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INDIA'S FOREMOST HEALTHCARE MAGAZINE

SEPTEMBER 2021, ₹50

INTERVIEWS

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Centre, Mumbai and
Consultant
Endocrinologist, Breach
Candy Hospital and
Research Centre

Ramya Subramanian
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Strategy

Private Equity (PE)
investments in Indian
healthcare: Key drivers
for success

Start-Up

Interview
Dr Manish Diwan
Head - Strategy Partnership
& Entrepreneurship
Development, BIRAC,
Department of Biotechnology,
Government of India

R&D AND INNOVATION IN MOLECULAR DIAGNOSTICS CHALLENGES & OPPORTUNITIES



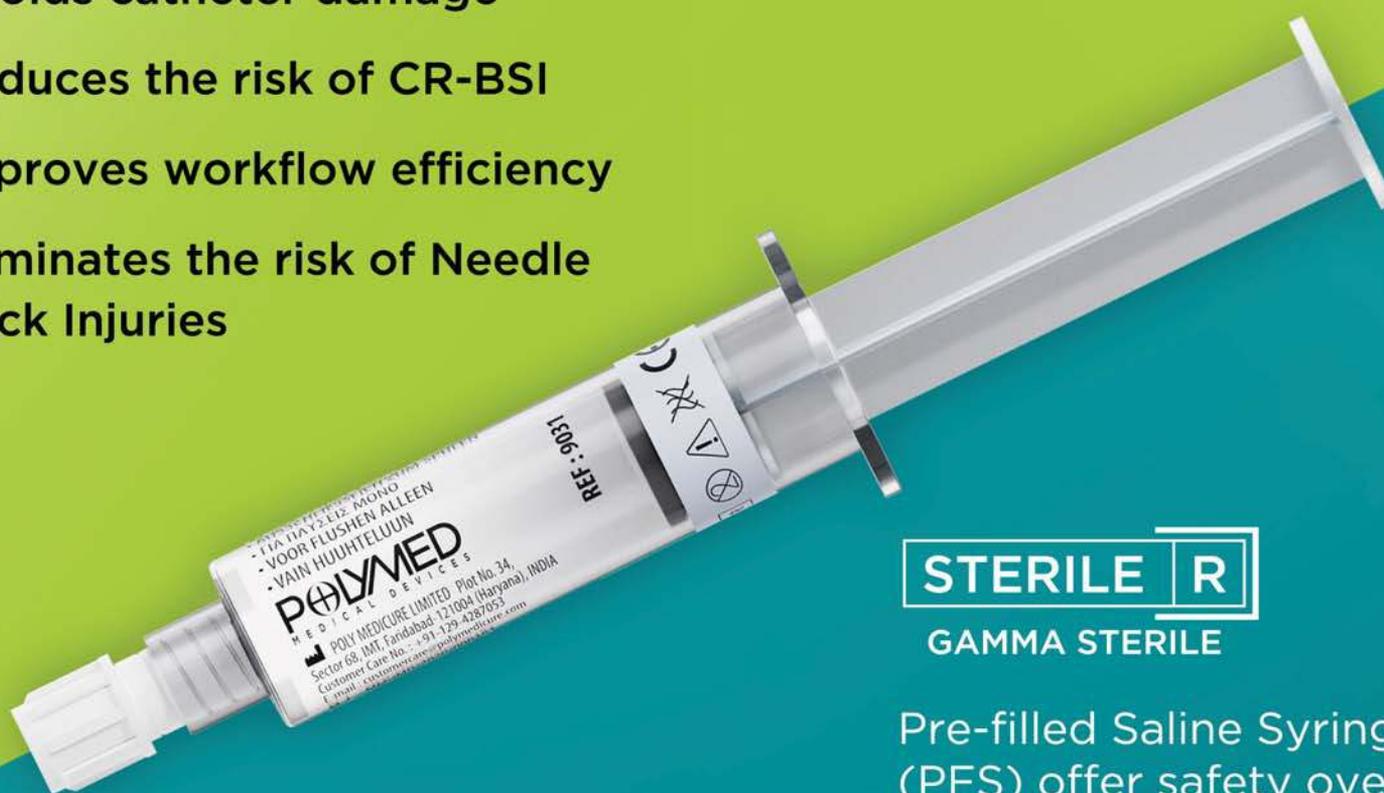
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Uniting divergent strands

As India moves closer to the festival season, vaccines are our hope of averting a catastrophic COVID endgame. No government - state or center - is going to have the political will to announce or enforce hard lockdowns like the one in March 2020. Especially as enforcement is leaky to say the least. They are right to protect lives and livelihoods, but we need a stronger and wider vaccine net to face the consequences of crowded beaches and weekend getaways.

Vaccine makers are willing to ramp up supplies to meet this demand. But is the data good enough to warrant regulatory compliance? Yes, India is building a trove of data on Covisheild and Covaxin vaccinations, but the regulators must be allowed to take their time for due diligence of each vaccine candidate and not be pressured into hasty emergency approvals. These two COVID vaccines must set the bar high enough for the jabs and nasal sprays, etc that will follow. Vaccine security is now a reality and the bedrock of health security.

Unfortunately, experts like Soumya Swaminathan, WHO have cautioned that SARS-CoV-2 shows signs of becoming an endemic infection in India and some regions of the world where total vaccine coverage is taking time. So, can we learn from the strategies used to combat other endemic infections?

Take polio for instance. All of us are familiar with the annual polio drops campaign. Thanks to Amitabh Bachchan's baritone, millions of babies and children in India got their polio drops on time, year after year. This was to ensure that their immune systems were boosted each year, to ensure that any surviving strains of wild poliomyelitis virus did not break through the immune shield.

Will COVID shots become as routine as polio drops? If so, when will we have enough data to make this conclusion? And is it ethical that some parts of the population receive boosters while others wait for their first dose?

Of course, certain populations like healthcare staff need booster shots as they are exposed to higher levels of infection. Some hospital chains in India and overseas have already reportedly given their staff booster doses, as this was the logical way to protect them as they faced abnormally high levels of viral loads from the patients they are treating. The US has reportedly also started giving booster doses to immune-compromised individuals.

So far, academics and our public health policymakers are very rightly reserving judgement. 'Show us the data' is the right refrain, but it also means that while we wait for more data, we need to figure out other aspects like the funding of such booster shots, their storage, administration strategy etc, should the data indeed show that they are needed.

Luckily, there are signs that the country's vaccine production seems to be finally picking up. The last few days of August saw the country's daily vaccination count cross one crore doses on two days. This is also an indication that administration infrastructure too has kept pace with vaccine production and delivery.

A key cog in the COVID-19 vaccine roll out and preparing for the third and future waves is the ramp up of



So far, academics and our public health policymakers are very rightly reserving judgement. 'Show us the data' is the right refrain, but it also means that while we wait for more data, we need to figure out other aspects like the funding of such booster shots, their storage, administration strategy etc, should the data indeed show that they are needed.

healthcare infrastructure in non-metros. Like vaccine production, this ramp up too cannot happen overnight and has a gestation period. Again, the government has stepped up efforts to get this in place. Finance Minister Nirmala Sitharaman recently reiterated that the Rs 50,000-crore Loan Guarantee Scheme for Covid Affected Sectors (LGSCAS) launched this June, would help in building healthcare infrastructure and related capacity in tier 2, tier 3 towns and municipalities to help deal with a possible third wave.

In a letter addressed to Nirmala Sitharaman, Rajiv Nath on behalf of the Indian medical device industry has cautioned that in order that these loans do not become NPA's and to ensure med device projects become financially profitable, more supporting policy enablers are required. He mentions a list of six suggestions, like a predictable nominal tariff structure matching the mobile phone industry to protect investors, protecting consumers by monitoring MRP (Maximum Retail Price) of importers in Bills of Entry as data to enable Capping of 2 to 4 times over 1st point of sale (when GST is charged 1st time), giving price preference based on QCI's Quality Certification in Public Healthcare Procurement as permissible under GFR 153, seeking customs to enforce restrictions on imports of pre-owned equipment over 3 years and Labeling (MRP, Country of Origin and Manufacturers & Importers name and address), phasing out export restrictions and various duty exemption notifications on medical devices as announced in this year's Budget and lastly, reducing GST on certain medical devices from 18 per cent to a nominal 12 per cent

The Government is closely tracking the policies of other jurisdictions as evident from the Commerce and Industry Minister Piyush Goyal recently asking the industry to give feedback on non-tariff barriers in other countries so that the government can take appropriate measures. Pavan Choudary, Chairman & Director General, Medical Technology Association of India (MTAI), which represents global medtech companies, makes the point that the "geo-political churn is forming new groups and forging new alliances among nations", with trading moving from "random off-shoring" to "friend-shoring", choosing countries with "similar political dispensations, market systems and shared histories of peace."

His suggestion that new trade barriers can be considered "with countries that India is not aligned geo-politically" while mutually reducing trade barriers with friendly nations which "will strengthen the supply chains and keep them competitive" should also be analysed in the context of making India's medtech sector more resilient to future shocks.

India's government will have to balance the aspirations of all segments of med device companies, as also corporate hospitals, diagnostic chains etc. Uniting these sometimes divergent strands of the sector is essential to jointly conquer COVID-19.

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PUBLIC HEALTH

INTERVIEW

The need of the hour is awareness, at both the rural and urban level as diabetes is increasing at an alarming level

Dr Vishal Gupta, Director, VG-ADVANTAGE diabetes thyroid and endocrine Centre, Mumbai and Consultant Endocrinologist, Breach Candy Hospital and Research Centre, Mumbai in an interaction with **Kalyani Sharma** talks about his book 'Beyond Type 2 Diabetes Mellitus' & diabetes management

Please tell us about your book 'Beyond Type 2 Diabetes Mellitus'

In the presence of the global diabetes-obesity pandemic, type 2 diabetes mellitus (T2DM) remains the single largest controllable non-communicable cause of morbidity and mortality in the world. It is soon becoming the leading cause of cardio-renal complications in the world. Diabetes (No: 9) has entered the top 10 causes of mortality in the world as per the WHO' 2020.

The book addresses the differences between elevated blood sugar and diabetes; diagnostic cut-offs of T2DM in Indians compared to the Western population, modern techniques for monitoring blood glucose (SMBG, CMBG), newer concepts of maintaining blood glucose with the concept of "time in range"; molecular



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The Art of Diagnostics

mechanisms behind development of diabetes, and a detailed outline of glucose lowering therapies developed based on the pathophysiology of diabetes. It discusses the ominous diabetic dyslipidemic triad (elevated bad cholesterol (LDL, triglycerides), low good cholesterol (HDL); 'biomarkers' beyond the cholesterol (LDL-C) that may help improve cardiovascular outcomes and the huge unmet need despite valiant efforts to reduce LDL-C and modern therapeutic options to reduce LDL cholesterol.

The book talks about therapeutic approaches to manage hypertension with and without diabetic kidney disease, detect heart disease and/or heart failure in an otherwise normal diabetic, the controversies and myths behind assessing kidney function, the great 'mimickers' of kidney disease, optimal strategies to diagnose and treat diabetic kidney disease. Management and ideal approach to treating diabetics with various rheumatic (joint) conditions, optimal use and avoiding complications of steroids. It discusses causes of immune dysfunction associated with diabetes with emphasis on various bacterial, viral, and fungal infections in poorly controlled diabetes, vaccinations and reason for frequent boosters, reasons for why diabetes serves as the optimal scaffolding for COVID-19 to unfold its wrath with diabetes having a 3-fold increased risk of mortality. It provides a detailed information of various cancer associated with T2DM and optimal screening methods. It highlights the relationship of various diets with glycemic and metabolic control, optimal cooking strategies of foods to lower the glycemic index (sugar raising capacity if a food), various types of diets (PALEO, KETO, INTERMITTENT, DASH, Mediterranean), artificial sweeteners (benefits and risks). It discusses diabetes in young, diabetes management in special situations such as



Once awareness of the disease spreads then free detection camps at local healthcare facilities offering expert advice for the affected with appropriate life-style interventions (diabetes-gyms, diabetes cafes) and affordable medication with incentives (discounts on health-insurance) should target for diabetes control be met and to maintain regular follow-ups based on incentives

kidney disease, liver disease and Ramadan (periods of prolonged fast), and finally risk factor management in diabetes with special reference to exercise (optimal type, duration, benefits etc.) cholesterol lowering and

blood pressure management.

As per a recent report by ASSOCHAM on "Non-Communicable Diseases in India", hypertension, diabetes & digestive diseases are among the top

three most prevalent NCDs. What is the need of the hour in this direction?

Despite our vast improvements in the understanding and treatment of diabetes and blood pressure, which often co-exist in as many 8/10 patients, we have failed to translate this into clinical benefit. Heart disease occurs in India at least 10 years before a Westerner with diabetes and elevated blood pressure driving most of these complications along with elevated cholesterol. A rural North Indian study showed that patients with an elevated BP only 12.1% received BP lowering therapy and less than 5% were optimized with regard to their BP control (<140/90mm Hg). This is probably both due to the lack of knowledge of BP targets by the healthcare provider (HCP) and resistance on the part of the Indian that fears the side-effects of the tablets. More than 75% opt to postpone BP management thinking that it remains unimportant in the risk factor management for diabetes. Unacceptance to consume several medications per day remains another challenge that is faced by the HCP.

The need of the hour is awareness, at both the rural and urban level as diabetes is increasing at an alarming level. Awareness needs to be at multiple platforms: media (TV, newspapers) being represented by a role model {who preferably has diabetes, digital-mobile apps sharing pictograms of diabetes and it's complications, social media sharing diabetes information by role-models preferably, billboards & posters on public transport; and needs to address children and adolescents (schools etc) with the main focus of obesity prevention (increase activity {30minute of exercise 5 days a week}, eat healthy {atleast 3-5 serving of fruits and vegetables, avoid sugar and saturated foods as much as possible} abstain from smoking). Once awareness of the disease spreads then free detection camps at local healthcare facilities offering

expert advice for the affected with appropriate life-style interventions (diabetes-gyms, diabetes cafes) and affordable medication with incentives (discounts on health-insurance) should target for diabetes control be met and to maintain regular follow-ups based on incentives.

What are the major gaps and challenges that needs to be filled as far as management & prevention of diabetes is concerned?

Prevention of diabetes needs to start in the womb, with the gynaecologist insisting that the mother maintain optimal weight gain targets for both herself and the fetus (increased risk of diabetes in youth if foetal weight at birth is less than 2.5kg or more than 4kg. Indian mothers are encouraged to gain weight with the consumption of sweetened foods and fat-rich oils with the belief that the baby's weight will also increase.

Maintain optimal weight and body fat which needs to be inculcated during childhood with adequate exercise, avoid inactivity (more than 1 hour/week of moderate/vigorous intensity {digging, dancing-folk dance and ballroom, mowing the lawn, jogging, swimming, tennis, soccer, and climbing stairs), limiting TV/screen viewing (less than 10 hours/week), maintaining a healthy dietary pattern (consuming at least five of the following foods: fruits, nuts, vegetables, whole grains, fish, and dairy products, and less consumption of refined grains, processed meats, unprocessed red meats, and sugar-sweetened or diet beverages). Food fadism, fast-food, treats offered to children for good performance in the form of sweets & savories, technology and social media indulgence, pressures of securing a good future have increased inactivity and imposed a mental and physical burden that has prompted weight gain and risk of developing diabetes in the youth and young adult.

Do you think, Indian policy

framework on NCDs still needs strengthening?

In India 1 diabetic dies every 10 seconds. Approximately 10-11% of the urban population is diabetic of which more than 30% is undiagnosed while more than 50% of the rural population remains undiagnosed. The overall standard of care for diabetes in India is poor with considerable variability in the quality of diabetes care.

Access to services: Despite the existence of community health programs, the post of medical officers lies vacant in most healthcare center's which in turn have poor laboratory facilities.

Affordable drugs: Essential drugs for the treatment of diabetes are still too expensive for a significant proportion of patients. Government controlled prices, and the absence of patent regulations have made the Indian market less attractive for foreign anti-diabetic drug companies. Hopefully with the new patent laws in place the market scenario will change and will become attractive for foreign companies.

Quality of service: In India there is considerable variability in the quality of care and the overall standard of diabetes care by HCP's. Lack of standardization in laboratory techniques for the measurement of blood sugar levels and HbA1c levels further adds to the problems.

What are your views on the role of technology in diabetes management & prevention? Do you think the Indian healthcare system is still recessive towards adoption of new technologies?

Cost remains the most prohibited factor in the use of modern technology for glucose monitoring with an average quarterly monthly cost exceeding the average Indians yearly income. Digital glucose monitoring systems can help remove the need for laboratory glycemic monitoring in the long run. Besides eliminating the pain from frequent glucose testing using the finger-stick,

information on low or high blood glucose attacks on a 5-minute basis can be achieved real-time that can greatly improve quality of life,

improve medical management decisions, and reduce future cardio-renal complications. India stays way behind western countries as the

machines are expensive, with poor-post-marketing machine management support programs that is left to the doctor or chemist to manage

who often don't understand the machine logistics.

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Post pandemic infection control strategy for healthcare centres

At a webinar, experts highlight the best practices and strategies that can be deployed at clinics, vaccination centres, hospitals, doctors, and healthcare workers to bring down the threat of infection

As India's healthcare sector strategises for a post COVID normal, it is clear that COVID care will have to co-exist with elective surgeries and routine check-ups. But patients hesitate, for fear of infection as fears of a third COVID-19 wave continue.

elective surgeries, dental work, routine check-ups, and even pregnancies, so business has taken a hit. As India's healthcare sector strategises for a post-COVID normal, it is evident that COVID care will have to co-exist with elective surgeries and routine check-ups.

tion from industry stalwarts like Alok Sharma, CEO, Shycocan Corporation; Dr Kirti Chadha, Sr Vice President - GRL Operations & Medical Affairs, Sr Consultant Oncopathologist, MD, PDCC (Oncopath & Oncohemat), Metropolis Healthcare; Joy Chakraborty, Chief Operat-

also highlighted their experiences on implementation of these strategies. The session saw participation/registrations from a large cross-section of healthcare professionals including doctors and more. A poll conducted during the same showed that 41% felt that we are

ond wave and measures taken the hospital during COVID to control the infection Chakraborty said, "Many patients with diseases like NCDs has starting deferring the treatments which has caused heavy on them and effected their treatment process. From the

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Post Pandemic Infection Control Strategy for Healthcare Centres

Panelists

- Alok Sharma**
Chief Executive Officer
Shycocan Corporation
- Joy Chakraborty**
Chief Operating Officer
Hinduja Hospital
- Dr Alok Roy**
Chairman & Managing Director
Medica Synergie
- Dr. Kirti Chadha**
Sr Vice President – GRL Operations & Medical Affairs
Sr Consultant Oncopathologist, MD, PDCC (Oncopath & Oncohemat), Metropolis Healthcare Ltd.

Moderator

- Viveka Roychowdhury**
Editor
Express Pharma & Express Healthcare

Date: Friday, 20th August 2021 | Time: 3:00 PM - 4:00 PM IST

Besides the high risk of transmission, the immense pressure to serve during the pandemic that our frontline health workers faced; medical facilities, hospitals, path labs, and diagnostic centers have also taken on enormous economic pressure. People being worried about the risk of transmission of the Coronavirus at these facilities land up delaying most

Express Healthcare, in association with Shycocan Corporation organised a webinar and panel discussion on best practices and strategies that can be deployed at clinics, vaccination centres, hospitals, doctors, and healthcare workers to bring down the threat of infection, for both patients and healthcare personnel.

