasound in reproductive medicine

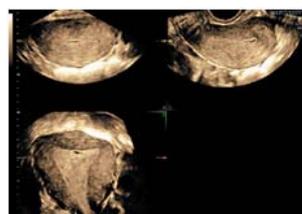
We believe that 3D ultrasound plays a pivotal role in infertility workup and in in-vitro fertilisation. For years, we have included 3D ultrasound not just for our infertility workup and follicle monitoring, but also for pregnancy confirmation and early pregnancy assessment.

The use of 3D has become essential for us during a patient's first visit for the evaluation of ovarian reserve, uterine morphology, and the fallopian tubes. Most often, we also include 3D sonohysterography to complete the study of the uterine cavity and tubal patency/anatomy. We refer to this as the "One-Visit Infertility Workup."

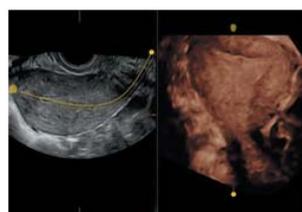
We will now provide a few examples of ultrasound images obtained using the Voluson

SWIFT+ illustrating its image quality, and the advantages of 3D and of the different tools and software packages.

## Uterine morphology



3a: 3D Multiplanar Reconstruction (MPR)



3b: OmniView with VCI

**Figure 3:** Normal uterus - menstrual phase. 3D ultrasound allows visualisation of the coronal plane, which is essential to evaluate the shape of the uterus; VCI (Volume Contrast Imaging) increases contrast and improves image quality. OmniView is a useful tool that allows delineation of the uterus with improved image quality.



4a: Sagittal uterus with trace line

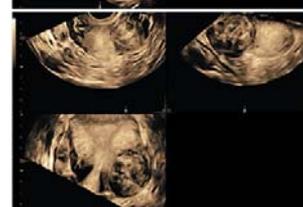
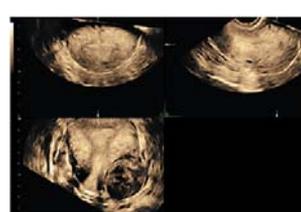
**Figure 4:** Normal uterus acquired using Uterine Trace, a new feature that enables easy visualisation of the coronal plane of the uterus. From a standard sagittal view, the endometrium is traced on the



4b: Automatically acquired coronal plane

touch screen and the system acquires the volume, automatically displaying the coronal plane.

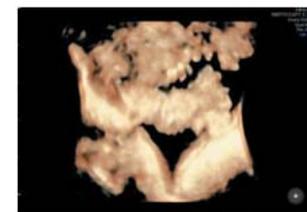
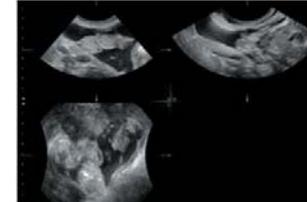
## Uterine fibroids



**Figure 5a, b:** Uterus with a 4 cm isthmic fibroid. The coronal plane allows accurate preoperative localization/mapping of the fibroid. In this case, 3D ultrasound gives information comparable to MRI, while being more accessible and cost effective. c, d: 3D sonohysterogram (same patient) allows better definition of the distance between a fibroid and the uterine cavity as well as identifying intrauterine lesions and micropolyps. e: Rendered 3D image of the same uterus using HDlive.

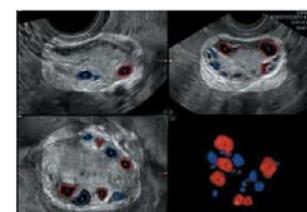
## Fallopian tube assessment

**Figure 6:** Sonohysterogram of tortuous fallopian tube with thickened wall evaluating tubal



patency. Peri-adnexal fluid facilitates visualization of the tube in 2D and acquired volume.

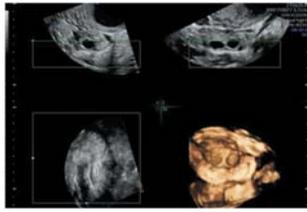
## Assessment of the ovaries at baseline



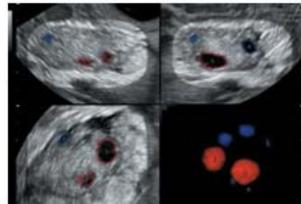
**Figure 7:** Antral follicle count using the SonoAVC™ antral (Sonography-based Automated Volume Calculation antral) tool. This tool allows for a quick and precise automatic identification and count of antral follicles and their volumes and reduces inter-observer variability.

## During Stimulation

Monitoring follicle growth with 3D has become an essential part of our practice.



8a: 3D with volume rendering



8b: SonoAVCantral tool  
Figure 8. Rendering of a fallopian tube and automated follicle count of the same ovary using the SonoAVCantral tool

SonoAVCfollicle (Sonography-based Automated Volume Calculation follicle) is a very useful software, which allows quick and precise automatic measurements of follicle diameters and volumes. Since follicles have irregular shapes and are not perfect spheres,

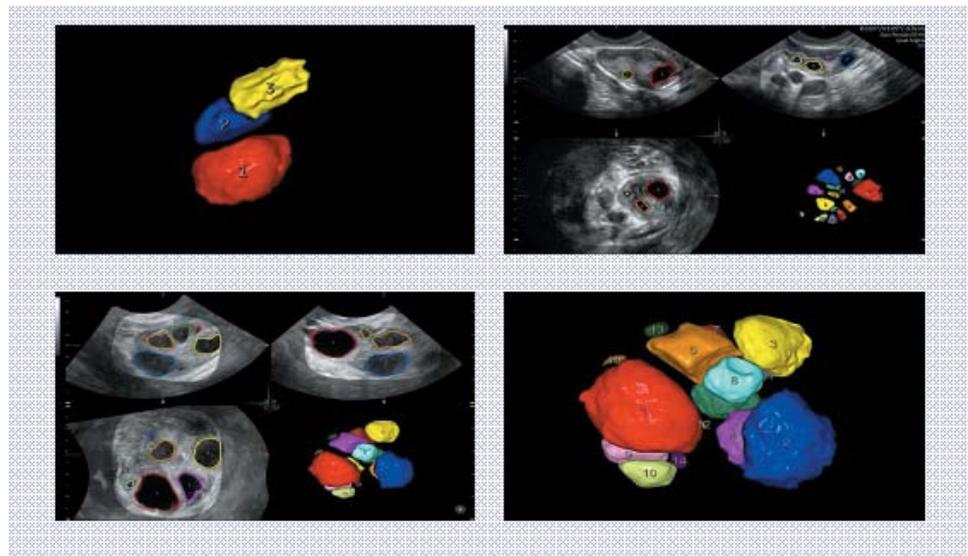
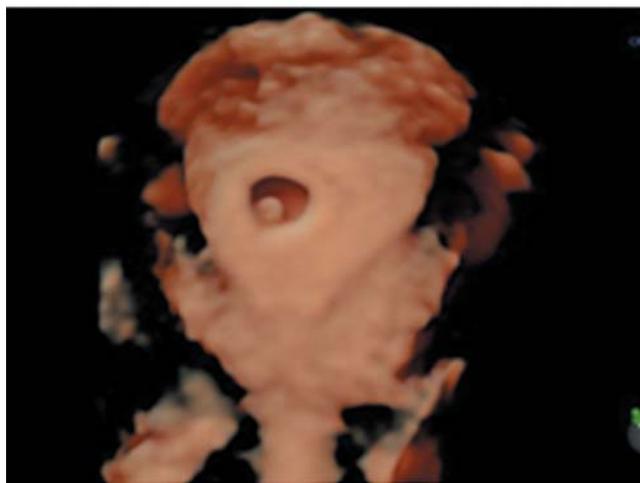
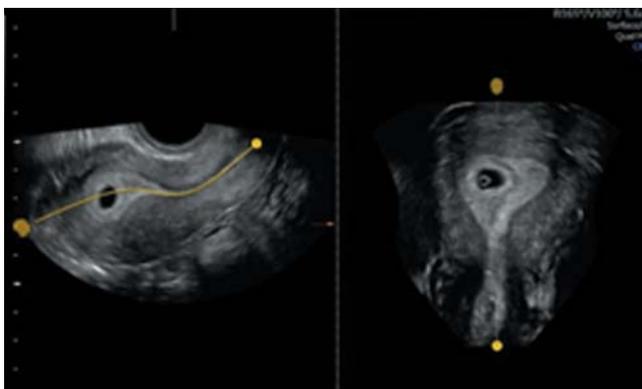


Figure 9: SonoAVCfollicle automates follicle measurements eliminating the need for time-consuming manual measurements.

measurement of the third dimension during follicular monitoring makes the overall measurement more precise. Moreover, follicular volumes have been demonstrated to have a better correlation with the retrieval of mature oocytes (Rodríguez-Fuentes A., et al.