The session saw participa-

ing Officer, P D Hinduja Hospital; Dr Alok Roy, Chairman & Managing Director, Medica Synergie along with Viveka Roychowdhury, Editor, Express Healthcare & Express Pharma as a moderator

The speakers discussed strategies and technologies with which patients, caregivers and healthcare personnel can go back to normal life safely. They

not adequately protected from the Coronavirus still and 33 % will still unsure.

Dr Chadha, Sr. VP, Metropolis Healthcare echoed the same sentiments saying how she found the results very believable and that lots more still needs to be done to ensure safety, protection of the staff and patients.

Talking about the specialty areas effected during the sec-

beginning of the pandemic, we have learned and observed many things and accordingly took measures at the hospital like changing certain places within the hospital and creating zones, monitoring and modifications in certain practices from environmental control point of view. We have also created safe OPDs for people with other diseases Also, in the OPDs, we have

created negative air pressure and monitor air circulation."

Commenting on the overall impact of COVID-19, Sharma said that "If humanity could learn something out of this pandemic, not take our environment, life, and relationships for granted. The enduring lesson which we can learn is how we need to treat nature and fellow humans. Whatever contribution if we can make and more so in Healthcare and help the healthcare team be safer and help some lives that will be a minimal contribution from Shycocan."

Besides the high risk of transmission, the immense pressure to serve during the pandemic that frontline health workers faced, medical facilities, hospitals, path labs, and diagnostic centers have also taken on enormous economic pressure

Highlighting the importance of strengthening hospital infrastructure, Dr Roy said, "The pandemic has made us realise the value of ventilation, segregation, strict hygiene as we weren't prepared to face the pandemic when it hit us. So, from all the respects, we were caught unaware. So, the pandemic has changed the ways hospitals are designed, ventilated, and infection control practices for the decades to come. The experience has made us

change completely."

Moreover, the webinar saw Alok Sharma talking about the world's first virus attenuation device, Shycocan, that neutralises up to 99.9 percent of the

entire family of coronavirus and brings back the businesses to normal and can be deployed at clinics, vaccination centers, and healthcare institutions to bring down the threat of infection for

both patients and healthcare personnel.

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/post-pandemic-infection-control-strategy-for-healthcare-centres/430823/>

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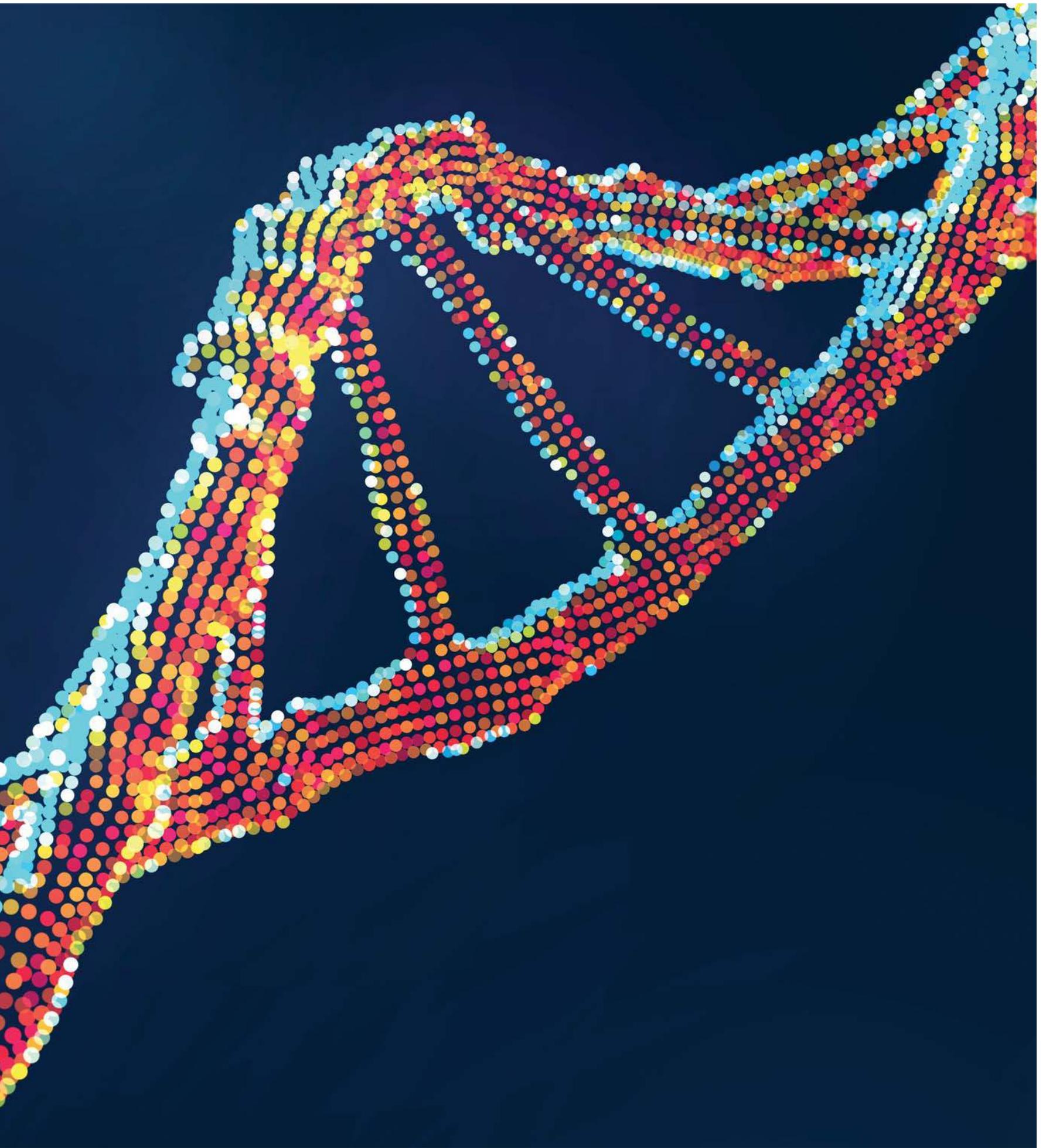
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R&D AND INNOVATION IN MOLECULAR DIAGNOSTICS CHALLENGES & OPPORTUNITIES

Technology & innovation are two important catalyst in the development of any diagnostic product. While, India is still harnessing the molecular diagnostic sector and coming out with ways to accelerate the need for it, R&D and innovation could be the game changer in this direction and a major learning as well

By Kalyani Sharma



The Indian molecular diagnostics industry has been playing a crucial role in the screening, detection and monitoring of various life-threatening diseases. This sector is rapidly evolving and emerged to be a key component of the healthcare segment. Molecular diagnostic tools ranging from polymerase chain reaction (PCR), sequencing, hybridisation, to microarray have benefited the clinicians by providing rapid and sensitive approaches for the screening, detection and monitoring of innumerable genetic disorders, cancers, infectious, and chronic diseases. The pandemic has pushed the sector even more to meet the challenges posed.

Testing & COVID-19

The COVID-19 pandemic has tested the healthcare ecosystem of even the most developed countries. Since the onset of the pandemic, India has been strengthening and expanding its testing strategy as per the changing paradigm which is in line with the scope, need and capacity to rapidly scale-up tests that needs to be performed. The government's 3Ts strategy of testing, tracking and tracing has played a major role in containment of the virus till now.

The testing rate has been ramped up significantly over the last few months with the introduction of the rapid antigen detection test in addition to the molecular tests, which remain the mainstay of diagnosis. This has accelerated the need, demand and responsibility of the diagnostic sector in India, especially the molecular diagnostic sector which proved to be the backbone, supporting containment efforts to mitigate the outbreak with government's higher focus on testing.

Highlighting the role of diagnostic sector during COVID-19, Amit Chopra, Managing Director, India and South Asia, Thermo Fisher Scientific said, "COVID-19 has significantly accelerated the need for reliable diagnostic



The technological advancements in molecular diagnostics has considerably boosted market growth due to improved accuracy, cost-effectiveness, and portability. Due to these reasons, the molecular diagnostics market has gained prominence and become more profitable lately, and especially so during the COVID-19 pandemic

Dr Sunita Polampalli

Head-Research & Development and Molecular Genomics, SRL Diagnostics



Industry-academia collaborations provide a mechanism to bring disparate sectors together to alleviate the molecular diagnostics challenges of innovations, fundings, reach, engagements, dissemination, and equity

Neeraj Gupta

Founder and CEO, Genes2me: Molecular diagnostics is a growing and challenging niche in health care services



The country needs to expand its information capability in a way that is encompassing as well as globally competitive. In the light of a developing country like India, innovation can offer a channel to both mount growth and decrease poverty. By applying knowledge in new ways to production processes, more, better, or formerly unavailable products can be produced at prices that all Indians can afford

Dheeraj Jain

Founder, Redcliffe Life Diagnostics said

testing, and the adoption of new approaches that are redefining the industry landscape. A more intense second wave and rising concerns related to the mutations are further driving the need for a multi-pronged strategy to strengthen healthcare systems".

The severity of this crisis and increasing capacity issues associated with polymerase chain reaction (PCR)-based testing, accelerated the development of diagnostic solutions to meet demands for mass testing.

Talking about the accelera-

Amit Chopra,
Managing Director, India and South Asia, Thermo Fisher Scientific: COVID-19 has significantly accelerated the need for reliable diagnostic testing, and the adoption of new approaches that are redefining the industry landscape

tion of molecular diagnostic solutions during the pandemic, Hasmukh Rawal, MD & Co-founder, Mylab Discovery Solutions said, "As the COVID pandemic escalated, Indian companies like us indigenised the development of molecular diagnostic solutions, which played an essential role in scaling up the testing capacity in the country".

Market Watch

As per the report by Markets & Research, "The Indian Molecular Diagnostics Market stood at an estimated 920 million in FY 2020 and is projected to grow at a CAGR of around 10% until FY 2026, predominantly on account of rising cases of fatal and chronic diseases. Moreover, spread of COVID-19 pandemic is expected to create more opportunities, which is anticipated to drive the market growth during the forecast period. Furthermore, government initiatives of raising funds for the country's molecular department is also expected to positively influence the market in the coming years".

The report also says, "However, since the department requires high competence and professional skillset, absence of the same can pose a hurdle. Also, with over 25% of the country's population being below poverty line and the rest of the population is either middle-class or lower middle-class, lack of funds and high cost of molecular diagnostics is also expected to hinder the growth of the market during the forecast period".

Giving insights on the molecular diagnostic market, Dr Sunita Polampalli, Head-Research & Development and Molecular Genomics, SRL Diagnostics says, "The technological advancements in molecular diagnostics has considerably boosted market growth due to improved accuracy, cost-effectiveness, and portability. Due to these reasons, the molecular diagnostics market has gained prominence and become more profitable lately, and especially so during the COVID-19 pandemic".

Talking about the molecular diagnostic market, Dr Shanktikumar Nair, Director, Center for Nanosciences and Molecular Medicine, Dean Research, Amrita Vishwa Vidyapeetham added, "India's growth rate in the molecular diagnostics sector is expected to be between 20 and 30 percent compared to about 10% globally. This is because of the large disease bur-

den in areas such as infectious diseases, diabetes, cancer and aging-related disorders such as Alzheimer's and Parkinson's. The market size that was \$ 5 billion USD in 2015 reached about \$ 10 billion in 2020 and is expected to be between \$ 20 billion USD and \$ 30 billion USD in 2030".

As far as point-of-care testing (POCT) market in India is concerned, it is still at a nascent stage. However, its acceptance is gradually increasing due to greater efficiency as compared to other testing options.

Stressing on the acceptance

ing the forecast period FY'2018-FY'2023.

R&D and innovation in the molecular diagnostics sector in India

Technology & innovation are two important catalyst in the development of any diagnostic product. While, India is still harnessing the molecular diagnostic sector and coming out with ways to accelerate the need for it, R&D and innovation could be the game changer in this direction and a major learning as well. Moreover, the ability to engage in academic research that benefits both soci-

ety and the sector overall is the greatest benefit for both industry and the research communities.

ops the institutional capacity of both faculty and students", he added. Sharing his opinions on the same, Dr Sam Balu, Head of Genomics, Lilac Insights said, "The connection between academia and industry is very important for the development of the next generation diagnostics methods, especially molecular methods. This includes newer methods of diagnostics whether it is lab based molecular tests such as quantitative fluorescence (QF) PCR based tests or droplet digital PCR in Oncology for analysis of Minimal Residual Disease up to Liq-

push to the industry-academia collaboration and R&D and innovation. While, India is already comparatively active in this direction, there is still a long way to go.

Sharing her views on this, Dr Angeli Misra, Founder and Director, Lifeline Laboratory said, "The lessons learnt from the covid pandemic in the field of Molecular Medicine has shown that the diagnostic tests and reagents can be fabricated in a short time. Not only that, we have seen that the instrumentation can be simpler, easily available and user and lab-friendly. Many such equipments do not now require the stringent structural changes needed in the laboratory. Hence, using the technique of molecular diagnostics is possible in smaller and mid-size laboratories, bringing this technology closer to the common man."

Sharing his opinions on this, Chopra said, "Mitigating the effects of the pandemic is not just the responsibility of the government or healthcare facilities. A collaborative effort between Industry and academia will help in implementing strategies that can improve efficiencies, enhance customer experience, and propel scientific advancements to be prepared for future outbreaks."

Talking about the way forward, Dheeraj Jain, Founder, Redcliffe Life Diagnostics said, "The country needs to expand its information capability in a way that is encompassing as well as globally competitive. In the light of a developing country like India, innovation can offer a channel to both mount growth and decrease poverty. By applying knowledge in new ways to production processes, more, better, or formerly unavailable products can be produced at prices that all Indians can afford".

In the process of revolutionising the sector, adoption and invention of advanced technologies will play a crucial role.

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Dr Sunita Polampalli, Head-Research & Development and Molecular Genomics, SRL Diagnostics: The technological advancements in molecular diagnostics has considerably boosted market growth due to improved accuracy, cost-effectiveness, and portability. Due to these reasons, the molecular diagnostics market has gained prominence and become more profitable lately, and especially so during the COVID-19 pandemic

of point-of-care testing in India, Chopra added, "Fast, accurate, and cost-effective point-of-care (POC) COVID-19 tests are set to revolutionise the testing market. Point of care tests are based on a variety of technologies and formats both old and new, like the conventional antigen-based tests for detecting viral proteins; nucleic acid amplification tests (NAAT) and loop-mediated isothermal amplification (LAMP) for the detection of viral genetic material. The volume of point-of-care (POC) testing has risen during the COVID-19 pandemic and there is sustained focus on testing leading to adoption of new and advanced technologies that offer reliable yet faster results".

The Ken Research report predicts the POCT market to register a positive CAGR of 11.9% in terms of revenue dur-

ing the forecast period FY'2018-FY'2023.

Talking about the importance of Industry-Academia collaboration in the advancement of the molecular diagnostics sector in India, Neeraj Gupta, Founder and CEO, Genes2me says, "Molecular diagnostics is a growing and challenging niche in health care services. Industry-academia collaborations provide a mechanism to bring disparate sectors together to alleviate the molecular diagnostics challenges of innovations, fundings, reach, engagements, dissemination, and equity.

"With the help of industry-academia collaboration in molecular diagnostics, India has the potential to unleash a new era of innovation in R&D that brings new solutions and devel-

uid Biopsy analysis by Next Generation Sequencing (NGS)".

"This type of collaboration can also lead to development of diagnostic kits as well field-based testing devices for rapid testing and screening; known as point of care devices. Most of these technologies are currently developed in Industrial R&D setup. However, in recent times there have been many devices and tests that have been developed in the academic setting which has been adopted by industry especially in view of the Covid pandemic and its testing", he added.

Way forward

The pandemic without a doubt has highlighted the role of many aspects of diagnostic sector including strengthening of testing infrastructure in the country and greater focus and

INTERVIEW

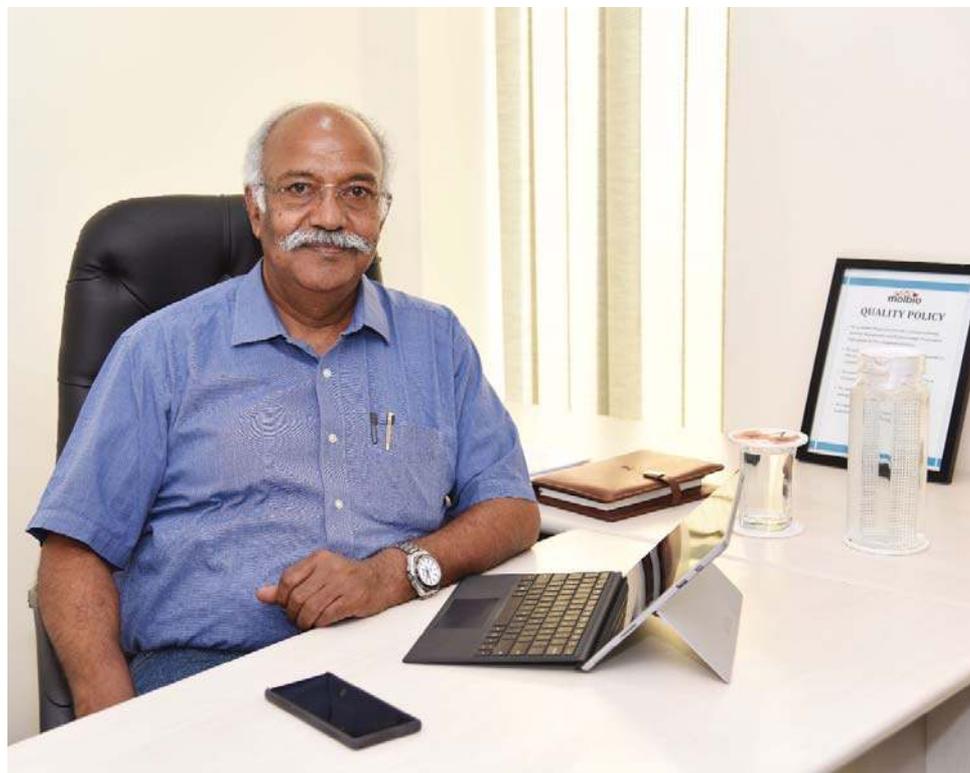
Early diagnosis is the key to better treatment

Sriram Natarajan, Founder, Director & Chief Executive Officer, Molbio Diagnostics explains **Viveka Roychowdhury** about his company's various technologies in molecular diagnostic sector

Molbio Diagnostics has modified lab based molecular diagnostics for a POC, field-based model, which goes from 'sample to report in less than an hour', as per your website. How was this done without compromising on sensitivity and specificity of results? And what is the price differential between the two systems?

The core technology - Real Time PCR, remains the same, hence performance characteristics do not get compromised. The conventional lab-based tests being highly centralised, are geared for high throughput. Hence it involves big machines, specialised infrastructure, high capex and opex costs, skilled manpower, and the need for batch testing. The consequent long turn-around time for results, logistical challenges of transporting samples and the high cost to patients have prevented the adoption of this gold standard technology from being used as a routine clinical tool.