10a: HDlive rendered image



10b: OmniView  
Figure 10: Early IVF pregnancy (5+3 weeks).



Figure 11: HDlive rendered image of a 9-week pregnancy.

2019). Studies in our laboratory have shown that follicles with volumes greater than 0.7 cc are associated with mature oocytes, and this information can be helpful to decide the day of trigger (Hernandez et al. 2009; Hernandez J. et al. 2016). We further tested the

SonoAVCfollicle software in egg donors, comparing manual and automatic measurements and found that SonoAVCfollicle is a more accurate and efficient method to monitor ovulation induction in this population (Hernandez J. et al, 2009; Sanabria V. et al, 2009).

## Pregnancy Confirmation

Utilizing 3D during pregnancy confirmation has also become part of our practice protocol. The first ultrasound, where parents are able to visualize a viable pregnancy is very emotional for many patients undergoing fertility treatment. A 3D rendered image adds a unique perspective and can make it seem even more real.

## Authors

**Angela Palumbo, MD, PhD, FACOG**

Dr. Palumbo is a board-certified obstetrician gynaecologist (Yale-New Haven Hospital, Yale University, 1988-1992) and infertility specialist (Brigham and Women's Hospital, Harvard University, 1992-1994), and the founder and medical director of Centro de Asistencia a la Reproducción Humana de Canarias (FIVAP) in Tenerife, Spain. Major research interests are in ovarian physiology (ovarian renin-angiotensin system, ovarian sirtuin expression), and clinical interests are in the field of 3D ultrasound in Reproductive Medicine, early pregnancy and hysteroscopic surgery.

## Manuela Costa, CNM

Ms. Costa is a certified nurse midwife and graduated in 2012 from the Università La Sapienza of Rome, Italy. She joined the FIVAP Clinic in 2013 and works both in Rome at the Clinica Quisisana and in Tenerife. Over the years, Ms. Costa has specialized in Reproductive Medicine and 3D ultrasound.

## Jean Paul Rouleau, MD

Dr. Rouleau is the director of the IVF program at Centro de Asistencia a la Reproducción Humana de Canarias (FIVAP). Following his residency in Obstetrics and Gynaecology, he specialized in Reproductive Endocrinology and Infertility with a particular interest in 3D ultrasound and Reproductive Surgery. In 2018, he obtained the ESHRE Certification in Reproductive Endoscopic Surgery and is currently pursuing a PhD at the Universidad de la Laguna in Tenerife. The focus of his thesis is the hysteroscopic treatment of spontaneous abortion and genetic studies on products of conception.

# Trivitron enhancing women's health through world-class breast imaging products

Mammograms are miraculous in the way that they enable to detect a breast lump even before you would have felt it. **Sudip Bagchi**, President-Imaging & Critical Life Support Solutions, Trivitron Healthcare highlights the role of early breast cancer screening for better treatment

**B**etter late than never is not just an adage, it's a wake-up call for self-assessment and early supervision of a confused circumstance that could translate into a positive one.

So is the case with early detection of breast cancer because when detected early, it can lead to the best chances of effective treatment associated with an increased number of available medical options, higher survival rates and improved quality of life.

Did you know that breast cancers found during screening exams are more likely to be smaller and still confined to the breasts in comparison to those detected at later stages?

Early screening is important because abnormal breast tissues or cancer may be easier to treat. On the contrary, when one waits for the symptoms to appear, the cancerous cells may have begun to spread and would get harder to treat.

According to the American Cancer Society, when breast cancer is detected early in the localised stage, the five-year relative survival rate is 99 per cent. Early detection includes monthly breast self-exams, regular clinical breast exams and last but certainly not the least, mammograms.

The earlier you get accustomed with the size, shape and orientation of your breasts,



the sooner you can detect lumps and abnormalities in the appearance of your breasts and the faster you can alert your healthcare expert - who may notice a suspicious place that fails to register as a warning in your mind.

Mammograms are miraculous in the way that they enable to detect a breast lump even before you would have felt it. That's why it is advisable to walk in for a Mammogram Screening and schedule them regularly (annually) to help detect potential breast cancer at the earliest possible time, even though you haven't had any symptoms.

At Kiran, we constantly advocate the need for early diag-

nosis of breast cancer and offer the latest in breast imaging for the best positive outcomes. Let's pledge to fight breast cancer through early detection.

Having a solid expertise in research and development, Trivitron manufactures and distributes exceptional medical technology products to 180 countries since 1997. With 13 manufacturing facilities in India, Finland, Turkey and China, Trivitron spearheads innovation in the fields of newborn screening, in-vitro diagnostics, COVID testing solutions, imaging and radiology, radiation protection, critical care products and operating room solutions.

## HMD launches new and improved 3-way Stopcock-Dispaway

Dispaway by HMD comes with some modifications that make it an easy-to-use leak-proof product and give healthcare workers better control while infusing fluids

**H**industan Syringes and Medical Devices (HMD) has introduced a new and improved 3-way Stopcock-Dispaway for infusing more than one fluid at a single time. This new and advanced Stopcock is made with medical-grade polycarbonate, polypropylene and polyethylene.

The 3-way Stopcocks are quite popular in the healthcare industry as they help in continuous transfusion of intravenous blood, medication and blood derivatives at the same time. Dispaway by HMD, however, comes with some modifications that make it an easy-to-use leak-proof product and give healthcare



workers better control while infusing fluids. The stop cock has one male Luer lock with a rotator and two female ports. As a result, the flow of liquids

is smooth and the fit is secure. The low dead-space design prevents any kind of leakage from occurring.

Rajiv Nath, Managing Director, HMD Ltd. said, "Although 3-way Stopcocks are already available in the market, what gives HMD Dispaway an edge is the use of lipid-resistant materials. Lipids and other volatile solutions can cause micro-cracks in the material that is used for making stop cock. HMD has spent a great amount of time designing a product that is durable and highly resistant to the damage done by volatile solutions. So far, we have been receiving great response from the market and our manufac-

turing facility is geared up to meet the increasing demand of Dispaway over the coming months."

In addition to being Lipid resistant, Dispaway has a rotation flow channel that makes it different from similar products available in the market. The flow channel has steps enabling the user to control and confirm the movement to a specific location. Dispaway has a shelf life of 5 years from the date of manufacturing.

### About HMD

Hindustan Syringes and Medical Devices Ltd is one of the top five manufacturers of syringes and needles across the globe.

*Founded in 1957, HMD also manufactures high-quality medical devices such as scalpels, scalp vein sets, surgical blades, safety IV and blood collection systems. Over the years, HMD has gained recognition as a brand that specialises in innovating new and improved products that ensure the safety of patients and healthcare workers. The company has more than 3,500 people employed across seven plants in India and deals primarily in markets in the USA, India, Europe and the Middle East. HMD was honoured with the 6th Medgate Today Award (MT), India's most sought-after award in the health sector.*

# Augmenting critical care facilities is the need of the hour

**Vivek Tiwari**, Founder and CEO, Medikabazaar, explains the need for ramping up the critical care facilities in India

India, and many other countries around the world, including US, Brazil, the United Kingdom, have experienced high disease burdens and deaths due to COVID-19. Several factors contribute to the differing fatalities observed in each country. One of the largest factors implicated in the COVID-19 deaths is the surge of cases that deplete hospital resources.

Many resources are required to adequately treat a critically ill patient with COVID-19, such as an ICU bed with a full-featured ventilator, personal protective equipment (e.g., isolation gowns, N95 respirators, gloves, etc.), and adequate hospital staffing. The rapid surge of cases has, at times, overwhelmed available resources and potentially comprised the ability to provide consistent, high-quality care, often forcing physicians to triage treatment among critically ill patients.

While India could handle the strain on its hospitals during the first wave, at the peak of the devastating second wave of COVID-19, close to 50,000 patients were ad-

mitted in intensive care units, while more than 14,500 were on ventilator support, according to the Government of India's data released in May.

With the emergence of the Delta variant of COVID-19, the second wave was much more fatal as compared to the first one.

## The intensive care crisis in India

In the last three decades, dedicated intensive care facilities have been set up in all the major Indian cities and larger towns. Despite the progress, Indian healthcare infrastructure still struggles with organisational aspects such as resource availability (e.g. number of negative pressure rooms, access to non-invasive and invasive ventilation, intravenous fluids, etc.) and personnel (critical care nurses, doctors and allied health specialists).

To boost the number of healthcare workers who can provide intensive care, the Ministry of Health through the All India Institute of Medical Sciences (AIIMS), New Delhi, has also implemented online training programmes on aspects of critical care management for ICU and non-ICU doctors. However, with India's



vast urban-rural divide, there is still a massive need of significantly ramping up testing and hospital infrastructure in tier-II/III cities and in rural areas too.