Molbio's innovation is a paradigm shift that decentralises molecular testing through its portable, battery-operated, ready-to-use, user-friendly machines. Also, it includes the room temperature stable reagents with single testing capability, right at the point of care without the need for skilled manpower or laboratory infrastructure, giving results in just an hour of sample collection. This enables timely and reliable



Molbio's innovation is a paradigm shift that decentralises molecular testing through its portable, battery-operated, ready-to-use, user-friendly machines

diagnostics at the first point of patient contact, allowing appropriate treatment to be initiated early, leading to a better patient outcome as well as preventing spread of the disease. Since our platform does not require a full-fledged lab setup, it naturally brings the cost down. Additionally, the

platform is priced lower than conventional systems, which could translate to an overall lower cost of testing as well.

Further, the cost benefit of early diagnosis and treatment is huge.

The Truenat Real-Time Quantitative micro-PCR System has been approved

by ICMR for TB diagnosis in India. Can you update us on the research papers published on this system and its roll-out as part of India's RNTCP?

Truenat for TB was extensively validated by Indian Council of Medical research (ICMR) both at central laboratory and at

primary level that included over 100 designated microscopy centers across 10 states. Based on successful outcome, the TB test was recommended to the RNTCP, which is now called, the National Tuberculosis Elimination Program (NTEP) for roll out as a replacement to smear microscopy. As the first phase of roll out, about 1512 machines have already been deployed and the testing was started with the supplies against order for over 5.9 million tests.

The study results have been published as two scientific papers with one more yet to be published.

A multi-country study conducted in four countries (Ethiopia, Peru, Papua New Guinea and India) by FIND and ICMR led to World Health Organisation (WHO) endorsement of our TB test as a point of care solution for replacement of smear microscopy across the globe. This study has also been published.

How has the system helped reduce the spread of various infectious diseases like COVID-19, Tuberculosis, Dengue and more in India? (Explain to us the partnerships with central and state governments to make it part of screening programmes)

The most important step in fighting any infectious disease is early and effective testing. Typically, TB tests have a turnaround time of 3-10 days. This is not a healthy

process for any parties involved. The person who potentially came in for a TB test could spread the disease to more people while they await their test results. Early diagnosis is the key to better treatment.

Truenat tests for TB and COVID are being procured both by the central government and state governments for use. 2500 plus machines are already deployed in the public sector and have been a dominant player. While the TB test has almost doubled the positive case finding, the COVID test is enabling access to early diagnosis and management even at rural settings.

Truenat being a multi-disease platform, will enable testing of many more diseases on the machines that are already installed and to be installed in the next phases. Some of the diseases Truenat can test are, HBV, HCV, HPV, Dengue, Malaria, Chlamydia etc.

As the government ramps up its COVID-19 testing rates, the company recently launched a new manufacturing facility in Verna, Goa as part of the scaling up process. What are the capex investments planned? Where is the funding coming from? DBT

Considering the growing requirements of the country and the huge potential of the technology in global markets, the company has already installed a fivefold increase in capacity, from the existing 70,000 tests per day to 3.5 lakh tests per day

etc? Or promoter-driven?

Considering the growing requirements of the country and the huge potential of the technology in global markets, the company has already installed a fivefold increase in capacity, from the existing 70,000 tests per day to 3.5 lakh tests per day.

The capex has been about Rs.140 crores and the funding has come from the company's cash flows. However, early-stage development was funded partly by soft loans from CSIR and DBT and thereafter from promoter led loans.

Screening/testing for other infectious diseases has slowed down as all resources are diverted towards COVID-19. How has this affected the company's revenue plans?

Central Government roll out of Truenat for TB testing across the country had begun with an order for 1,512

machines and 5.9 million kits in February 2020, just a month prior to the outbreak of COVID-19. During the first wave of the pandemic, we had to temporarily halt TB supplies since our entire installed manufacturing capacity was consumed by the urgent demand for COVID-19 kits. The first tranche of 500 machines supplied through the NTEP were repurposed for COVID-19 testing to meet the emergency requirement in the country.

By July 2020, with states having procured additional machines for COVID-19 testing and us having enhanced our manufacturing capacity, supply of TB kits through the NTEP along with subsequent tranches of machines was resumed. Ever since, supply of TB and COVID-19 kits has been contributing to the bulk of the company's revenues. Now, with a 5-fold increase in capacity, the company is

looking forward to meeting the requirements of other diseases such as HBV, HCV, HIV HPV, Dengue, Chikungunya, Malaria, etc. The company is also awaiting lifting of export restrictions on RT PCR test kits to meet the huge global requirements for all diseases.

How does the company handle the biosafety aspects of sample disposal with its POC test kits?

The samples are decontaminated right after collection, by the special lysis buffer provided with the kit. All disposables are to be discarded in hypochlorite solution after use to make them biosafe before discarding.

Being a low-cost POC test, this has significant export potential, especially in the global South, the developing nations with similar infectious disease burden to India. Though

exports are currently banned until India has COVID under control, what are your plans on that front? In which countries, diseases areas, etc. do you already have partnerships?

We have distribution already set up in over 35 countries spread across the globe who are all waiting to restart activities once the export restrictions are removed. This process is ongoing and more countries will be covered in the coming years to reach full global coverage.

We also have long term agreements signed with UNOPS/GDF, UN agencies, etc. to cater to global funded programs.

Bigtec Labs, your R&D wing, believes that volatile organic compounds are the future of diagnostics, as breath-based diagnostic kits. Any progress to share on this front?

Our R&D wing, Bigtec, is working on many new technologies with focus on the point-of-care application. Breath-based diagnostics is one such technology that can have a big impact as a screening platform. We expect to roll these out in the next couple of years.

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INTERVIEW

Fast, accurate, and cost-effective point-of-care (POC) COVID-19 tests are set to revolutionise the testing market

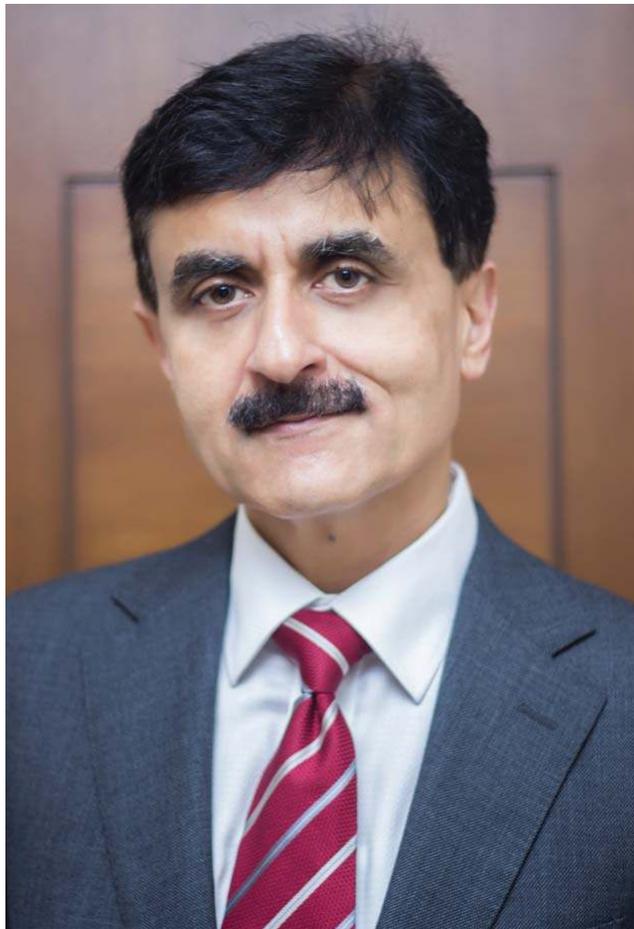
Amit Chopra, Managing Director, India and South Asia, Thermo Fisher Scientific, explains *Express Healthcare* about acceptance of point-of-care testing in India and his company's AcculaSARS-CoV-2 test

Tell us something about the AcculaSARS-CoV-2 Test.

The AcculaSARS-CoV-2 Test is a rapid molecular point-of-care test that combines the accuracy of RT-PCR with the simplicity, convenience, and procedural familiarity of traditional rapid immunoassays. The Accula System has received Emergency Use Authorisation (EUA) from the US FDA for in vitro diagnostic testing of SARS-CoV-2 in Clinical Laboratory Improvement Amendments (CLIA)-waived environments. The test utilizes polymerase chain reaction (PCR) and lateral flow technologies that enables shortened cycling times without the need for costly thermal cycler hardware and optical detection systems used in lab-based RT-PCR. The Accula SARS-CoV-2 Test uses nasal swab specimens, collected from patients suspected of COVID-19 by their healthcare provider. All the steps of sample testing are fully integrated for decentralized use at the point of care. This portable, easy to use, qualitative and rapid PCR-based test provides visual results within approximately 30 minutes.

How different is this test from the other available in market?

The Accula SARS-CoV-2 Test is a point-of-care test that uses gold standard RT-PCR



technology. The exponential amplification of nucleic acid targets by nucleic acid amplification tests (NAAT) methods enables detection of very small amounts of SARS-CoV-2 RNA in a specimen, unlike antigen (Ag) based tests that do not amplify their protein targets, hence are generally less sensitive.

With performance

characteristics equivalent to lab-based PCR testing for SARS-CoV-2 as confirmed by FDA reference panel, the test has a limit of detection (LOD) of 475 NDU/ml. With operational aspects enabling rapid, decentralized deployment, it is a best in-class solution uniquely positioned to address the requirements for timely

results with high sensitivity and specificity.

Where can patients access these tests and what are your plans to make this test widely available?

At Thermo Fisher, we are inspired by our mission, which is to enable our customers to make the world healthier, cleaner and safer. Our efforts are to ensure we are providing the right solutions at the necessary scale, with highest quality, and reliability. We will continue to leverage on our operational excellence, and existing distribution channels to ensure uninterrupted supply of instruments and consumables. Further, we are collaborating with new channel partners to expand our distribution networks to make the tests widely available in India.

The tests will be available in all diagnostic labs/hospitals (private and government) approved by ICMR. Apart from this, the tests can be used in places like airports, ICU settings, ambulances, defence, sports arenas, and other important set-ups for safe return to work/activities.

How do you foresee acceptance of point-of-care testing in India especially when there are several players and testing options available?

Fast, accurate, and cost-effective point-of-care (POC) COVID-19 tests are set to revolutionise the testing market. Point of care tests are based on a variety of technologies and formats both old and new, like the conventional antigen-based tests for detecting viral proteins; nucleic acid amplification tests (NAAT) and loop-mediated isothermal amplification (LAMP) for the detection of viral genetic material. The volume of point-of-care (POC) testing has risen during the COVID-19 pandemic and there is sustained focus on testing leading to adoption of new and advanced technologies that offer reliable yet faster results.

The Accula point of care device is an ideal solution that addresses requirements for timely results with high sensitivity and specificity using the gold reference RT-PCR technology. As the point-of-care diagnostic market expands, at Thermo Fisher we are well-positioned to support healthcare bodies and government with more options and flexibility for COVID-19 testing. These tests will significantly bolster India's response against COVID-19, fast-track reopening of economies and strengthen the overall healthcare capabilities for infectious disease management in the country.

Molecular diagnostics: Addressing the unmet medical need posed by pandemic

Dr P K Julka, Principal Director-Max Institute of Cancer Care, Delhi highlights the challenges and opportunities posed due to the pandemic

Our body contains trillions of cells and inside every cell, there is a control centre which is called the nucleus. The nucleus contains two types of nucleic acid namely the deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) that in turn are responsible for the storage and expression of genetic information. Molecular diagnostics deals with the detection and identification of biomarkers at the level of nucleic acid. Scientific advances in molecular biology and cell genetics have led to the development of novel ways for the better detection and management of a variety of life-threatening disorders, including cancer. The improved understanding of various genes responsible for causing certain types of cancers has triggered the discov-

ery and development of translational and targeted approaches for its management. Similarly, a better understanding of cancer genetics is assisting in the prediction of therapy response in specific cancer forms. For example, breast cancer patients with HER2-positive cells shows a very good response to newer drugs such as Trastuzumab and lapatinib. Similarly, in chronic myeloid leukemia (CML), the drug that targets the BCR-ABL protein, such as imatinib, is often very effective. While some medications are ineffective in particular gene variants, others function very well in others. For example, cetuximab and panitumumab do not work in advanced colorectal cancer patients with KRAS mutations whereas erlotinib works



better in non-small cell lung cancer patients having a mutation in the EGFR gene.

Before the advent of new coronavirus disease (COVID-

19) the clinical application of molecular diagnostics was largely concentrated in cancer and some infectious diseases. However, within a very short span of time, the post-pandemic era has already witnessed the contribution of molecular diagnostics in reducing morbidity and mortality at an unprecedented level globally. Whether it is the development of novel tests for the detection of COVID-19 or identification of virus variants or assessment of immune response on various organs or development and monitoring of vaccine response, the wide-scale application of molecular diagnostics has been instrumental in addressing the unmet medical need posed by the pandemic. Although the pandemic has highlighted the lack of required infrastruc-

ture, expertise, and laboratory connectivity across different nations, it has also served as an opportunity to boost the investment in this sector at a global level. This has provided a stimulus to the research and development activities with a further possibility of expansion in the non-COVID areas once the pandemic is over. The creation of a large number of jobs in the domain of molecular diagnostics also will go a long way in serving the public health mission globally.

Molecular characterisation of various life-threatening diseases followed by treatment with the appropriate therapy will pave the way for a new era of improved treatment outcomes while offering personalised treatment to individual patients.

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- Besides the regular columns, each issue will have a special focus on a specific topic of relevance to the Indian market. You may write to the Editor for more details of the schedule.
- In e-mail communications, avoid large document attachments (above 1MB) as far as possible.
- Articles may be edited for brevity, style, relevance.
- Do specify name, designation, company name, department and e-mail address for feedback, in the article.
- We encourage authors to send a short profile of professional achievements and a recent pho-

tograph, preferably in colour, high resolution with a good contrast.

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COVID and vaccination crises: Role of diagnostic labs

Dr Kanav Kahol, Founder and CEO, DIVOC Health highlights the role of diagnostic sector in curbing the current crisis caused due to the pandemic

When the COVID-19 pandemic broke out, India, like many other countries, was left reeling and scrambling for medical supplies, equipment and protective gear to handle the crisis. The roll out of the vaccines expected to bring the pandemic to an end, a ray of hope shone signalling that India may be well-prepared on one count at least. Being the world's leading vaccine manufacturer, India was expected to have better access to vaccines as compared to other developing countries. However, the second wave of the pandemic revealed serious cracks in our healthcare system, leaving it overwhelmed.

India has been constantly battling COVID-19 since March of 2020 but has been experiencing the worst with the second wave. Endless efforts have been undertaken to instil hope in people and this has improved with the introduction of vaccines. However, experts believe that there is also a dire need for innovation and change. Improvements by introducing plans in fields like data analysis, diagnostics, tracking, contact tracing, vaccinations and sero-surveillance are critical for managing and overcoming the crisis, especially since the environment is dynamic and keeps evolving.

By March 1st, 2021, India received approximately 1.48 million vaccine doses. In addition, the government has been endlessly encouraging people to take the vaccines and follow the safety guidelines. But though the number of vaccination doses administered looks like a huge number, it is, in fact, quite insufficient when placed against the population of the country.



The involvement of diagnostic laboratories and vaccines manufacturers can complement the rigorous work being carried out by the government to get more people vaccinated, which in turn would contribute to building herd immunity

Besides, as the national vaccination drive continues and the total number of vaccinated people rises, the private diagnostic labs are required to step in.

Role of diagnostic labs in curbing COVID-19

The involvement of diagnostic laboratories and vaccines manufacturers can complement the rigorous work being carried out

by the government to get more people vaccinated, which in turn would contribute to building herd immunity. Experts believe that mass vaccination is solely how people can be protected from the fatal effects of the second wave. With diagnostic labs involved, the coverage for vaccination will also increase and the public will acquire greater access to vaccina-

tions. And this is essential, especially for the ones who are at a much higher risk of contracting the virus as compared to others. India has nearly 2000 labs for COVID testing and post the mayhem caused by the second wave of the pandemic, there is an urgent need to focus on expanding the coverage of the vaccination drive. Also, testing should be carried out on a large scale in states which have a high number of coronavirus cases.

Diagnostic labs are present pan-India, and the big private ones have a network of labs which are already set up with a skilled workforce. Organised diagnostic lab chains have phlebotomists who are well-trained and can inoculate the entire population efficiently and work effectively under the supervision of MBBS doctors.

For the healthcare sector, the analysis points to three causal factors which led to the crisis: low levels of testing, failures in the implementation and execution of necessary measures for containing the virus spread during lockdown, and adverse impact on other health services. To tackle these, official guidelines state that private labs must create dedicated sections for the purposes of registration, verification, and vaccination of people. This, in turn, can greatly increase the vaccination drive coverage across the country.

Also, there is a need to increase the testing capacity. We can do this by leveraging the capacity of the private sector for laboratories, test supplies and kits. However, at the same time, the government will have to

scale the density and capacity of labs and test sites as well as improve procurement and supply chains. Additionally, India's domestic production of PPE kits has been a success story and thus, paints an optimistic picture.

Another recommendation is that vaccine centres can be temporarily set up in big corporate houses, hotels, malls, airports, schools and similar other places in order to continue with the inoculation of the vaccines as per the guidelines of the Health Ministry and the general SOPs.

Summing Up

In conclusion, it can be said that more private healthcare players can be further involved in reducing the costs that are incurred by caring and providing for patients. They can also help relieve the burden placed on the hospital systems working to their maximum capacity. Also, the convenience of easy access to vaccines and flexibility are needed for all working professionals and to dissipate the fear that the senior citizens have about visiting the hospitals.

The whole recommended system has to be similar to the process already set and being followed across hospitals. This includes registrations of the vaccines and having only those healthcare professionals administer the vaccines who know how to work with the standards and protocols laid down for infection control. But the expansion of vaccination beyond the hospitals and diagnostic centres that are designated solely to vaccines relies on getting the supplies, where currently there is a gap due to inadequate supplies.

Role of technology in diagnostics

Ashvin Sharma, Head of Products, Mfine and **Bhavesh Gore**, General Manager - Diagnostics Business, Mfine highlights the role of technology in diagnostic sector

Diagnostics sector was evolving over the years and with the pandemic, it went through significant changes and adaptations. Today, people are not just aware of diagnostic tests but they actively participate to understand the data. Healthcare providers enable data information in a way that's consumable for patients. There is also a shift from reactive to proactive diagnostics to stay aware of their overall health and ensure optimum immunity.

Role of diagnostics in preventive healthcare

Prevention is better than cure. With our busy schedules, maintaining a healthy lifestyle has become really tough. The world has slowly moved from communicable/infectious diseases to lifestyle disorders which are considered a pandemic themselves. India is burdened with lifestyle disorders like diabetes, heart diseases. They do not exhibit any symptoms but can be detected with simple tests and that's where the preventive health checks come as a saviour. These health checks will help in identifying the disease at an early stage or even know the risk and can help in preventing complica-



Ashvin Sharma, Head of Products, Mfine

tions, some of which can turn fatal. Preventive health checkups have become mandatory to identify these diseases at an initial stage as prevention is the key. Even before becoming a diabetic, one can take necessary steps to prevent the risk of Diabetes with the preventive health checks. Even the deadly cancer if detected early can be cured. Periodic preventive health checks will help doctors to identify problems at the right time before it's too late.

Popularity of at-home tests during COVID pandemic

COVID-19 pandemic has brought a new normal and with the lockdowns most of the people are at homes. While this is

convenient in a few ways, it has also affected the health of the public as doctor visits and lab testing are postponed or avoided, in fear of contracting the infection when one steps out. At-home test gives us a chance to get the lab tests done without stepping out of home and increasing the risk. It lowers the exposure to others especially in the vulnerable population like elderly. There is also a chance to opt for a convenient time and wait for their turn even for a single test, which makes it flexible especially for patients who have diabetes and different work schedules. This is also less expensive and the patient has confidence about the hygienicity of the surroundings.

Role of mobile technology and AI in diagnostics

Technology in diagnostics has been there for a while and has impacted lives. For example, process and workflow automation has increased the efficiency of the labs, AI models for imaging are giving recommendations to a radiologist and saving their time. However, it is only recently that it started affecting the patients directly by solving some deeper problems in diagnostics



Bhavesh Gore, General Manager - Diagnostics Business, Mfine

of unused data in reports and sub-optimal experience of patients.

At Mfine, we are leading these efforts by building the tech stack for delivering the best diagnostics care and experience for the patients. Patients can book for home sample collection in 30 sec from the app, expect the phlebotomist to come in a few hours and study the smart report without any expert's help while your doctor gets the report automatically.

Also, our smart reports and detailed analysis help patients understand medical language and encourage them to ask better questions to doctors. AI-driven automated recommendations based on reports for diet, fitness routine, and doctor con-

sultation are helping patients get better results faster. This is just the beginning of AI's contribution using millions of data points hidden till now in reports.

Role of digital healthcare players

Digital players are taking a holistic approach at solving quality care problems. Along with enabling quality and standardisation of services, there is also an increase in awareness. They are providing user-friendly information and helping them understand the data and thus encouraging a proactive approach towards healthcare.

Digital Healthcare companies are partnering with reputed lab partners to provide quality health-checks at home. While labs have a lot of experience in processing and test research, digital companies add a layer of technology to maintain standardisation and quality. They add technological solutions for a user to take responsibility, making them aware through data led tracker, reminder, proactive nudges etc. Users understanding the benefit of frequent check, tracking and proactive steps is the first step towards better health management.



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Evolution of molecular diagnostics before & after the pandemic

Dr Veeraal Gandhi, Chairman & Managing Director, Voxtur Bio talks about the evolution of molecular diagnostic sector during COVID-19

The COVID-19 pandemic has emerged as an inflection point in the history of the molecular diagnostics in India, as it has escalated the demand growth of such diagnostics solutions and changed the perception towards diagnostics services. The widespread adoption of reverse-transcription polymerase chain reaction (RT-PCR), for detecting viral infections has made molecular diagnostics an integral part of the diagnostic and healthcare service delivery. The sudden spike in demand for testing solutions in the initial phase of the outbreak put stress on the

molecular diagnostics infrastructure. However, with diagnostics solutions manufacturers enhancing their manufacturing capacity, the gap was bridged to some extent. Molecular diagnostics has become the mainstay of the preventive healthcare ecosystem, as it depends majorly on molecular diagnostics in battling the pandemic impact.

The large-scale adoption of molecular diagnostics solutions to detect COVID-19 infection has actually underlined the importance of making diagnostics services accessible to all, by taking those beyond the periphery of hospitals and labs.



In fact, molecular diagnostics has a bigger role to play in ensuring quick and convenient

access to testing services not only for COVID-19 but also for other infectious diseases. The acceptance of molecular diagnostics has increased significantly, thanks to its inherent beneficial features such as sensitivity, specificity, accuracy, etc. As a result, molecular diagnostics have altered the way people look at diagnostics services. People are now familiar with the idea of availing diagnostics services at their convenient locations with a faster turn-around time. An enhanced molecular diagnostics infrastructure can meet that evolved demand.

The further growth in mo-

lecular diagnostics infrastructure will not only enhance the knowhow on infectious disease prevalence but also develop superior mechanisms to combat the pandemic spread. In fact, the application of molecular diagnostics in detecting COVID infections will act as a blueprint to develop an effective pandemic response framework in future. Efforts are on across the world to cut down test development times as well as analytical test times to enhance the efficiency of molecular diagnostics. Molecular diagnostics will develop the foundation for a robust pandemic preparedness.

Industry-academia collaboration and molecular diagnostics

Dr Jaya Vyas, Consultant Geneticist, Genetics department, Metropolis Healthcare stresses on the need for strong industry-academia collaboration in molecular diagnostic sector

Molecular Biology techniques and molecular diagnostics are the major tools that has revolutionised the way the world looks at genetics and infectious microbiology diagnostic industry. It has created a long-desired boom in the field and provided the wealth of knowledge and database information. This has happened in a such a rapid pace and in such a short span of time that its quite a challenge to assimilate, synthesise and clinically interpret this huge knowledge and database.

Almost, all the disciplines of health sciences, be it cancer or reproductive health, newborn/pediatrics, or neurology and of course infectious or microbiology disciplines are all positively influenced by it and therefore the genetic aspect is always kept in mind for patient treatment and managements.

All this has been possible and would continue to be so, only, and only if there is a complete industry-academia collaboration. There must be total understanding and balance between the two, to ensure the quality of scientific work, for the interpretation of the knowledge data bank for perfect genetic and clinical correlation and for avoidance of variant of uncertain significance like situations.

Molecular techniques, like NGS, chip microarrays and cytogenomics has rocket speeded the pace at which genetic results are delivered but at the same time we need scientist, academicians who analyze this data with the same speed with the help of software and IT related tools and derive clinical interpretation from this which can be used in patient management.

India has huge diverse population but at the same time has



high risk for genetic conditions due to consanguineous and within family marriages. Besides, there is no awareness of the risk to genetic conditions both in the people and sometimes even the treating clinicians are also not much aware.

Therefore, although we do need to bring in all the latest technologies and scientific innovations, we need to create awareness of the genetic and medical conditions among the primary treating doctors, healthcare workers, social workers, and people at grassroot level. Bringing in technology and innovations is relatively simpler but to create awareness in our country will be helpful.

One good thing COVID-19 pandemic has created is that not only it has awareness and acceptance of molecular diagnostic techniques amongst medical fraternity, but it has also made us realise that we can not only establish these labs but also standardise, validate, and offer these diagnostics.

Tests at a war footing pace while still maintain in a world class quality standard. This being one the major key features of

molecular diagnostic tests and the best part is it can all be done in an economical way as these are very high through put nature.

As mentioned earlier also, both R&D and industry must work as hand in glove way because both are complimentary to each other and in absence of either one molecular diagnostic ecosystem may just collapse. A lot of weightage needs to be given to R&D as it will serve as fuel for industry for growth, a lot of emphasis needs to be given to maintain quality.

Standards as per international guidelines and accreditation standards which are dynamic and are updated from time to time as knowledge and information is constantly flowing. Besides, a huge gap is there between technical database and its clinical correlation and information.

The technologies that are shaping the molecular diagnostics market

Hasmukh Rawal, MD & Co-founder, Mylab Discovery Solutions explains about the technologies that can revolutionise the molecular diagnostics market in India

The healthcare industry has witnessed rapid technology-driven advances in the recent times. Pandemic has significantly accelerated the innovations in Indian healthcare sector especially in the diagnostics sector. Before pandemic, the molecular diagnostics was not fully harnessed and disease detection was largely dependent on serology. As the COVID pandemic escalated, Indian companies like us indigenised the development of molecular diagnostic solutions, which played an essential role in scaling up the testing capacity in the country.

In future, molecular diagnostics will witness a major shift from centralised laboratories to

decentralised POC testing. Due to its ease, convenience, faster turnaround time, and potential to improve patient outcomes, POCT is rapidly gaining prominence. After the second wave of COVID-19 pandemic in India, the importance of de-centralised and point of care testing has become evident. Traditional diagnostic laboratories have limited capacities, and thus POC tests have huge significance. POC molecular diagnostics has a variety of applications in the fields of genetic testing, pharmacogenetics, and infectious diseases.

Most notable progress will be observed in the areas of infectious diseases and oncology POC molecular tests. Research work is being undertaken on advance-



ments in biosensors, microfluidics, bioanalytical platform, assay formats, lab-on-a-chip technologies, and huge potential is observed in the smartphone-based biosensors that can be used in POC diagnostic devices. Also, the bacteria-derived technology will drive the next generation of accurate and inexpen-

sive molecular diagnostic technologies that can detect from antibacterial resistance to viral outbreaks to cancer-causing mutations in circulating tumor cells.

In upcoming years, molecular diagnostics will continue to be of critical importance to public health. In fact, Mylab has developed some technologies that improve the processes in molecular diagnostics. For example, Magnetic Bead Technology which helps in isolation of viral / Pathogen / Genomic Nucleic acid using Magnetic Bead technology. This leads to better yields of nucleic acid. We are extensively working on Multiplexing to combine many tests like TB and COVID-19 in a single

test.

The molecular diagnostics sector will also get benefitted from increased awareness and measures taken by the government in moving fast toward in this field. We believe with automation of process of molecular diagnostics, the cost will come down and adoption will increase. Many diagnostic tests which used to take hours of a pathologist's time can now be done in minutes.

In the coming years, molecular diagnostics will get a front seat when it comes to the distribution of healthcare budgets. This will help us introducing new technologies and make healthcare more accessible, effective and affordable for all.



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INTERVIEW

India is currently at the peak of digitisation and is highly accepting towards new innovations

Ramya Subramanian, Co-Founder, Docty in an interaction with **Kalyani Sharma** talks about her company's plans for Indian market and current status of digital healthcare sector in India

Tell us about Docty's role in advancing the healthcare IT sector in India?

Over the last few years, the Healthcare IT system had been evolving at a slow pace but after the outrage of Covid-19, it has seen distinct movement alongside a trajectory in the applications ranging from remote access to essential healthcare to the treatment of chronic diseases.

Launched in 2018, Docty is a telehealth startup that was born out of a need to provide safe and reliable care to patients, and can be accessed anytime, anywhere. Due to recent technological advancements, the service cost of the digital healthcare industry skyrocketed rapidly, making people unsure about the use of telehealth. Docty extends its cost-effective interactive ecosystem which seamlessly connects patients and their family members with healthcare providers.

Docty offers a whole scale set for an advanced telehealth experience:

Easy Access: Alongside its cost benefits, the platform offers an extra edge to its users as it operates on low data consumption and provides features like low bandwidth video consultations. This not only makes it feasible for rural communities but also ensures quality healthcare for patients across the globe.

Transforming with AI: With the integration of AI on its platform, Docty improves clinical diagnosis through tools like '24/7 symptom checker'. It could determine an individual's emotions through facial recognition and assist doctors in their diagnosis and endeavour to drive behaviours



The growing penetration in tier-2 & 3 cities will increase the demand for telehealth in ways more than one. The current day growth of the telehealth sector is just the beginning of many more advancements which are yet to revolutionise the healthcare industry

for improved outcomes. AI-enabled care helps to define and decide treatment regimes for patients suffering from complex diseases. The databases generated out of the entire health tech system have the potential to form the foundation of predictive healthcare soon.

Privacy: As patients rely more on telehealth during the ongoing global pandemic, the security risks increase exponentially. Docty ensures user privacy and data security by complying with HL7 security standards and providing end-to-end encryption.

Sensors and integrated wearables: Empowering medical professionals to keep a real-time update on a patient's situation and providing timely remote care has been a successful change for the healthcare industry.

What is the current market scenario of telehealth in India and how do you see its future?

While the telehealth market had witnessed decent growth by the time COVID-19 hit the world, the pandemic has certainly fuelled it. Advantages like reduction in hospital visits for regular checkups and the ease of specialty care access have made people more friendly with teleconsultation. As per the Telemedicine Society of India, Teleconsultation saw a rise of 3x during the first year of the pandemic. The applications of telehealth are on a constant incline ever since the COVID's onset, as the awareness increases towards traditionally 'taboo' topics such as mental health and

sexual health. Over Docty's App, the mental health of a patient is monitored through its 'Emotion Index' feature.

The growing penetration in tier-2 & 3 cities will increase the demand for telehealth in ways more than one. The current day growth of the telehealth sector is just the beginning of many more advancements which are yet to revolutionise the healthcare industry.

Can you throw some light on market opportunities in telehealth sector in other countries and its comparison with India?

Docty first launched its platform in Colombia and simultaneously started mapping out its penetration into India. Owing to its global expansion plans, in July 2021, it also expanded its footprint in the South African market. While expanding its services in 3 different continents, Docty has grown with a versatile experience coming from different international markets.

India is a forerunner in terms of adopting new technology and making the most out of it. Colombia has a universal healthcare system that enables Docty to partner with the clinics, pharmacies, and insurance companies to get direct access to the patients. South Africa on the other hand is still a nascent market with respect to technological trends and is bound by strict guidelines to be followed.

What are your views on 'lessons to be learned from other countries' as far as incorporating technology in

healthcare in India is concerned?

Among all the countries in which Docty is present, India ranks highest in terms of technological adaptation. India is currently at the peak of digitisation and is highly accepting towards new innovations. However, it's true that the healthcare infrastructure in tier-1 & 2 cities is highly advanced and it will certainly take time to make it accessible in suburban and rural areas. With the growing telehealth ecosystem, it is becoming convenient for urban healthcare providers to connect with patients from rural communities and vice-versa. With a customizable search function, Docty allows patients to

new technologies? Your views

The acceptance of new technologies in India is gradual, yet higher when compared to that in other developing nations. A combined study by India's healthcare research organization (SMSRC) and Purdue University in the US, conducted during June-July 2020 with 2116 physicians says that 81% of doctors in Northern India accepted telehealth from the beginning of the pandemic. The studies also concluded that these adoption rates have significantly raised in metropolitan cities. As smartphones and stable internet connectivity has upgraded telecommunication, it has also provided

India is a mature market with respect to technology and we can learn a lot from India and use it in other countries

explore and find the best-suited doctor for themselves instead of compromising with the locally available medical professionals. Docty has embraced the smarter way of healthcare and it has been an uphill climb of success for its users as well as for the doctors associated with the platform.

India is a mature market with respect to technology and we can learn a lot from India and use it in other countries.

Do you think India still needs to strengthen its policies and management on data privacy & protection, especially in healthcare sector?

India is a developing nation that is heading towards wearable technology for improving healthcare. With the health records being managed over cloud networks, which contain both patients' personal data and professional opinions on their health, it becomes extremely important to safeguard the data.

Docty being an early adopter of IoMT and AI adheres to HL7 security standards while keeping all of its data end-to-end encrypted. Owing to its high-end digital security algorithm, Docty has noticed an increase in the number of patients using the App. Privacy is the governing factor of any internet-driven industry and it cannot be compromised. Docty's digital health platform encompasses the entire ecosystem of patients, doctors, pharmacies, clinics - all while staying patient-centric.

Do you think the Indian healthcare system, especially the hospitals are still recessive towards adoption of

various opportunities in telehealth, making the Indian healthcare system susceptible to new innovations.

There are gaps, still need to be filled as far as digital healthcare in rural areas is concerned. What are your views on this? What according to you is the need of the hour in this direction?

Issues such as high costs, limited services x remote patients, low patient adherence, low ROI, high TCO, long waiting times, congested ER facilities, low customer satisfaction, interoperability, fragmentation of care, and patient risk management continue to restrict digital healthcare solutions from reaching to most parts of the country. There need to be progressive solutions with proper addressal to all the said issues. While eliminating these healthcare challenges seems like a never-ending hustle, a phone, internet connection, a post office with our kiosk, NGOs with partnership with the government and digital health platforms are all that is required to provide proper healthcare to all.

Docty's interactive ecosystem connects patients and their family members to clinics, hospitals, doctors, nurses, and other healthcare providers and enhances medical consultation. It uses Artificial Intelligence and Analytics to enrich the experience - eliminating the care fragmentation problem and securely facilitating risk-free healthcare access and quality to all. We aim to democratize healthcare access and quality to all.

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Telemedicine & digital diagnostics alters rural healthcare landscape

Vimal Prakash, Co-Founder and CEO, Cartula Health India shares his views on positive impact of technology in strengthening rural healthcare

As India readies to face a possible third wave of Coronavirus attack, healthcare service providers in villages, small towns and cities are under greater stress to strengthen existing health infrastructure. The ongoing pandemic has only highlighted the gaps in healthcare infrastructure, which even at the best of the times is inadequate given the size and spread of our population.

This fact is recognised, and is being addressed by the governments, at the centre and in states, but more so by the states, as health is a state subject. And the central government has put in place an overarching policy to reach affordable and accessible healthcare to every citizen.

But clearly the efforts need to be stepped up. The central government admits that availability of healthcare facilities and doctors was poor in rural areas when compared to urban areas. Now, this gap was felt acutely during the second wave that claimed thousands of lives in villages and small towns.

Rural health infrastructure is a cause for concern, and it faces a crisis of huge proportions. From the perspective of a patient, it often is an acute and insurmountable problem even to access basic medical facilities. Often, they have to travel long distances in search of doctors and clinics.

Recent studies show, nearly 86% of all the medical visits in India are by villagers, a majority of whom have to travel up to 100 km to reach a well-equipped health centre. Sans any insurance cover, some 70% to 80% of them have to pay out of their pockets, adding that much pressure on their finances.

Luckily for the masses,



In the spread of medical services across small towns and villages, the role of technology and technology aided services is immense as the experience of many is now beginning to show

some recent disruptive innovations and use of technology in the delivery of healthcare services - digital diagnostics and telemedicine - are proving to be a boon.

These new innovations increase accessibility of quality health care facilities and bring down their costs - both of which are the goals of the government. Imagine, consultation

with a heart specialist at mere Rs 100, via telemedicine facility. The patient would have had to spend some Rs 500 in commute charges only.

Now, increasingly, digital diagnostics, telemedicine and consultations with qualified experts in different fields of medicine, are becoming the new normal, which unleashes a huge potential for medical

health practitioners, specialists, surgeons and medical technicians. Now they can expand the footprint of their respective services. Post COVID, there is an increasing use of telemedicine instead of visiting clinics, for consultations.

Now, this is born by anecdotal evidence - Union Health Ministry's national telemedicine initiative eSanjivani has crossed One million telemedicine consultations. This service is being accessed by people in 550 districts, and even aged patients are learning to use technology. The ministry has pointed out that 10% of the users were aged 60 and above. The contagiousness of the Coronavirus has put the fear of physical contact - unless otherwise essential - in the minds of many, and Covid appropriate behaviour too acts as a restraint. This is the principal reason for a change in people's behaviour and to do away with physical visits to the clinics.

Now, there are a plethora of technical platforms, from the government and private service providers, that offer a range of telemedicine services, connecting the patients with the medical fraternity. It is possible, through the telemedicine Apps, to get teleconsultation, health check-ups, corporate wellness programmes, video consultation services, which can serve the communities that most need them. Over the past few years, digital diagnostics and telemedicine, along with few other innovations in healthcare services, have spread across the length and breadth of the country, enabling the medical fraternity to reach out to patients in far flung, remote areas.