After tackling with a tremendous rise in the case-load on Indian healthcare, there are fears of an imminent, and much sharper and more infectious third wave. This means we would need more ICU capacities as opposed to what we had in the second wave, which was originally not sufficient.

Another trend suggests that the third wave might infect children on a larger scale. Whereas, intensive care units

for children are still very limited in India.

## An innovative solution

To offset the acute shortage for ICUs in the pandemic and post-pandemic era, Medikabazaar's Paediatric ICU and COVID ICU Packages can prove to be a gamechanger. Focussed on providing intensive care for adults and children alike, and to be prepared for any future waves of COVID-19, Medikabazaar, India's pioneering and largest online platform for medical supplies, has meticulously designed emergency ICU packages for hospitals and medical establishments.

Curated by Medikabazaar's medical experts, the ICU packages are also aimed at reducing the deficit of intensive care units in tier II/III cities and rural areas as well. An added advantage of these packages is that they are emergency ICUs and can be created fairly quickly within days at any site where a large hall or room exists or even within a temporary air-conditioned structure, like Covid centres.

## The paediatric ICU package

includes the following equipment:

- ◆ BiPAP machine
- ◆ Nebuliser
- ◆ Patient monitor
- ◆ Portable suction machine
- ◆ Ventilator

Whereas the Covid ICU package (for adults) includes the following equipment:

- ◆ BiPAP machine
- ◆ ICU bed
- ◆ Oxygen concentrator
- ◆ Patient monitor
- ◆ Pulse oximeter
- ◆ Ventilator

At the start of the pandemic, India suffered from widespread shortage of personal protective equipment to safeguard citizens and healthcare workers, but according to recent reports, we have become the second-largest producer of PPE suits with over 600 domestic companies to manufacture them.

With heightened sensibilities towards medical care, government's renewed focus on augmenting healthcare infrastructure and corporate India's commitment to rise to the challenge, a revolution in critical care is surely on its way.



When it comes to nourishing this sector, experts prescribe a regular diet of Express Healthcare. The magazine has been the source of a healthy dose of expert information, incisive category analysis and remedies for industry ailments since 20 years, thereby earning the trust of industry professionals. It's no wonder then that the finest in the field trust the foremost in the field.



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# Virosil Pharma: A revolutionary, eco-friendly fumigant

Virosil Pharma has proved to be effective in controlling aerial bacteria and fungus present in sterile rooms. The area becomes completely sterile within 60 minutes of spraying without causing any irritation to the eyes, nose and skin - unlike conventionally used formulations

## ABSTRACT

In the past years, the pharma and healthcare industry has witnessed tremendous growth and there have been tie-ups with a number of multinationals for production and R&D facilities to be nurtured in India. Organisations are applying for ISO standards and upgrading themselves to the latest norms related to health and hygiene.

Microbial contamination and pollution play a significant role in the pharmaceutical industries. Control of microbes has always been the biggest challenge to these industries. A load of microbes are present in areas such as production, storage/packaging, R&D, Q.A/Q.C., filling etc. They are present everywhere in the air, surface, water, instruments, linens etc.

Hence the disinfectant used should be so precise that it should not only take care of the microbial contamination but also be user and eco-friendly. Virosil Pharma meets all the required standards for the pharmaceutical industry.

## ABOUT US

Sanosil Biotech, a Mumbai-based company, has launched a range of multipurpose disinfectants which are eco-friendly, chlorine-free and completely biodegradable and have applications in the pharma and healthcare industry as well as in the food processing industry. It is manufactured in India in technical collaboration with SANOSIL AG of Switzerland. SANOSIL AG in Switzerland is the patent holder and has joint venture agreements in more than 15 countries such as France, Italy, Spain, Holland, Norway, South Africa, Australia, Saudi Arabia, Oman, the UAE, etc. The product is being used in various countries by reputed institutions and has been thoroughly tested under strict regulations imposed by

European Health bodies.

## PRODUCT DESCRIPTION

Virosil Pharma is a multicomponent fumigant and disinfectant. The oxidizing agent used is hydrogen peroxide, which is bonded with stabilizing agents to form a complex solution. A long-lasting effect is ensured by the addition of silver, which acts as a catalyst in trace amounts. The bactericidal effect of silver is based on the fact that the monovalent silver ion Ag<sup>+</sup> binds very firmly to

bacterial proteins by a covalent or co-ordinate bond, and thus inactivates or precipitates these.