What Apps like these do is to act like 'One-Stop-Medical-

Solutions' in that they have built in tie ups with diagnostic centres, and major pharmacy chains to provide door-to-door delivery of drugs and medicines in time. In reality, on the ground, these innovations have begun to make a difference. As they said, the taste of the pudding is in the eating. For the patients, these innovations have meant lower costs of healthcare services and availability of the services of international experts and specialists to the masses - at affordable prices. Platforms like these, are freeing the medical practitioner from being rooted to a geographical location for serving the people. Now, the medicos can be on the move, and still treat their regular patients and also examine new patients from wherever they are at that point in time. Now, few doctors had become household names during the pandemic because of the help they rendered, for their locations, to one and all. Clearly, this will be the new normal, as is Work from Home becoming (for companies, WFH has meant higher productivity, reduction in costs, adding up to greater efficiency).

In the spread of medical services across small towns and villages, the role of technology and technology aided services is immense as the experience of many is now beginning to show. Given the huge potential that exists in the sphere of public health, and especially after the outbreak of Covid 19 pandemic, it is no surprise that newer players are entering the healthcare services, in the process helping reach medical services and facilities wider and deeper into the country. Quality healthcare for all, appears to be more achievable now than ever before.

Role of cybersecurity in the healthcare industry

Rishikesh Kamat, Vice President-Managed Services, NTT, Global Data Centers and Cloud Infrastructure, India highlights the need for strengthening cybersecurity in healthcare sector

The healthcare industry is undergoing a massive digital transformation. With growing adoption and acceptance of online consultations, the Indian healthcare sector is using technology in a big way. The impact of the COVID-19 pandemic has accelerated the number of digital initiatives in the healthcare sector. The digital healthcare market in India was valued at INR 116.61 billion in 2018, and is estimated to reach INR 485.43 billion by 2024, expanding at a compound annual growth rate (CAGR) of 27.41% during the 2019-2024 period.

With India taking active steps to digitise its healthcare records with the National Digital Health mission, the digital healthcare ecosystem is only going to be strengthened. However, the increased digital activities have also exposed the Indian healthcare sector to cyber criminals. Stolen medical records are placed at a high premium in the black market, and is hence of obvious interest to hackers. Cyberattacks on the healthcare sector have also escalated due to the COVID-19 pandemic.

According to NTT's 2021 Global Threat Intelligence Report, the healthcare industry jumped from being the sixth most attacked industry in 2019, with 7% of detected attacks, to becoming the third most attacked industry in 2020, with 17% of all detected attacks. The increased percentage of cyberthreats can be attributed to more telehealth visits, an increase in healthcare digital infrastructure, and greater pressure on the healthcare industry as it attempts to drive management of COVID-19 outbreaks and vaccines.



With threat levels at an all-time high, it is crucial that healthcare organisations are cognizant of the increased threats that can prove to be extremely detrimental to the survival of the organisation. This is more relevant for the healthcare sector, as it is an extremely sensitive sector, where any cyberattack can cause havoc, and endanger the lives of patients

Once a hospital is hit by a ransomware attack, the access to electronic health records can be shut down.

This lack of access can cause several issues from the inability to prescribe doses for patients to shutting down

critical medical devices that are connected. This can be a life-threatening issue for certain patients who may be critically ill. Many healthcare organisations also commonly experience DDoS attacks directed at their websites, forcing them to take their websites down.

Healthcare organisations can mitigate these risks by taking a proactive stance towards security. Some of the recommended best practices include:

◆ **Conduct regular risk assessments:** Healthcare firms should do periodic assessments of their IT infrastructure from an information security perspective. This will help firms identify the gaps in their IT infrastructure, identify possible threats and discover any possible vulnerabilities.

◆ **Restrict access to patient information:** In view of the increasing data breaches with respect to patient data, it is important to restrict access. All access should be governed appropriately, and monitored continuously, as many stakeholders of a healthcare ecosystem may access patient information for different requirements.

◆ **Encrypt data:** Most data that lands up on the Internet or on the dark web is unencrypted. As healthcare organizations handle a lot of sensitive medical related information, it is extremely important to encrypt data at rest and in motion. This ensures that even if the information ends up in the hands of cybercriminals, it would be of no use.

◆ **Regularly backup your data:** Given the growing incidents of ransomware, it is vital that organizations regularly backup their data. They

should also invest in solutions that promise real-time availability and access to data in case of a disaster. This can be done cost effectively using a cloud-based storage or disaster recovery solution.

◆ **Take the help of specialists:** With their knowledge of security solutions, managed security service providers can ensure a proactive security response mechanism. Managed Security Service Providers can ensure continuous threat monitoring, detection and mitigation services using a combination of proprietary tools, frameworks and threat intelligence

◆ **Improving awareness about latest security threats:** All members of the healthcare ecosystem such as doctors, nurses, healthcare support staff and suppliers must be made aware of the latest security threats. Many breaches happen due to old or weak passwords. In most healthcare firms, security patches are not applied on a regular basis. Employees also have to be made aware about cleverly disguised phishing emails, which can be used to provide an entry for hackers to enter the system.

With threat levels at an all-time high, it is crucial that healthcare organisations are cognizant of the increased threats that can prove to be extremely detrimental to the survival of the organisation. This is more relevant for the healthcare sector, as it is an extremely sensitive sector, where any cyberattack can cause havoc, and endanger the lives of patients. There is hence a big need to reinforce security and use the pandemic as an opportunity to rebuild and relook at existing information security processes.

Orthomolecular therapy can bring visible and impactful results in cancer patients

Dr R N Mittal, Head & Neck Cancer Specialist, Senior Consultant, Jaipur Golden Hospital explains about the orthomolecular therapy as a treatment option for cancer patients

Cancer as disease has seen a growing trend in India. According to National Cancer Registry Report, the cases of cancer are rising rapidly in India. In last four years only, the cases have seen a surge of almost 10 percent from 1.26 million in 2016 to 1.36 million in 2019 and are expected to reach to 1.57 million by 2025. Approximately, two thirds of patients' loose battle to Cancer. These are alarming numbers for a nation like us, where the healthcare system is struggling to survive and is under stress due to Covid pandemic. The low ratio of oncologists to patients with cancer (1:2000) is another challenging factor leading to non-delivery of anticancer therapy.

That makes it highly imperative for the medical fraternity to make most of the limited resources, which calls for the intelligent solutions to fight against the problems. There comes the role of looking into the problem holistically and consider all possible ways to achieve the solutions. Fortunately, technological advancements have brought some light of hope to the lives of cancer patients and which is why they happily live their lives as cancer survivors and live long to inspire others.

However, the battle with this fatal disease is not as easy as it may seem to the world. Treatment like chemotherapy is a highly painful which itself adds on to the suffering of the patient. Unfortunately, a high number of recipients of chemotherapy succumb to the treatment itself. The periodicity, procedure and after effects of cancer treatment through



The road to a comprehensively equipped healthcare system is still long but methods like orthomolecular therapy will surely help us to take long leaps

chemotherapy is capable of killing the paramount determination and internal motivation of the patient.

The side effects of chemotherapy vary from person to person depending upon on the type of cancer, treatment duration, type of chemotherapy and so on. As it works on active cells, it generally cannot discriminate between healthy cells and malignant cells which further affect skin, hair, blood, digestive system and mouth. According to the National Cancer Institute,

Nausea and vomiting occur in up to 80% of chemotherapy patients. The Oral Cancer Foundation estimates that 40% of chemotherapy and radiotherapy patients develop mucositis, or inflammation of the mucous membranes in the mouth.

To reduce the sufferings of chemotherapy treatment comes a commonly available agent to the rescue of its recipients to make this battle easier. Vitamin C, when taken along with chemotherapy is highly recommended as it has multifaced benefits. Calcu-

lated dose of Vitamin C given 24 hours prior or post the therapy is proven to reduce chemotherapy related toxicities. Even though cancer-related fatigue can be managed through physical activities and mind-body strategies, Orthomolecular therapy lessens the intensity of fatigue without the help of extra efforts involving more time.

Chemotherapy is also notorious to leave the patient with bone pain. Bone pain can occur as a side effect of some of the biologic response modifiers like filgrastim. People

who have metastasis to bones from prostate cancer or breast cancer may also experience increased bone pain with therapy. Vitamin C helps reduce bone pain too and acts as a powerful antioxidant that fights molecules which trigger joint inflammation and serves as a co-factor in collagen synthesis, the main protein in joint tissue and bone. Use of Vitamin C also reduces the need of blood transfusions because it has been shown to enhance iron absorption and colony stimulating factors. Orthomolecular therapy has proven boon to the cancer fighters in improving the overall quality of life by almost 30-40% facilitating a life which is less painful, more active and definitely more enduring.

However, high-dose vitamin C may not be a wise decision in patients with certain risk factors as patients with a history of kidney disease, have suffered from kidney failure after treatment with high-dose vitamin C. Reports of cases have also shown that patients with an inherited disorder by the name of G6PD deficiency should stay at a bay from high doses of vitamin C as it may cause a condition in which red blood cells are destroyed, known as hemolysis.

The road to a comprehensively equipped healthcare system is still long but methods like Orthomolecular therapy will surely help us to take long leaps. There are many commonly available agents like Vitamin C which are yet to be explored, experimented and executed in medicinal treatments that are always welcome with open hands and hearts.

Treat sanitisation as an investment

Dr Sulaiman Sharieff, Consultant Microbiologist and Infection Control Officer, Specialist Hospital, Bangalore highlights the importance of sanitisation in hospitals

COVID-19 has repositioned sanitisation as one of the most important features in the maintenance of a hospital. As healthcare centers, hospitals attract a large number of people, many of whom could be vulnerable to infection. It is primarily this aspect that has prompted hospitals to relook at best practices in sanitization.

The foremost purpose of sanitisation is to reduce and contain the spread of microorganisms that are prevalent in a hospital environment. Studies suggest that Healthcare-associated infections (HAI) are one of the most frequent complications that can occur in a hospital. Five to fifteen percent of all hospitalized patients may develop at least one HAI during hospitalization and it is estimated that over fifty to seventy percent of all HAI are spread through contaminated hands. It is important that sanitization crews focus not only on all furniture and objects, assembly areas and patient rooms, but also medical offices and nursing stations. Individual doctors and nurses also need to follow a strict sanitisation regimen.

There are five main components of sanitisation in a hospital. These include what sanitization products are being used, the technique and equipment used to apply the product, surface type, contamination level and the sanitisation crew. The cleaning practices in a hospital must include all these elements in order to ensure optimal sanitization. An ideal product would be one that is effective against all actively multiplying vegetative bacteria, most viruses and other microorganisms, and yet be environmentally friendly, safe and easy to use.

Alcohol based sanitizers



Regular environmental sampling, water quality testing, usage of physical and biological indicators goes a long way in achieving the goal

and handrubs can be considered as Saviours, when it comes to hand hygiene. Chlorhexidine is a useful addendum, especially in Critical care areas, tackling multi-

drug resistant bugs. Sanitizers mixed with glycerol, or usage of moisturizers to provide care to those with sensitive skin, and with skin conditions like dermatitis could also be

considered.

When it comes to surface disinfection, most chemical products available today have some impact on the environment. Different surface types may require customized products that work against certain types of pathogens that might be present on a particular surface. The product chosen should not alter the surface itself. Phenolic compounds are used for cleaning of floors, toilet seats, bed pans. Hypochlorite solutions are the cost-effective for treatment of blood spills in a hospital. Critical zones like Operation theatres, ICUs can be cleaned with commercially available dihydroxy - dioxahexane solutions or other appropriate solutions. Many more disinfectant products are out in the market. It is recommended to objectively scrutinize the studies done on such compounds, and read literature on its environmental impact and not just merely accept word of mouth. These could be discussed with the Infection Control Team and Safety Officers, before the order is placed.

Care must be also taken to ensure the AC ducts are fully functional, its HEPA filters regularly checked at least once in six months, by a qualified technical supervisor, and appropriate calibration and service reports are maintained. Regular environmental sampling, water quality testing, usage of physical and biological indicators goes a long way in achieving the goal.

In times such as these, where the level of contamination is high, it is important that hospitals follow a strict schedule for sanitisation with increased frequency. Hospitals are reducing frequent touchpoints, finding new and safer solutions for patients to reduce contact points by making mobile phones the pri-

mary point of access for appointment bookings, consultations, inpatient registrations, diagnostics services, reports etc.

Last but not the least, is the human component. It is vital that sanitisation crews are provided with the highest quality of training and protective gear. Cleaning crews play a vital role in infection control in a hospital. Hence, intensive and ongoing training is paramount. Schedules must be documented, and all standard operating procedures have to be followed.

Every hospital must have a set of procedures that define responsibilities of the sanitisation crew including standards and frequency. The management should introduce proper systems to monitor and assess environmental contamination on a regular basis. Sanitization crews must remember that they could well be carriers of microbes from one area to another on their person. It would be a good practice for the sanitization crew to begin the sanitization process with more healthy patients and then move to vulnerable ones. This way they will reduce chances of more infections.

Often sanitisation crew are pressed to complete the process quickly, many times ignoring the efficiency of the process. It is important that the sanitization crew follow the recommended dwell times for disinfectants in order for it to have maximum efficacy.

Many hospitals today assess hygiene maintenance costs from a cost cutting standpoint. A shift in this approach must happen where appropriate sanitization products and equipment are chosen over cost. It will immensely benefit hospitals if they look at these costs as an investment and choose quality products and equipments.

A simulation based 'phygital' education model for empowering HCPs to provide the best-in-class care

Dr Amit Garg, Director, Medical & Clinical Affairs and Strategy Planning, Terumo India highlights the importance of providing strong scientific training to healthcare professionals in India

Modern medical technology businesses have introduced several advanced technological products and applications for the healthcare industry. The efficacy of these devices depends greatly on the manual dexterity of the medical professionals using them. It is critical therefore that they are provided hands-on training in the use of the products. For example, if a company supplies an endovascular graft, then it often needs to support the surgeon in the operation room. Similarly, it is important to provide medical devices education and training to ensure that physicians and HCPs gain confidence and competence. This will result in the delivery of high-quality care and improved outcomes.

As a medical technology company whose products are the choice of medical professionals across the globe, Terumo considers it its duty to enable HCPs with the most advanced techniques and practices through its products and their use. Consistent with the company's mission of 'Contributing to society through healthcare', we are committed to providing strong scientific training to HCPs in India, through relevant clinical and educational programmes and thereby enable better patient care.

Traditionally, we have always done these, face to face. We launched the Terumo India Skill Lab (TISL) in February 2018 with the following objectives:

- ◆ To provide dedicated knowledge & experience sharing facility for HCPs
- ◆ To provide state-of-the-art simulation on cardiac surgery and interventional cardiology for hands-on practice

Equipped with state-of-the-art simulation training facilities,

which provide doctors and medical technologists with virtual training of cardiovascular surgery and cardiac intervention, TISL became a great platform to serve the community and advance the standards of care through pioneering academic initiatives.

COVID-19 created the need for rapid digital adoption

TISL was originally designed with an aspiration to achieve scale, but the new realities post



of these models is that certain case scenarios, that are very rare, can be simulated in this setup and in any unfortunate instance where they encounter the same, physician can be much more confident of dealing with potential complications and saving patient's life.

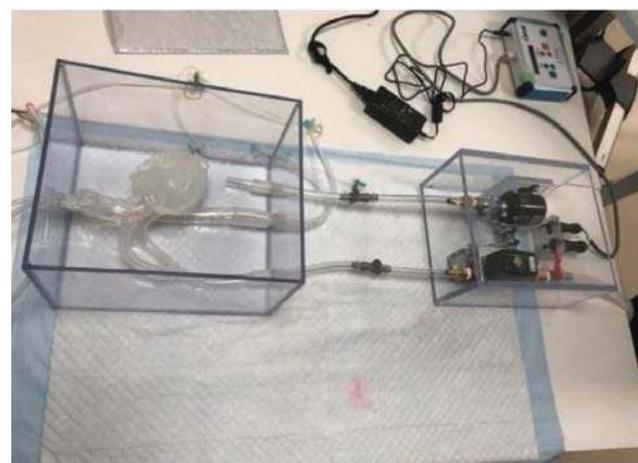
The impact

Coinciding with Terumo Corporation entering its hundredth year since inception, TISL is a fitting tribute to an organiza-

tion whose starting point and unchanging corporate mission has been 'Contributing to Society through Healthcare.' The shift to a 'phygital' model will allow the initiative to exponentially increase its reach and impact.

Key learnings and future prospects

Our agile response to the pan-



the COVID-19 pandemic meant that we needed to accelerate its implementation.

We started conducting online education sessions, webinars with partners and scientific bodies, and started engaging thousands of KOLs covering various safe cardiovascular procedures.

This 'phygital' version of TISL was launched in September 2020. Designed as a hybrid of physical and digital interfaces, the platform aims to accelerate medical education for cardiovascular healthcare professionals in India. It is designed to include live events, digital colloquium and patient resources covering various topics such as safer cardiovascular:

Procedures, bifurcation, multiple vessel disease,

complex PCI, trans-radial intervention, complex CTO and perfusion technology.

TISL intends to democratize the education of interventional cardiologists, interventional radiologists, and perfusion medicine. Physicians can learn as per their convenience, in their own space and per their time schedule. We have been investing in acquiring high end simulation models and engaging digital content to help HCPs learn new skills and enhance existing competencies. We recently introduced an advanced and unique Beating Heart Model and a Nanto Model. These models will facilitate doctors in building their clinical expertise through a nuanced three-dimensional perspective. The biggest advantage

democ allowed us to quickly adapt to the changing dynamics and reinvent our offerings. We upgraded training programs, created new customized educational modules and consistently stayed relevant to the changing environment. Our initiatives were welcomed by HCPs as they were perceived as being driven by the company's fundamental ethos of empathy and care.

The TISL platform will allow physicians and allied healthcare professionals the advantage of self-paced learning through a rich bank of meaningful resources including live and recorded webinars, scientific presentations by clinical experts, interactive online resources, interdisciplinary compilations of journal articles and product demonstrations, along with patient resources.

Keeping in mind the increasing emphasis on safety, we created Playbook - a detailed

Private Equity (PE) investments in Indian healthcare: Key drivers for success

Ratna Geetika, D V R Seshadri, Raghu Bommaraju, Indian School of Business (ISB) talks about PE investments in India healthcare and its key takeaways

The road Ahead

PE investments provide avenues galore for the growth of many healthcare organisations. Hospitals require vast amounts of capital to invest in infrastructure, technology and to reach viable scale. In most cases, PE firms are investing in large healthcare companies through big-ticket, multi-million-dollar acquisitions. Healthcare as a sector is attractive to such investors for its resilience even in economic downturns. However, the essential prerequisite for a successful investment is alignment between investor and investee organizations on several dimensions. Being aware of the intended synergies can transform the deal into a prudent strategic partnership, which can help both the hospital and PE firms to achieve their objectives.

Key factors

Hospitals vary widely in size, complexity, service mix, facilities, and business models. For any PE investment to succeed in Indian healthcare, it is crucial to take into account the interests of different stakeholders, including doctors, nurses, patients, and the management team.

Healthcare is a people-intensive and capital-intensive business. If both these aspects are taken care of, which are provided respectively by the investee and investor organisations, desirable outcomes in terms of better healthcare outcomes will ensue.

It is essential to provide substantial operational and management freedom and flexibility to the investee firm post the investment. This will



Ratna Geetika



D V R Seshadri



Raghu Bommaraju

It is essential to provide substantial operational and management freedom and flexibility to the investee firm post the investment. This will ensure positive synergies. Fostering a spirit of collaboration between both is vital for success

ensure positive synergies. Fostering a spirit of collaboration between both is vital for success. The focus must be on value creation for all stakeholders, centred around providing quality services. This will ensure long-term viability of both organisations.

Factors such as optimum utilisation of funds, improving clinical outcomes through top-class patient care and service quality assessment processes, accreditations, immaculate strategy implementation, and robust governance mechanisms would further strengthen the partnership. While the investor provides finances, the government must provide conducive incentives including an inviting taxation regime. The investee must focus on cash flows and viability,

without compromising on patient care. With these factors in place, all stakeholders would be motivated to give their best to make the deal flourish. It is also essential that the investor and investee organisations agree on vital aspects such as quality initiatives, protocols, revenue models, etc, before forming an alliance.

Due diligence is the most crucial facet of any successful PE investment. Both the investor and the investee firm need to do due diligence on financial, operational, social, governance, and regulatory aspects. A robust governance system, optimized workforce, and focus creating a conducive ambiance for successful investment are vital for success.

In addition to the above, the government's actionable measures of strengthening the primary, secondary, and tertiary healthcare and creating a macro-level infrastructure to build and upskill resources, augurs well for private equity investment. The success of attracting private investment would additionally depend on how flexible and nimble the government's approach is. The role of the government on a variety of dimensions including in upskilling manpower quality and instituting robust and early fraud management systems can serve to make India an attractive destination.

PE investors should look for investing in organizations that manifest transparency in

transactions. Ideally, the investee organisation should have experienced staff, a competent management team, a track record of success, and a good reputation. Relatively low-risk entry strategies for the investor firm include expansion of existing facilities, and construction of other additional facilities nearby. In contrast, a greenfield hospital development tends to be a high-risk investment from the investor organisation's perspective. It is vital that potential PE investors should seek investee organizations suiting their risk appetite.

Conclusions

A strategy that encompasses investment portfolio management as well as human welfare is at the core of PE investment's success in Indian healthcare; alignment between these two components is vital for success of the PE investment. The government could create a conducive policy framework and showcase role models of successful PE investments in Indian healthcare, to make this sector attractive to potential PE deals. A prerequisite for success is trust among all stakeholders, including the government, hospitals, clinicians, and patients. If harnessed well, these factors can create inclusive, growth-oriented, and commercially viable models that could benefit all stakeholders. On its part, the government could take a proactive role to gauge and address the problems of both the investor and the investee organisations, which could lead to successful outcomes that positively impact the quality of healthcare in the country.

Peritoneal dialysis with remote patient monitoring technology could improve health of patients with end stage kidney disease

Dr Santosh Varughese, Christian Medical College, Vellore and **Dr Georgi Abraham**, MGM Healthcare, Chennai talks about the advantages of peritoneal dialysis and role of remote patient monitoring in the same

CCOVID-19 and its far-reaching consequences forced India to delve deeper into its healthcare infrastructure and constantly upgrade it. The focus now is on patient centric methods of healthcare delivery that are hassle free for patients and their family.

Since, in recent times, the overwhelming focus of the medical fraternity at large, has been the acute care of patients with COVID and its sequelae, patients with non-communicable diseases, including those with chronic kidney disease (CKD), have experienced relative neglect. The lockdown affected transportation, access to health care facilities, availability of medicines and consumables as well as outpatient and inpatient medical services.

Now more than ever, both patients and healthcare workers realised the need for remote patient management and smart healthcare solutions.

As we know, patients with end stage kidney disease (ESKD) on haemodialysis (HD) have to visit the hospital or dialysis centre frequently for dialysis. According to the Ministry of Health and Family Welfare (MoHF&W), people having comorbidities like CKD and ESKD, are at an increased risk of contracting the deadly SARS CoV-2 infection. Even earlier, CKD has been an acknowledged major cause of mortality and morbidity in India.

Over 28% of patients with ESKD in one report missed at least one session of hemodialysis as a consequence of the initial three weeks of nationwide lockdown. There has also been hesitation among patients in



Dr Santosh Varughese, Christian Medical College, Vellore

coming out of their homes risking exposure to SARS CoV-2 infection, Missing dialysis sessions greatly increases their risk of myriad medical complications including sudden cardiac death and heart failure.

However, patients with ESKD who were in peritoneal dialysis (PD) were able to continue their dialysis safely at home.

What is Peritoneal Dialysis?

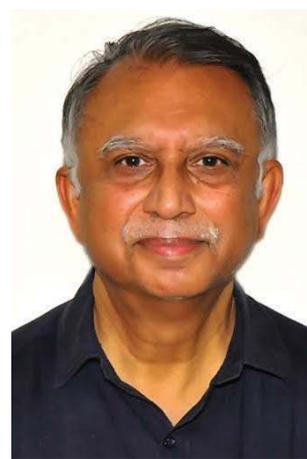
Peritoneal Dialysis (PD) is a type of dialysis therapy, that uses the peritoneum in a patient's abdomen as the membrane through which fluid and dissolved toxic substances are removed from the blood. PD is a very convenient, home-based procedure which can be done by the patient and his / her family following very basic training and practicing careful hygiene. Peritoneal Dialysis can be done in two ways - Continuous Ambulatory Peritoneal Dialysis (CAPD) and Automated Peritoneal Dialysis (APD). CAPD involves manual fluid exchanges

using gravity approximately three to four times a day, whereas APD is performed at night with the assistance of a mechanical device called a cycler.

PD allows patients to move about freely and maintain a flexible lifestyle. The patient can perform the therapy as per his / her convenience without having to worry about frequently visiting a hospital, unlike HD which mandates two to three hospital visits a week for dialysis. PD has lower infrastructure requirements including non-requirement of hemodialysis machines. In each session of HD, 120 litres of purified water are used. PD avoids this depletion of our precious resource. The other advantages of PD are its safety profile in patients with cardiac dysfunction, less anemia since there is no blood loss in the tubing and dialyser and a less strict dietary adherence requirement as the treatment being continuous and round the clock, somewhat mimics the natural kidney's function rather than intermittent removal of toxins and water in HD. To perform a session of HD, blood needs to be removed from the body and returned to it by puncturing a surgical connection of an artery and a vein (called fistula). Both construction of fistulae and their malfunction, may become challenging in patients with diabetes and those with vascular disease. This is another problem that patients on PD do not encounter.

Remote patient management on peritoneal dialysis

PD could become a preferred choice of dialytic therapy for many patients with ESKD for its various advantages. In



Dr Georgi Abraham, MGM Healthcare, Chennai

fact, now, with the deployment of IT-enabled patient monitoring systems or remote patient management (RPM), homecare treatment such as PD is being embraced more than ever, aiding both doctors and their patients. This would not just help manage the patient's medical condition better but also helps to improve the overall quality of life. Knowing that their therapy is under constant supervision is a big relief to patients on APD and relieves them of much of their apprehension. APD with RPM is made possible through cloud-based software such as Sharesource which provides seamless two-way communication between the patient's home and the healthcare team. This monitoring helps to promptly identify patients with higher risk of complications. The cost/benefit analysis weighs strongly in favour of APD with RPM compared to APD without RPM.

With the excessive load on hospitals to prioritize acute care

for patients with COVID-19, the medical fraternity could explore avenues of greater remote patient management for a variety of medical conditions, wherever feasible. As for patients with ESKD, home-based PD with remote monitoring allows nephrologists to treat patients at home rather than in hospital. This gives an opportunity to enable both doctors and patients to critically analyze and choose their choice of dialysis treatment based on the patient's lifestyle and personal preference. Allowing the patient, the privilege to continue unhampered care at home during the repeated "waves" of the pandemic is the biggest advantage of PD.

The role of the government

While the government has taken significant steps to include PD in its policies to ensure free access, the penetration of these policies remains low. Pradhan Mantri National Dialysis Programme (PMNDP) was rolled out in 22 states and union territories; however, the implementation has been initiated only in 4 states so far. The initiative is supported by National Health Mission and provides free of cost dialysis to patients below poverty line.

Despite the potential advantages of PD, its penetration in the country is very poor. According to a report, there were only 8,500 patients on PD in India in 2019. However, with constant upgrade of the healthcare infrastructure, it is hoped that these patient-friendly initiatives will be increasingly adopted, thus ensuring that the patient, at the center-point of the healthcare system, will be immensely benefitted.

INTERVIEW

Unmet needs, value proposition, technical feasibility, team strength & commercialisation potential: Key parameters for funding support from BIRAC

Dr Manish Diwan, Head - Strategy Partnership & Entrepreneurship Development, BIRAC, Department of Biotechnology, Government of India in an interaction with **Viveka Roychowdhury** talks about BIRAC's criteria for selecting and funding start-ups



What is BIRAC's criteria for selecting start-ups and ideas for funding, when it comes to the healthcare space?

BIRAC focuses on start-ups that are working to address unmet needs through development of technology-based globally competent and affordable solutions with the potential for commercialisation. A start-up can receive funding support from BIRAC across the value chain from ideation to proof of concept, minimal viable prototype to validation and pilot to manufacturing stage. Unmet needs, value proposition, technical feasibility, team strength and commercialisation potential are the key parameters used for competitive evaluation of an application for funding support from BIRAC.

Why was Cardea Biomedical Technologies' handheld ECG device chosen? What are the gaps in our public health ecosystem that the device addresses, especially those accentuated by the COVID-19 pandemic?

This handheld ECG device by Cardea Biomedical Technologies can work in low resource settings, providing accessible, affordable and a high-quality solution, and

therefore it was chosen for support by BIRAC.

Cardiovascular Diseases (CVDs) are on rise in the country and ECG screening is clinically helpful for early diagnosis of CVDs. The device has been named by the founder as Accurate Tele-Electrocardiogram on Mobile (ATOM). The device can also be used routinely to check ECG and is especially relevant in the current COVID-19 situation.

ATOM ECG is a product for monitoring the heart health of COVID-19 patients and post COVID-19 patients. A regular 12 lead ECG is mandatory to check for myocardial inflammation. For COVID-19 patients, there is a high probability that the ECG paper may get contaminated with the virus when the ECG is conducted in the COVID-19 ward and might become a carrier of the virus to the cardiologist and care giver. When using ATOM ECG, there is no paper requirement and the ECG can be safely sent to the cardiologist instantly, using applications such as WhatsApp and email.

Walk us through how the device works and its USPs compared to handheld ECG devices in the market.

ATOM can potentially record

a medical grade 12-lead simultaneous ECG on any low-cost smart phone. It is a low-cost, portable, and compact equipment. With bluetooth connectivity between hardware and mobile, the transmission of the ECG PDF file recorded on ATOM app is easily done through messaging services such as WhatsApp, or emails to a cardiologist for immediate tele-consultation.

ATOM ECG comes with Machine Learning (ML) algorithm which runs instantly on the smartphone itself to identify several cardiac anomalies. This allows ATOM a differential advantage compared to its peers to provide the necessary information without having to send the data to cloud via internet services. The mobile application is being made extremely user-friendly while handling the most sophisticated algorithms, to get noise-free data with ease.

ATOM's features also include augmented reality-based Electrode Placement Guidance System. This helps the user place the electrodes with desired clinical precision even without support from any trained personnel.

Such features enable this to be an affordable,



A start-up can receive funding support from BIRAC across the value chain from ideation to proof of concept, minimal viable prototype to validation and pilot to manufacturing stage

accessible, and friendly solution for low resource settings, especially relevant for rural and tier 2 and 3 towns where skilled healthcare givers and access to expertise might not be available easily.

What was the funding received by Cardea and the terms of the funding?

Cardea Biomedical Technologies has won BIRAC's BIG grant. Under BIG, INR 50 lakh grant-in-aid is given to innovative ideas. It allows access to incubation, high end instrumentation, hiring manpower, engaging experts, and other opportunities. ATOM was also supported (both funded and facilitated) under the BIRAC- WISH (Wadhvani Initiative for Sustainable Healthcare Foundation) partnership program, where the ATOM ECG device was field validated during the period August 2018 to March 2019 in Primary Healthcare (PHC) settings in Rajasthan.

How has the device performed during the pilot

There are about 350+ products from BIRAC supported start-ups that have already reached the market

roll-out? What kind of public health settings was it trialled in?

Pilot studies were conducted in two phases in PHC at Rajasthan between Aug 2018 to Mar 2019. The white paper was submitted by WISH which summarizes the following:

- ◆ The first phase aimed to estimate sensitivity of ATOM in screening patients for CVDs: During the study period, a total of 463 patients underwent ECGs using both ATOM as well as conventional ECG machine at the PHCs. A total of 451 pairs of ECGs (one each from ATOM and conventional ECG) were analysed by a senior cardiologist. The cardiologist reviewed all the ECGs and reported pre-defined clinical outcomes for each ECG.
- ◆ The second phase aimed at investigating feasibility of

ATOM as a screening tool in terms of cost, convenience, and quality in PHCs as well as in community outreach settings. Around 1000 patients went through tele-ECG (ATOM) at various PHCs.

- ◆ Pilot study shows that sensitivity of ATOM in screening patients of suspected cardiovascular diseases (normal/abnormal ECGs) is 92.71% in comparison to the gold standard conventional ECG machine.
- ◆ Pilot study shows that sensitivity of ATOM in screening patients at the last mile for referral to a cardiologist for consultation is 92.68% in comparison to the gold standard conventional ECG machine.

Give us an idea of other such innovations being supported by BIRAC which are close to pilot phase?

There are about 350+ products from BIRAC supported start-ups that have already reached the market. BIRAC's dedicated biotech showcase e-portal www.biotech-solutions.com features 150+ such biotech solutions. About 20% of BIRAC supported solutions are currently in the validation stage.

Some of the BIRAC supported healthcare innovations, such as those listed below, shall be field validated under the BIRAC-GCI-NASSCOM Healthcare Innovation Challenge "JANCare"

JANCare is a nationwide innovation challenge to discover, design and scale the health-tech innovations, which work in low resource-settings especially, in rural & semi urban environments. These innovations will be built on

technologies such as artificial intelligence, IoT, machine learning, big-data, and analytics, making use of telehealth platforms to enhance the access, quality, and affordability of the delivery of healthcare at the last mile.

Some of the other such innovations being supported by BIRAC which are close to pilot phase are:

- ◆ CervAstra (Aindra Systems): A Computational Pathology based, affordable system for detection of Cervical Cancer
- ◆ Aum Voice Prosthesis (Innaumation Medical Devices Pvt. Ltd.): a simple, non-invasive, and cost-effective device made for laryngectomy patients. It allows the patient to speak even in the absence of a larynx.
- ◆ Keyar (Janitri Innovations Pvt. Ltd.): An affordable, wearable, and wireless intrapartum fetal heart rate, uterine contraction, and maternal heart rate monitoring device.

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Siemens Healthineers inaugurates manufacturing facility for molecular diagnostic kits in Vadodara, Gujarat

MDX facility with core production area of around 9,500 sq. ft., is co-located in the diagnostics facility spread over 50,000 sq. ft.

COVID-19 pandemic has led to a heightened awareness and need for Molecular testing infrastructure in the Country. Siemens Healthineers has announced local manufacturing of molecular testing kits, including COVID-19 testing (IMDX SARS-CoV2 Multiplex RT-PCR) as well as other Molecular testing kits in its state-of-art facility at Vadodara, Gujarat.

The facility was inaugurated on August 27, 2021, jointly by Krishnan Seshan, Executive Director (Finance and Administration) of Siemens Healthcare and Arpan Malhotra, Head of Diagnostics, Siemens Healthineers, India

While inaugurating the facility, Malhotra said, "This investment reaffirms our belief in the India growth story and our commitment to the India healthcare sector. As a pioneer in diagnostics manufacturing in India, local production of molecular testing kits is a breakthrough in scaling up testing, especially during crisis. These kits are designed and developed by Siemens Healthineers along with eminent researchers from Indian universities and research centers, reinforcing our open policy to work and to enhance our efforts in expanding precision medicine."

IMDX family of molecular diagnostics assays tracks infectious diseases, human genetics and oncology marker based on molecular RT-PCR technology to address equitable access to diagnostics value chain, starting with advanced genomics driven



Krishnan Seshan, Executive Director (Finance and Administration) and Arpan Malhotra, Head of Diagnostics, Siemens Healthineers, India inaugurates the facility

IMDX family of molecular diagnostics assays tracks infectious diseases, human genetics and oncology marker based on molecular RT-PCR technology to address equitable access to the diagnostics value chain, starting with advanced genomics driven IMDX SARS-CoV2 Multiplex RT-PCR kit

IMDX SARS-CoV2 Multiplex RT-PCR kit.

The IMDX SARS-CoV2

Multiplex RT-PCR kits will be produced in compliance with the guidelines prescribed by

the Indian statutory bodies and confirm to the highest global standards.

The existing manufacturing facility licensed as per Medical Device Rules, 2017 (MDR 2017), comprises of two product lines namely urine analysis strips and AUTOPAK biochemistry reagents. As a part of the skill development initiative, the facility also serves as a Centre of Excellence for training in laboratory diagnostics, point-of-care testing and diagnostic imaging, across the South Asia region.

R&D and innovation in the molecular diagnostics sector in India

Thomas John, Managing Director, Agappe Diagnostics highlights the role of R&D and innovation in molecular diagnostics sector in India especially during COVID-19

R&D and innovation in India is at a slow pace as compared to other countries, as a matter of fact. For example, India's gross expenditure on research and development is less than 1.0% of GDP, whereas ideal rate is at least 2% of GDP.

COVID-19 has given a big boost on the road of research & innovations in molecular biology segment, in particular, for India, as the adage; necessity is the mother of invention. The COVID 19 pandemic has created opportunity for academia & industry to understand the awareness on long-lasting infant stage of molecular diagnostics in India, which was not much bothered about both parties till now.

Before pandemic, academia focused on implementing the molecular diagnostic tools for their research & Industry too did the same. This resulted in poor growth in the sector of molecular diagnostics in India. Though many academic institutes developed various technologies and new reagent formulations related to molecular diagnostic, no

body was interested to take it to the public benefits like its applications in detecting infectious diseases, oncological mutations & gene polymorphisms study.

As a result of this delay, this field of science faced slow growth where the needy were suffering on the other end. In India 8 to 10 standalone molecular diagnostics labs are operating with full technical facilities to facilitate the entire populations in our country. And few labs operated as collection centres as they were not confident on the technologies as, public and the doctors were not confident to use it. On the other hand, no industries were bothered to have their own manufacturing of reagents and instruments related to molecular diagnostics and were traded from overseas and buyers were also very less. Very few manufactures depended on trading raw materials for their kit that were made in India.

During Pandemic, our country had no academia & industries with basic facilities to manufacture the raw



materials for molecular biology kits to detect SARS-CoV-2 RNA. We could manufacture only Viral transport medium and swabs. India, a fast-growing nation couldn't manufacture her own kits within the country. Even now we are importing all basic raw material like polymerases, dNTPS & other simple chemicals from overseas. Any kind of primers will be imported. Any simple molecular diagnostic equipment needs to be imported. This has caused a huge financial loss as all the companies increased the cost understand-

ing the demand. As soon as our government understood the condition, price capping helped to certain level to control the price, but quality was compromised by the current suppliers that generated poor quality results. Our government capped the price to 500 INR in many states which was once the RNA extraction cost.