◆ Its effectiveness against bacteria, viruses, amoebae, fungi and algae; i.e. its extremely wide range of application makes it easy to handle for the end user; i.e. only one product is needed, where so far 2, 3 or various products were necessary.

◆ Owing to the good stability of the product, a long storage time can be guaranteed. As the



## ADVANTAGES

- # Eco-friendly - It is totally biodegradable since (H<sub>2</sub>O<sub>2</sub>) breaks down into water & oxygen
- # Chlorine free
- # Non-toxic (no irritation to skin or eyes)
- # No effect on pH
- # Non carcinogenic and non mutagenic
- # Excellently rinseable with no remains

## PROPERTIES

- # Can easily be dosed
- # Does not foam
- # Decomposes into water and oxygen
- # It is excellently rinseable with no remains
- # Treats any other material with consideration

## USFDA DRAFT GUIDELINES

Clean Area Classification	Microbial limit CfU / 10 cu.ft.	Microbial limit CfU / 10 cu.m.
100	< 1a	< 3a
1000	< 2	< 7
10,000	< 5	< 18
100,000	<25	<88

*a = samples from class 100 environments should normally yield no microbiological contaminants*

## WHO 2002 MICROBIAL LIMITS

Grade	Max. no. of microorganisms permitted / m <sup>3</sup>
A	Less than 1
B	5
C	100
D	500

## EU GMP 2002

Grade	Air sample cfu / cu.m.	Settle plates (90mm) cfu / 4 hours	Contact plate 55mm cfu / plate	Glove print CfU/glove
A	< 1	< 1	< 1	< 1
B	10	5	5	5
C	100	50	25	-
D	200	100	50	-

product remains stable at high water/air temperatures, and as its effectiveness is even increased at high temperatures. ◆ Due to its long-term effectiveness and pronounced characteristics to prevent recontamination, this product is perfectly suited for disinfection of drinking water and wells.

◆ Virosil Pharma is ecologically harmless. Its principal constituent - hydrogen peroxide - does not pollute waste water, because it breaks down into water and oxygen (H<sub>2</sub>O

and O<sub>2</sub>), i.e. it produces no noxious by-products.

◆ The two basic substances (H<sub>2</sub>O<sub>2</sub> and Ag) enhance their advantages (\*synergism). The bactericidal effect comes into action quicker and more intensively than if either substance was used on its own.

## Fumigation with Virosil Pharma, the perfect alternative to Formalin

Fumigation is one of the most important factors associated with pharma industries, it plays a vital role in maintaining

the sterility of areas and is directly related to production.

Sanosil Biotech is the first company to pioneer the novel concept of eco-friendly fumigation. The company has great respect for human health and the environment. The CEO, Dev Gupta, an MBA from the Bentley Graduate School of Business, Boston, has been actively marketing the brand nationally. According to Gupta, "Virosil Pharma has simplified the lives of so many people who work in the pharmaceutical industry as they are guaranteed sterility with the minimum risk exposure". As there was a high risk to the staff involved in the use of Formaldehyde/Glutraldehyde for sterilization and disinfection.

Owing to the stringent integrated micro contamination control and biosafety requirements, it is desirable to have micro-contamination control procedures and methods that could be monitored, evaluated and assessed periodically, which are convenient, cost-effective and safe.

A glimpse at the standards put down by various monitoring agencies would help an individual or an organization help decide on choosing the most appropriate control procedure/methods. The important microbial limits which have been prescribed by various agencies is as follows:

To meet those requirements aerial disinfection (fumigation) with formaldehyde was the most convenient method. With the regulatory having restricted the use of formaldehyde and also putting into place the monitoring levels of formaldehyde after fumigation makes it a procedure with its own limitations.

Formaldehyde is a known carcinogen (IARC & NTP). Formalin is toxic by inhalation, toxic if swallowed, may be fatal if swallowed, causes eye burns, may cause blindness, strong sensitizer, causes irritation to skin, eyes, and respiratory tract. Repeated or prolonged exposure increases the cancer risk.