After pandemic, scenario has been changed completely. Need of the hour is not R&D in the field of Molecular Diagnostics as enough R&D has been already done by our academia by spending huge sum of money so far. So, what we need is a surgical strike type of action by the government policy makers to implement the below list rather to spend money on conducting online meetings continuously for years.

◆ Academia has the technology to make the raw materials like polymerases & other reagents needed to manufacture a Molecular diagnostic kit which need to be transferred to Industries based on proper documentation to share the royalties. Of course, other regulations to be

implemented accordingly.

◆ India has all the technologies in this field of science and no need to expect support from other countries. Once we successfully implement the immediate requirements, we shall think of latest technology development which will need continuous R&D as it is inevitable.

◆ Academia and Industries must have the freedom to contact directly and independently to conduct brainstorming sessions to find the solution for the immediate requirement in Molecular diagnostics & direct access to lice samples keeping all ethical standards.

◆ Another issue faced by the COVID testing labs are trained manpower. Hence students also can be involved in manufacturing facilities as a part of their curriculum, so that they also get trained as required by the industrial requirement & don't face the problem as a "Fresher". We do have to go a long way to ameliorate the application side of research concepts for Industry & social benevolence.

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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Strategy: TB control in India: Role of private sector
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HEALTHCARE LEADERS

Voluson BT21 - Next Generation Imaging Transforming Fetal care

Dr Ashok Khurana, The Ultrasound Lab, New Delhi; **Dr Chander Lulla**, Ria Clinic, Mumbai and **Dr H S Mann**, Mann Scanning Centre, Jalandhar shares their experiences with GE healthcare's Voluson BT21

The last two years have swept by us with the pandemic being omnipresent throughout. While COVID may or may not abate over the coming years, what is heartening is that there's no slowing down in technological innovation when it comes to telemedicine products and solutions. The advent of Artificial Intelligence (AI) & Machine Learning (ML) hasn't just eased lives in general, but has brought about exceptional breakthroughs in bridging diagnostic and treatment gaps. Ultrasonography has been in use since the last 3 decades. It has moved from portable radiology machines and X-Rays to the latest in imaging techniques with more fruitful outcomes, heralding us towards an era of non-invasive treatments. The new generation of Voluson™ E10 with advanced imaging capabilities, is positioned to change the way doctors address maternal & fetal health, intervening early with critical & lifesaving measures and treatment.

Obstetrics and neonatal health require critical intervention at every stage. Higher imaging resolutions, increased penetration and clarity, and quick comprehensive evaluation of both mother and fetus can bring down mortality and morbidity rates significantly. The Voluson™ E10 BT21 achieves resolution and volume rates up to 29 times higher, than those with mechanical technology found in the standard electronic 4D probe. Whether it is for routine examination or complex fetal echocardiography, the flexible imaging formats and deep penetration makes it truly stand apart from other machines in



Dr Ashok Khurana, The Ultrasound Lab, New Delhi

the series. However, the true test of the machine lies in its applications, and below are what eminent imaging technicians and radiologists across India have to say about it.

Radiance System Architecture

Dr Ashok Khurana: I have been continuously using the Voluson series of ultrasound equipment since early 2000, and it has certainly made a radical impact in pregnancy imaging. We have a greater appreciation for fetal movements, image resolution and depth, and all of this with user friendly techniques.

Dr Chander Lulla: In the last 35 years of my radiology practice, I haven't seen a machine as good as this. High resolution imaging built on this machine's innovative Radiance System Architecture with beam forming technology is powerful, and has parallel processing power. This not only improves resolution multifold, but the new single crystal transducers - C1-6, C2-9 - provide excellent penetration, imaging with good frame rate in 2D & color doppler to catch fetal heart rate in real time. There is extreme definition of the fetal



Dr Chander Lulla, Ria Clinic, Mumbai



natal structure in-situ, and the shadow technique enhances images with great 3D perception including the depth of eye orbits, nose, facial structure of fetus. The high frame rate allows us to see fetal heart in real time, identify defects, stenosis, regurgitation, anomalies and pathologies, fetal circulation, fetal small parts like thymus, adrenals and more.

Dr H S Mann: I'm absolutely in love with the Voluson E10 series, and especially this new model. Voluson has changed the way we see ultrasound,



Dr H S Mann, Mann Scanning Centre, Jalandhar

improving technology for doctors. Although the old transducer gave good images in 2D, the new RM7C is much more exciting. It displays extraordinary image detail in 3D/4D with better resolution at extremely fast frame rates. It is also lighter to carry, elevates my standard grey scale images to sharp clarity, and helps me switch between different views seamlessly.

RM7C XDClear Volume Probe

Dr H S Mann: When it comes to the probes, the range of options are phenomenal. It is great for day-to-day imaging of obese individuals or those with higher BMI. The challenge of doing abnormality scan in 11-12 weeks, has become entirely possible with this machine. The XD clear probes have joined the arsenal of this equipment. The RM7C XDClear single crystal probe is a game changer. Earlier it was hard to pick out structural definitions of different heart chambers, but with the advent of this probe many of those challenges have been answered. It gives us very clear side to side, and membrane view. The probe is exceptionally good for the fetal

heart as it gives complete outline of the chambers. There is no overflowing of the color images and more confidence while doing the scan. Scanning time is also reduced because of ease of automation. The other 2 probes, XD Clear probe C1-6 and C2-9 are amazing and have similar resolution and give complete solution of imaging from 11 weeks to full term pregnancy.

Dr Chander Lulla: The new transducers in Voluson BT21 are XD Clear single crystal transducers - C1-6, C2-9. The RM7C is a highly acclaimed 3D transducer which is lightweight, and provides excellent images at great depth. The frame rates in 2D are excellent & color doppler helps observe fetal heart in real time. The biggest differentiator is the extreme definition of the natal structure.

Slowflow 3D

Dr Ashok Khurana: When it comes to the BT21, the slowflow 3D gives a depth perception never seen before. The grey scale, throws up fascinating features of the face. There is a greater appreciation for fetal movements with the imaging resolution and depth, and all of this is very user friendly.

Dr H S Mann: With the shadow reduction software, organs behind shadows are crystal clear especially in fetal imaging. L8-18i transducer gives excellent resolution of small parts like parotid gland and thyroid in the neck. In neonates, it helps in abdomen and musculoskeletal imaging, observing peripheral vasculature and carotids. All I see in this machine are immense possibilities for the future of diagnostics.

Integration - Key to a successful heart health management

Amit Mohan, Business Head - LCS & LCS Digital, GE Healthcare, South Asia talks about GE Healthcare MUSE™ v9 and its role in enhancing heart health with integration capabilities

Alone, we can do so little. Together, we can do so much. Collaboration and Integration of efforts have proven to do wonders for people as well as machines. For decades now, digitisation has improved and enhanced processes in healthcare. Starting from diagnosing early to providing quality care, technology has permeated into all levels of disease management. While technology helps derive insights from the data, it is the integration that is increasingly becoming key to the successful management of healthcare. Integrated healthcare helps physicians consolidate the diagnostic results, patient history, and treatment regimen and view it all together to provide an informed and insightful treatment. This leads to early diagnosis which can prevent deaths among patients.

As per the Global Burden of Disease study 2010, nearly a quarter (24.8%) of all deaths in India are attributable to CVD1. An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths.2 Of these deaths, 85% were due to heart attack and stroke.3

With heart health becoming a cause of concern across India and the world, it's time to take the treatment and diagnostic regime to an all-new level. ECG, one of the first steps in the prognosis and diagnosis of cardiovascular diseases has evolved with time. However, the lack of integration with other equipment may delay the prognosis and/or mislead the prognosis, leading to delayed treatment. This is where GE Healthcare's MUSE™ v9 takes a huge step in reaching the heights of integrated technology in heart care.

The new and improved

cardiology information system, MUSE™ v9 helps manage the challenges of the cardiology department, led by cardiologists, lab technicians, and administration staff, with its expanded connectivity tools, smarter workflows, enhanced data security, and privacy capabilities.

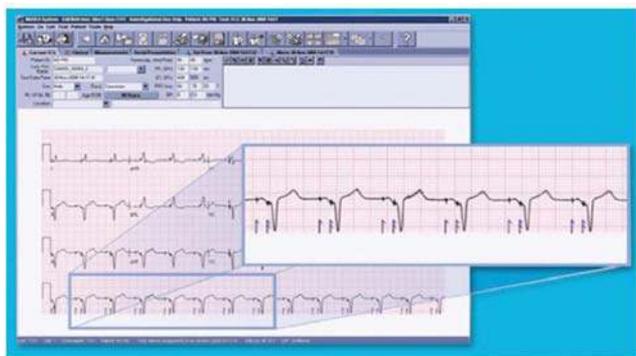
Nurturing connectivity

Time plays a critical role in heart care. To provide timely diagnosis and care, MUSE™ v9 leverages wireless capabilities to enable access to ECG information while the patient is still in the ambulance. While access to information is only the beginning, the crux is in the speed with which this information is



Marquette™ 12SL™ Serial Comparison programme, allowing accurate and expedient assessment of a patient's ECG data.

Seamlessly connecting



put to work towards the continuum of care. MUSE™ v9 utilises clinically relevant tools validated against clinically correlated databases for accuracy and supported with over 150 scientific references. Building on its heritage of storing and analysing clinically rich cardiac data, MUSE™ allows data to be easily accessed and transferred automatically. Its physician editing tools enable report review and help physicians facilitate better patient care.

MUSE™ stores electrocardiograms with physician-edited interpretations and works in conjunction with the

data, and providing a comprehensive, flexible, and easily accessible system to physicians give the ability to correlate care, when patients are seen at multiple sites. While retaining the heart of treatment in integrating information, it also ensures the safety of the information by using IT-approved systems.

MUSE™ Integration System

MUSE™ v9 connects to various systems in the network to provide a single view of the patient's clinical results to the physicians providing ease of

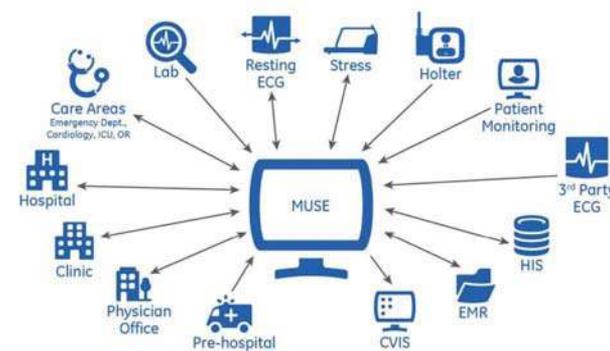
management. Designed to bridge the communication gap between vendors, modalities, clinics, hospitals, care areas, and the enterprise, MUSE™ eDoc Connect provides an open and direct multi-modality, multi-vendor solution, enabling easy integration of non-GE technologies, direct connectivity to receive and store reports from other network-connected devices such as stress testing equipment, electrocardiographs, wearables, pulmonary function equipment and more.

MUSE™ v9 comprises of other system integrators such as MUSE™ A/D Connect that enables integration with active directory solutions for a more

analysing clinically rich cardiac data and allows it to be easily accessed and transferred automatically.

Future of integrating healthcare

The future of heart care and healthcare lies in the integration of systems, information, and care. Connected systems enhance access to services, improve quality of care and reduce overall healthcare costs. With connectivity becoming more important than ever, GE healthcare's MUSE™ v9 integrates all the relevant ECG information on one screen, accurately predicting, detecting, and managing cardiac health.



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Vivid™ ULTRA EDITION by GE Healthcare

The Vivid ULTRA EDITION has proved its capacities with the advent of AI and first of its kind advanced quantification tools

Vivid™ ULTRA EDITION

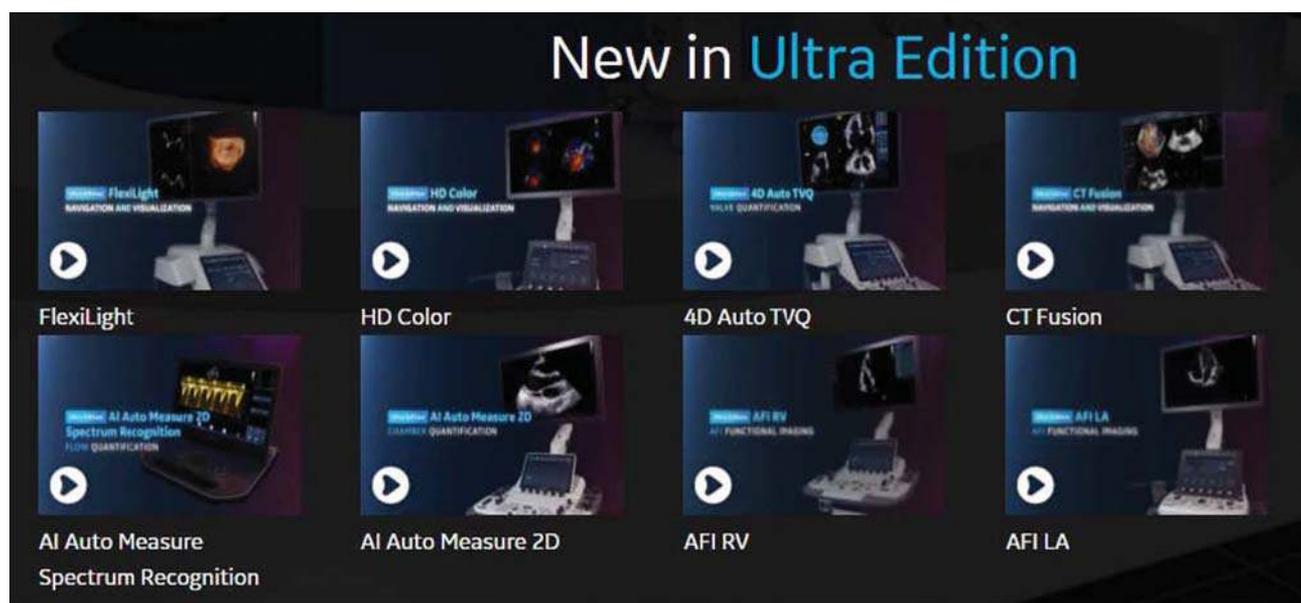
Healthcare has never been more accessible, intelligent, or dynamic. It's also never been under more pressure, from rising costs to aging populations and unanticipated threat of pandemic. At GE Healthcare, precision health takes primacy, and their innovation focus, built on years of research and practice, is meant to elevate care as well as to deliver optimum patient outcome.

The vision of GE Healthcare is to "Impact lives in the moments that matter", and what moments are more precious than when a patient is seeking care and treatment for his ailing heart. With the Vivid systems, GE Healthcare has consistently evolved technology to elevate clinical solutions for efficiency, productivity, and conclusive diagnosis. To help empower the care teams, amidst the unprecedented pressure observed with the rising challenges in Cardiac environment, GE Healthcare has raised the performance of their Vivid systems.

The ULTRA EDITION, which is powered by AI and elevated by you, is recognised as the most advanced Vivid system built till date.

The Ultra edition version of Vivid is:

- 1. Ultra-Precise:** offering uncompromised Image Quality and advanced visualization capabilities for precise diagnosis,
- 2. Ultra-Fast:** with AI based automation tools, Echo is going to be Easy, Fast & Accurate; thereby improving workflow efficiency, reducing inter observer variability & ensuring consistency across echo lab environment, and
- 3. ULTRA Efficient:** with advanced quantification tools across Vivid product portfolio, GE Healthcare tend to improve clinical diagnosis across patient spectrum for better clinical outcome and patient



care. Users who have experienced Ultra Edition, firsthand, confirm that the elevations in image quality, frame rate & scan-time optimisation with advance quantifications are beyond usual capacities.

Vivid™ ULTRA EDITION - Why guess? When you can see

The Vivid ULTRA EDITION has proved its capacities with the advent of AI and first of its kind advanced quantification tools. The VINGMED Technology - known for its gold standard Doppler, has been

revolving on the grounds of understanding the workflow to facilitate the state-of-the-art research.

The contact time, with each patient, has reduced significantly with number of clicks, involved in measurements, going down to '3 instead of 23', thereby making the overall scan process safer for both the patients and the healthcare professionals. The Vivid ULTRA EDITION helps reduce repetitive tasks with up to 93% reduction in measurement time, ~3x lesser inter-operator variability, ~98% detectability,

automated recognition, and accelerated workflow.

It facilitates photo-realistic illumination, and easy navigation techniques to plan the interventions, with its innovative features in the form of FlexiLight and CT Fusion (real-time co-registered navigation in 4D Ultrasound & CT). To enhance the spatial relationships between flow and surrounding structures, HD color feature suppresses the non-diagnostic low-flow information whilst it supports 4D color flow data from the previous releases.

With the launch of Vivid Talks™ Ultra Edition

GE Healthcare has also taken the initiative to educate the healthcare world with the series of clinical learnings, along with latest tips and tricks, from eminent clinicians across the globe. It has also introduced a network of thousands of fellow Vivid ultrasound users which facilitates access to many tools and resources exclusive to members, helping them experience the full power of their ultrasound system.

MEDRAD CENTRAGO: CT Injection System

Dr Sanjeev Mani talks about the advantages and characteristics of MEDRAD CENTRAGO: CT Injection System

As the post COVID era takes us towards finding solutions to support busy workflows, and to reduce resources, product companies are looking to focus on efficiency, and this is driving the need for product and workflow innovation. While CT injection systems have seen minor changes over the years, there is still a need to have more focus on patients and less on the injection process. Even today, key factors in the injection process include precise timing, high iodine delivery rates, and the different viscosities of contrast media.

The Injector

Smart options: Centargo Injector is available in two configurations, a Pedestal Version that includes batteries for wireless operation, and can also be operated on mains power while the batteries are charging; this is a useful feature in the pedestal version, while there is also an Overhead Counterpoise Configuration (OCS) that has an integrated cable. The system has a dual screen



configuration within the scan and the control room. Heat maintainers are built within the system for the contrast reservoirs. One nice feature we liked was the recessed connections that are supposed to

reduce and almost eliminate the chances of contamination. **Workflow advantages:** The system has many firsts to its credit - smart protocols to calculate individualized injection protocols, integrated bar code

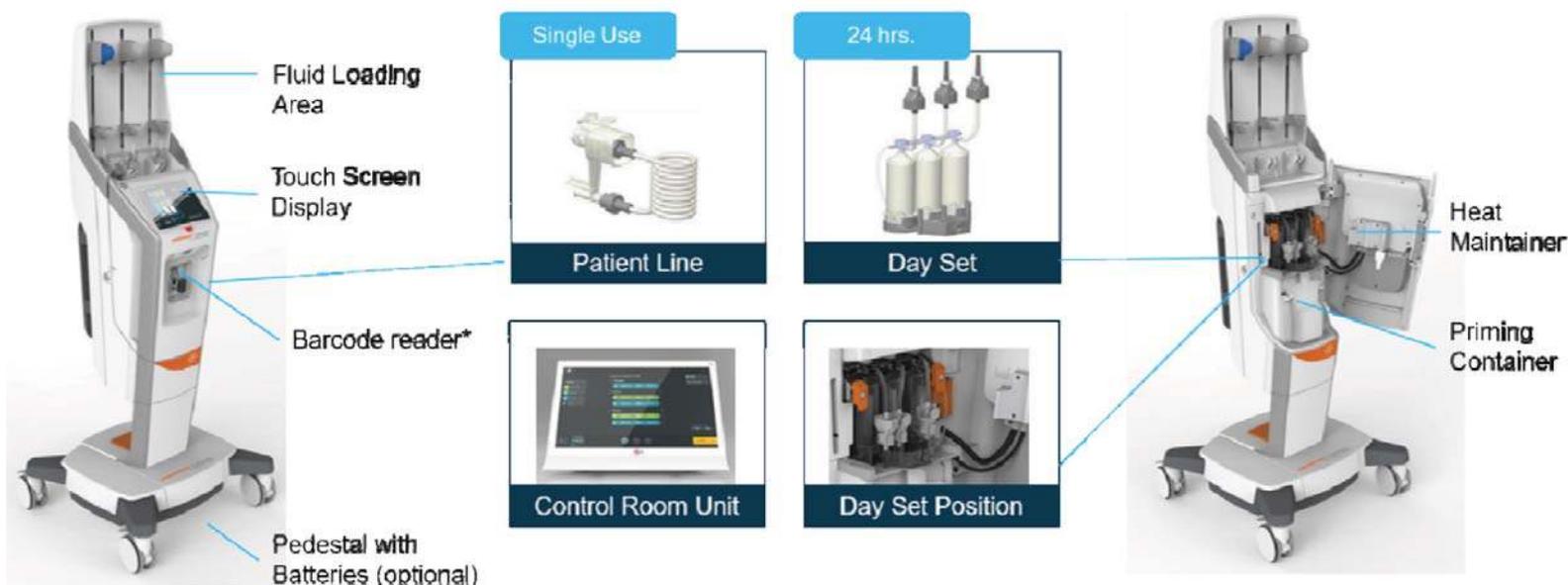
reader for contrast data capture and wireless (WiFi) scanner connectivity. Another unique point is that of integration of the contrast data into PACS and also availability to interfaces such as RIS and

quality management systems.

Setup is very quick within 2 minutes with the pre-assembled set including 3 reservoirs of 200 ml each (1 x saline, 2 x contrast), 3 spikes with an auto-off option at the end of the patient examination. Separate lines can be created for different patients with a fast changeover, almost within seconds with a snap-in Patient Line.

Maintenance of contrast temperature: Once we go into the understanding of this device, we realise that this injection system has been made keeping many factors in mind. For example, in order to maintain the temperature of warmed contrast medium, Centargo utilises heat maintainers surrounding the Day set reservoirs that heat the contrast only for the next few injections and not the entire bottle, thus reducing wastage of energy and battery life.

Prevent air embolism: We know that air embolism is a potentially rare but fatal complication of IV contrast medium. The system has 3 inlet air



*Barcode Reader: Centargo will offer an integrated barcode reader (scan room unit) as standard.

detectors and one outlet air detector as well as reservoir air detection and automatic air removal. There is also an advanced Saline button that pushes additional saline through the line to make a wet-to-wet connection if so desired.

Extended battery life: In order to allow for the flexibility and mobility of a wireless system, Centargo has the option of incorporating two batteries into the base of the injector. An integrated, smart Battery Management System automatically controls the battery charging and discharging for safe and seamless transportation and use. The injector is also fully functional while connected to AC power; there is no need to wait until the batteries are charged to continue using the system. Battery status is reflected on both the injector and the control room unit displays. If the battery is too low to complete the upcoming programmed injection, the injector will prevent arming until it is connected to AC power. These features ensure that your study can get going in no time, no matter what the battery status.

Priming the contrast media: Typically, the Patient Line is primed with saline in order to minimise contrast media waste. The first few seconds of any programmed injection is therefore saline, depending on the volume of the tubing and the flow rate. Centargo has introduced a new feature: "Pre-load Protocol". In order to improve accuracy and efficiency, it eliminates the manual calculations and adjustment of priming settings. Instead, the disposables are primed with saline and checked for air. Prior to connecting to the patient, the injection protocol is advanced through the Patient Line, discarding the primed saline volume.

Prevent microbial contamination

Various steps have been taken by BAYER to prevent microbial contamination as highlighted below.

- ◆ The Day Set is fully pre-assembled.
- ◆ The Patient Line connection port is recessed, minimising accidental touching.

The value of MEDRAD® Centargo for radiology staff and patients

Efficiency	Confidence	Quality
<p><i>Centargo is designed for a simple, reliable and automated workflow, easy daily set-up and quick patient-to-patient changeover between scans:</i></p> <ul style="list-style-type: none">  Daily set-up process that can be completed in under 2 minutes  Pre-assembled 24-hour Day Set  Simple snap-in Patient Line that auto-primers upon insertion, and is ready for the next patient in less than 20 seconds  Advanced scanner connectivity, synchronizing scan timing and simplifying workflow 	<p><i>Less manual data entry and an intuitive user interface help staff confidently complete their daily tasks:</i></p> <ul style="list-style-type: none">  Touch screen within the scan room so that staff can be close to their patient  Integrated barcode reader that reduces manual data entry and provides easy traceability and access to contrast and injection details  Two check valves in the patient line to prevent cross-contamination 	<p><i>Centargo offers trusted Bayer MEDRAD® quality, relying on decades of experience, comprehensive service networks and expert clinical support:</i></p> <ul style="list-style-type: none">  Inlet and outlet air detection, in addition to automatic air removal within reservoirs, to help prevent air injection  Piston-based fluid delivery and heat maintainers for contrast reservoirs designed to provide quality fluid delivery, even during the most demanding protocols  Informatics features that automate documentation and calculate individualized injection protocols  Cordless mobility with battery power and a Wi-Fi enabled configuration

While CT injection systems have seen minor changes over the years, there is still a need to have more focus on patients and less on the injection process

◆ The Spikes and the Patient Line connection port have dust caps, which should not be removed until ready for use.

◆ The Patient Line is inserted with a single snap-in motion and removed with a squeeze/pull.

◆ The patient end of the Patient Line remains connected to the injector until ready for patient connection.

◆ The Patient Line port turns orange after a patient's exam is completed, providing a visual reminder

to change the Patient Line. Centargo will also disallow arming an injection for the next patient until the Patient Line has been changed.

◆ Replacement Spikes are available.

Summary

While this product has been launched world over, we in India are eagerly waiting for its launch, which is tentatively believed to be by the last quarter of 2021. The presence of this fine product with all its

advantages will surely shake up the quiet Indian market of CT injection systems.

For more information and product details you may connect with Bayer team on Medrad.service@bayer.com
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MedTech: Breaking accessibility and affordability barriers in healthcare

Himanshu Baid, Managing Director, Poly Medicure highlights the role of medical technology innovation in making the modern care accessible, available and affordable

The healthcare and medical device sectors have grown significantly in the last decade. A transforming medical technology landscape, improving healthcare delivery and financing mechanisms and changing patient profile are driving growth in the medical technology industry. However, the industry has been stifled by some key impediments to growth. The foremost among these is the lack of affordability, accessibility, awareness, and availability. A key question, therefore, is how to increase penetration of medical technology to improve health outcomes in India. The answer lies in innovation. Medical technology innovation can be the tool to make modern care accessible, available and affordable by lowering the cost of the product or delivery. Innovation need not only be restricted to products. Business model innovation across the value chain and frugality can often generate significant benefits to all stakeholders, including patients.

For innovation to make an impact, collaboration between the stakeholders in the medical technology ecosystem is a key success factor. The industry must move from 'company-centric' to 'co-creation model'. All stakeholders - government, industry, academia, healthcare delivery and insurance providers need to strategise and collaborate to bring about lasting change. MedTech industry will need to derive business models to make healthcare affordable and bring it at the doorstep for the masses.

Telemedicine aims to meet the needs of today's healthcare consumers and has the capacity to revolutionise the delivery of healthcare. The poor infrastructure of rural health



MedTech Industry will need to derive business models to make healthcare affordable and bring it at the doorstep for the masses

centers makes it impossible to retain doctors in villages, who feel that they become professionally isolated and outdated if they are stationed in remote areas. Also, people from these

areas prefer to spend out-of-pocket for health expenses in hospitals in bigger cities.

Telemedicine may turn out to be the cheapest, as well as the fastest way to bridge the

rural-urban health divide. Considering India's huge strides in the field of information and communication technology, telemedicine could help to bring specialised healthcare to the remotest corners of the country.

The Public Private Partnership (PPP) model in India has seen success in other areas such as infrastructure, energy, education, urban development, tourism and more. It can be the panacea to India's healthcare challenges as well. PPP in healthcare has the potential to accelerate and provide deeper access to masses in hinterland of the country. It has the potential to improve the healthcare system by pooling in the expertise and finances of the private sector and subsidies of the public sector. New-age innovative technologies adopted by private players can make healthcare accessible to rural India.

We are witnessing technology-led solutions which were in the forefront treating people impacted by COVID-19. These solutions were in the form of IoT devices, to specialised equipment for telemedicine, to data analytics, all vying for the same space - the patient's home and geared towards focus on disease prevention and early intervention. Also, there is a strong need to change the focus diametrically and move from treatment model to preventive model. Availability of screening tools like Holvers, Portable X-ray machines, portable Ultrasound equipments, Echo, External loop recorders (ELRs) etc. would further improve accessibility of quality Healthcare in remote areas.

People in tier 2 & tier 3 cities are becoming more conscious about their health risks and proactively adopting preventive healthcare measures. Medical

devices such as blood glucose monitors, blood pressure monitors, pulse oximeters, body fat analysers are high in demand due to the increased cases of diabetes, cardiovascular diseases, chronic respiratory disorders, obesity, etc. These devices will enable patients to regularly monitor health indicators and take charge of their health at home.

The application of these point of Care equipments along with self-testing will be more widespread in the coming years. Digital devices, that provide real time health readings, negate the requirement of manual intervention for diagnosis of the vital statistics and offer data while providing access to quality medical practitioners through connected devices.

The key innovation trends in healthcare should help in developing affordable medical devices to extend the reach and accessibility of healthcare services beyond tier-1 cities.

MedTech sector must partner with the government to invest in skill development so that technicians can operate easily new technology devices in the remote area. Virtual trainings and learning events can reduce the need for the additional infrastructure for skill building. Companies must scale up online medical education programs for knowledge upgradation of the doctors & other healthcare professionals for continuous improvement of patient care.

While medical technologies can push boundaries and redefine the healthcare ecosystem, it is to be remembered that the impact of such endeavors depends entirely on their extensive adoption by the public and private stakeholders in the delivery of healthcare.

3rd booster dose? Neutralizing antibody test to play a key role

Importance and benefits of neutralising antibodies in COVID testing

With multiple COVID-19 vaccine producers, including Covishield (SII), recommending a 3rd booster dose to counter the threat of COVID-19, the Neutralizing Antibody Microlisa test will play a critical role in India's fight against the corona pandemic. Neutralization is the gold standard for determining antibody efficacy - it showcases how effective the vaccination has been against the SARS-CoV-2 virus.

Neutralization assays are complex biological lab tests, the only method to functionally test antibodies for their ability to prevent cell infection by SARS-CoV-2. Some countries that have implemented SARS-CoV-2 antibodies to monitor the development of herd immunity include the USA, UK, Australia, China, Thailand, Germany, Sweden, Austria, Switzerland, Finland, Brazil, Iceland, and Spain.

What is neutralizing antibody?

NAb is the antibody that defends cells from pathogens, which cause disease (in this case, SARS-CoV-2). The body produces them naturally as part of its immune response, and both infections and vaccinations against diseases trigger their production. NAb stops infections by incapacitating the invading pathogen by Blocking cell entry, replication, or other vital function. Neutralizing antibodies can result in lifelong immunity to certain infections. They are used to see if a person has developed immunity to disease after they have recovered from it or post-vaccination.

What are the importance and benefits of neutralizing antibodies in COVID testing?

1. Neutralizing antibodies (or Late arriving IgG) is the key to

reducing virus capture and spread of infection.

2. Neutralizing antibodies prevent the virus from attaching to the host cell.

3. The prevalence of these antibodies (in High Titre) will determine:

a) If the individual has an excellent humoral immunity

b) If the vaccination is successful.

4. NAb(s) are ideal as they provide no cross-reactivity with any other coronavirus infections.

5. The NAb(s) testing can help

the patients segregate between Mild, moderate, and severe categories.

6. They assist in tracking infection chains

7. and answering virological, clinic, and epidemiological questions about whether a robust antibody response has occurred.

8. The short-term to long-term immunity and the treatment regime can be devised explicitly for an individual by testing NAb(s).

9. Neutralizing antibodies



Neutralizing Antibody Microlisa test will play a critical role in India's fight against the corona pandemic

assures protective immunity against viral infections.

Who is manufacturing these tests?

J Mitra & Company, an Indian biotechnology company and IVD leader launched the COVID-19 neutralizing antibody Microlisa Elisa Test.

◆ The test kit has cleared all government parameters and received all necessary approvals, including Drug Controller General of India (DCGI) & successful product validation.

◆ The test kit has high sensitivity (> 95%) and Specificity (100%) and is validated by DCGI.

Tackling financial slowdowns with smart payment alternatives

Vivek Tiwari, Founder & CEO, Medikabazaar talks about the role of smart payment methods to deal with financial slowdown due to pandemic and other factors

Setting up and running a successful business isn't always easy, especially if your business is a part of the healthcare industry. While those issues that plague setting up a business are aplenty, there are some unique financing problems that medical professionals also encounter.

In 2020, several medical institutions struggled to find healthcare solutions in the wake of COVID-19. Many medical institutions and healthcare workers are still struggling to keep up as the pandemic continues to surround us. As demand for hospital services increased due to the pandemic, many hospitals and health systems worked to expand their treatment capacity by incurring costs to set up additional space for COVID-19 testing facilities, ICU beds, and other treatment beds.

Another factor in increasing costs for medical establishments has also been the rising demand for equipment and supplies, such as PPE, oxygen supply systems has increased as a result of the pandemic. Hospitals have incurred additional costs to acquire additional supplies to meet the needs of their patients and staff.

Slowdowns and increasing costs

The pandemic-induced lockdowns meant that people placed their elective surgeries on the backburner; thus, drying up the inflow of people with chronic illnesses that need regular in-facility interventions such as blood transfusions and dialysis etc. Due to the shutdown of



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international flights, foreign patients also stopped visiting India for surgeries.

These losses in revenue have been met with a sharp increase in costs for hospitals since the beginning of the pandemic. A global indicator of the same trend was the loss estimated by The American Hospital Association, that the financial impact on hospitals and medical systems by COVID-19 totaled over \$200 billion in losses during its first four months alone.

For healthcare businesses, it is vital to stay vigilant and prepare for the unknown-not only for rare global health emergencies but also for more frequent changes that may occur in the overall business landscape. Doing so can help them avoid financial losses and maintain a high quality of service for patients.

Medikabazaar freedom

Setting up and sustaining medical establishments has become entirely harder in the post-pandemic era and this is a problem that Medikabazaar Freedom counters with its unique payment solutions. Right from zero-cost EMIs, equipment finance, long term asset financing, and EMI based finance to revolving credit lines, long term asset financing options, and finance solutions for AMC/CMCs, MB

Freedom delivers tailor-made payment solutions to healthcare providers.

MB Freedom offers the following benefits in acquiring finance to medical establishments.

◆ **Limited documentation:** Finance proposals are approved with limited paperwork.

◆ **Virtual processing:** With no branch visits required, MB Freedom allows healthcare providers to focus on their business, and procure payment solutions with comfort.

◆ **Fast documentation:** Finance solutions are instantly delivered with swift documentation and instant sanctions.

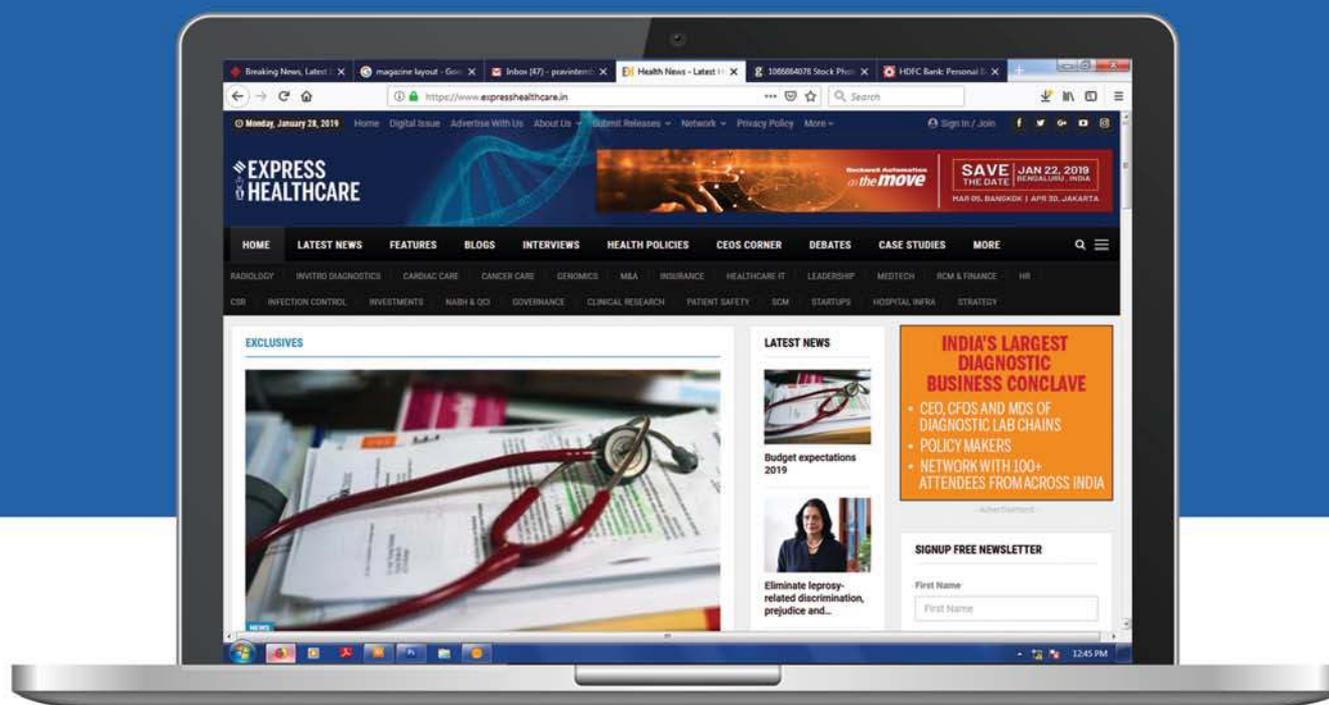
◆ **Flexibility of payment:** MB Freedom offers pre-approved financing options to provide healthcare providers a general flexibility of payment alternatives.

◆ **Smart tailor-made solutions:** Every business can have different needs. Freedom creates financing options that are tailor-made for whatever a medical business' requirements may be.

By enabling hospitals to adopt an online procurement system, the Mumbai-based organisation has already made the supply chain of hospitals more transparent and streamlined. With Medikabazaar successfully taking care of the procurement worries, doctors can concentrate on diagnosing the patients without having to think about the quality of supplies needed for any treatment they undertake. MB Freedom is simplifying payments and financing to relieve healthcare professionals of another overhead.

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