Virosil Pharma has been a direct alternative to Formalin Fumigation. Virosil Pharma has proved to be effective in controlling aerial bacteria and

COMPARISON	
VIROSIL PHARMA	FORMALIN
Eco-friendly, Non-toxic	Highly toxic
Room gets sterilized within 1 hour after fumigation	Requires overnight fumigation
Requires no de-fumigation	Requires de-fumigation
Person can be present during fumigation	Causes skin, eye irritation even after next day of fumigation
Time Saving	Time consuming
Multiple Applications	Application restricted

fungus present in sterile rooms. The area becomes completely sterile within 60 minutes of spraying without causing any irritation to the eyes, nose and skin - unlike conventionally used formulations. Virosil Pharma can even be successfully used in AHU which are responsible for optimal and steady air exchange in production facility, of which the ducts, air shafts, humidificator, filters, etc. are often contaminated with loads of bacterial and bio-films.

The main aim of Virosil Pharma is to increase productivity by cutting down disinfection time while at the same time providing a totally microbe-free environment.

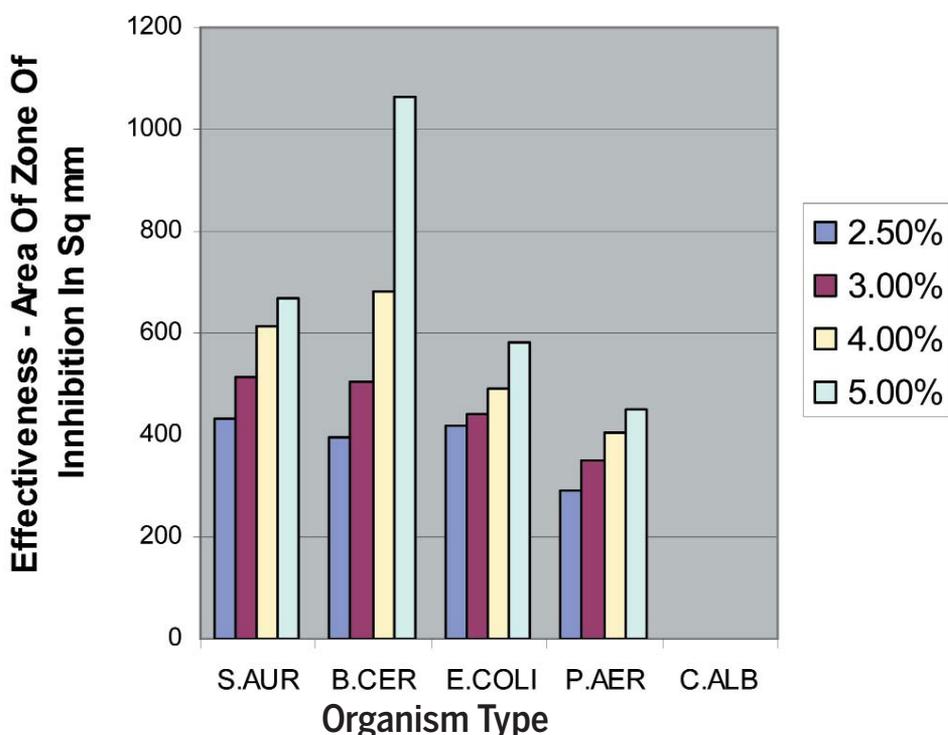
Virosil Pharma is also very effective in disinfection of all critical surfaces that come in contact with pharma products. There is no requirement to re-wash equipment and surfaces disinfected with Virosil Pharma since it is H2O2 based and decomposes into water and oxygen.

Virosil Pharma has been tested by several reputed and renowned institutions in India with respect to its disinfection and fumigation applications in Pharmaceutical Industry

Because of all these factors, Virosil Pharma has attained maximum satisfaction of the customers in controlling the microbial contamination in their respective applications. The introduction of an eco-friendly, non-carcinogenic and totally biodegradable versatile product, like Virosil Pharma, has not only brought an end to the era of conventional biocides but has completely solved the disinfection require-

## A GRAPHICAL VIEW ON DISINFECTANT EVALUATION DATA - VIROSIL PHARMA

### Disinfectant Effectiveness Evaluation Data Virosil Pharma



	S.AUR	B.CER	E.COLI	PAER	C.ALB
2.50%	429.83	397.4	418.15	289.38	0
3.00%	514.44	502.4	440.92	349.48	0
4.00%	615.44	683.14	490.625	404.5	0
5.00%	669.32	1063.07	580.77	452.16	0

ments which these healthcare industries were prone to.

#### Targets

Sanosil Biotech is marketing

this disinfectant under the 'Virosil Pharma' brand name and is targeting the entire industrial belt of India. The company has already set up a dis-

tribution and infrastructure network having establishments in Maharashtra, M.P., Hyderabad, Chennai and Delhi.

# Sequoia Healthcare launches Precision 32 Slice Spectral CT Scanner with Dual Energy Applications

Precision 32 comes with mega pixel HRCT lung imaging against the conventional HRCT which are of 512 matrix which significantly improves the diagnosis of lungs

**B**angalore-headquartered Sequoia Healthcare has launched a 32 Slice CT Scanner with Dual Energy - Low Dose CT Scanner.

HRCT lung imaging against the conventional HRCT which are of 512 matrix which significantly improves the diagnosis of lungs.

Talking about the CT Scan-

ner With Dual Energy Applications, S Viswanathan, Chief Executive Officer, Sequoia Healthcare said that the dual-energy applications that were available only with high-end CT scanners are now available at entry-level scanners. "Dual-energy applications like urological calculi analysis, fatty liver analysis, metal artifact removal, virtual non-contrast scans, the base of skull beam

hardening artifact removal and others to come in future are going to help radiologists in the diagnosis of the diseases," he further explained.

Talking about the feature,

"In short, we want to bring diagnostic reach for all. With high-tech services accompanied with new world Artificial Intelligence, Robotics, etc, Sequoia aims to become the #1

dures), 205 kg weight bearing capacity and 165cm scan

◆ Comes with physical gantry tilt against digital tilt to avoid unnecessary radiation to patient doing spiral scans when a simple sequential scan will suffice

◆ Combination of 42 KW, 350 mA, X Ray generator and 3.5 MHU 735 KHU/min metal tube you can have good images with obese patients as well as higher throughput without waiting for tube cooling

◆ Fast rotation time of 0.72 sec for quick spiral coverage with lesser breath hold times for patient comfort

◆ Patented P Axial technology to get acquisition slice of 0.275 mm thickness for crisp



The company said that the Precision 32 Dual Energy CT scanner produces good quality diagnostic images with stable performance and high throughput. That can help radiologist to achieve persistent diagnosis. It will redefine the new standards of 32-slice CT imaging.

CT is a critical tool for COVID-19 diagnosis. Precision 32 comes with mega pixel

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Viswanathan, said, "In order to minimise the radiation dose to patients, Precision 32 adopts a unique low dose technique."

We thrive to bring in advanced and affordable international technology, which ultimately serves in Cost-Effective Healthcare. Sequoia believes in delivering radiology equipment accessibility for cost-effective healthcare.

Imaging Devices Manufacturer globally," Viswanathan concluded.

## FEATURES

◆ With mega pixel reconstruction for lung imaging to give sharper HRCT images compared to the convention 512 matrix images in other CT scanners

◆ Full functional couch with up/down (easier biopsy proce-

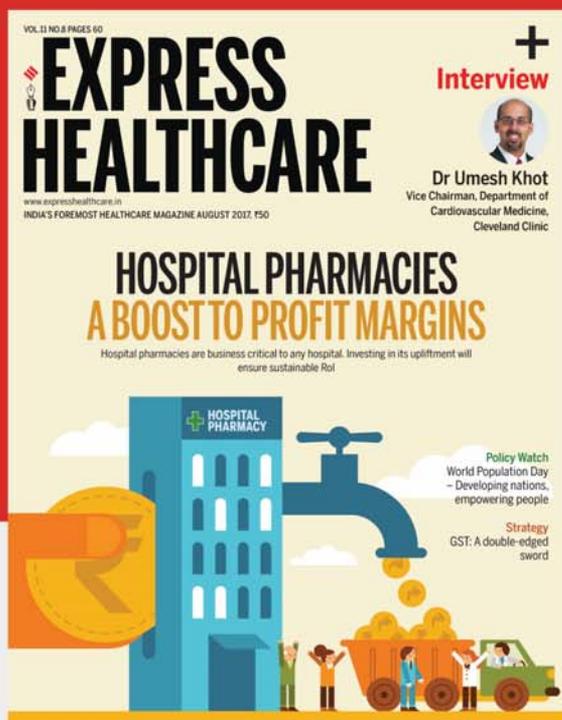
inner ear imaging

◆ Ultra-low dose algorithm from 60KV, dose modulation and dual domain iterative reconstruction technique

◆ 71.5 cm gantry opening for patient comfort and 50 cm Field of View. Intelligent console with all post processing software's; dual energy applications, Virtual endoscopy, 3D, Auto bone removal and more features



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