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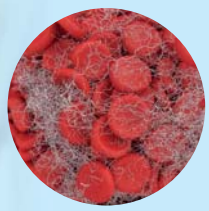

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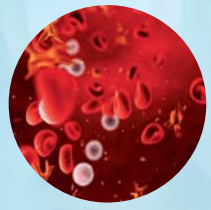

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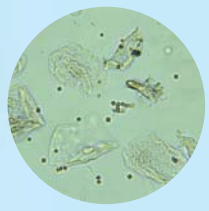

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EXPRESS HEALTHCARE

INDIA'S FOREMOST HEALTHCARE MAGAZINE JANUARY 2019, ₹50

Interview

Deepika T Grandhi
Business Development Head, India,
Cleveland Clinic

19th ANNIVERSARY SPECIAL

TALENT REBOOT

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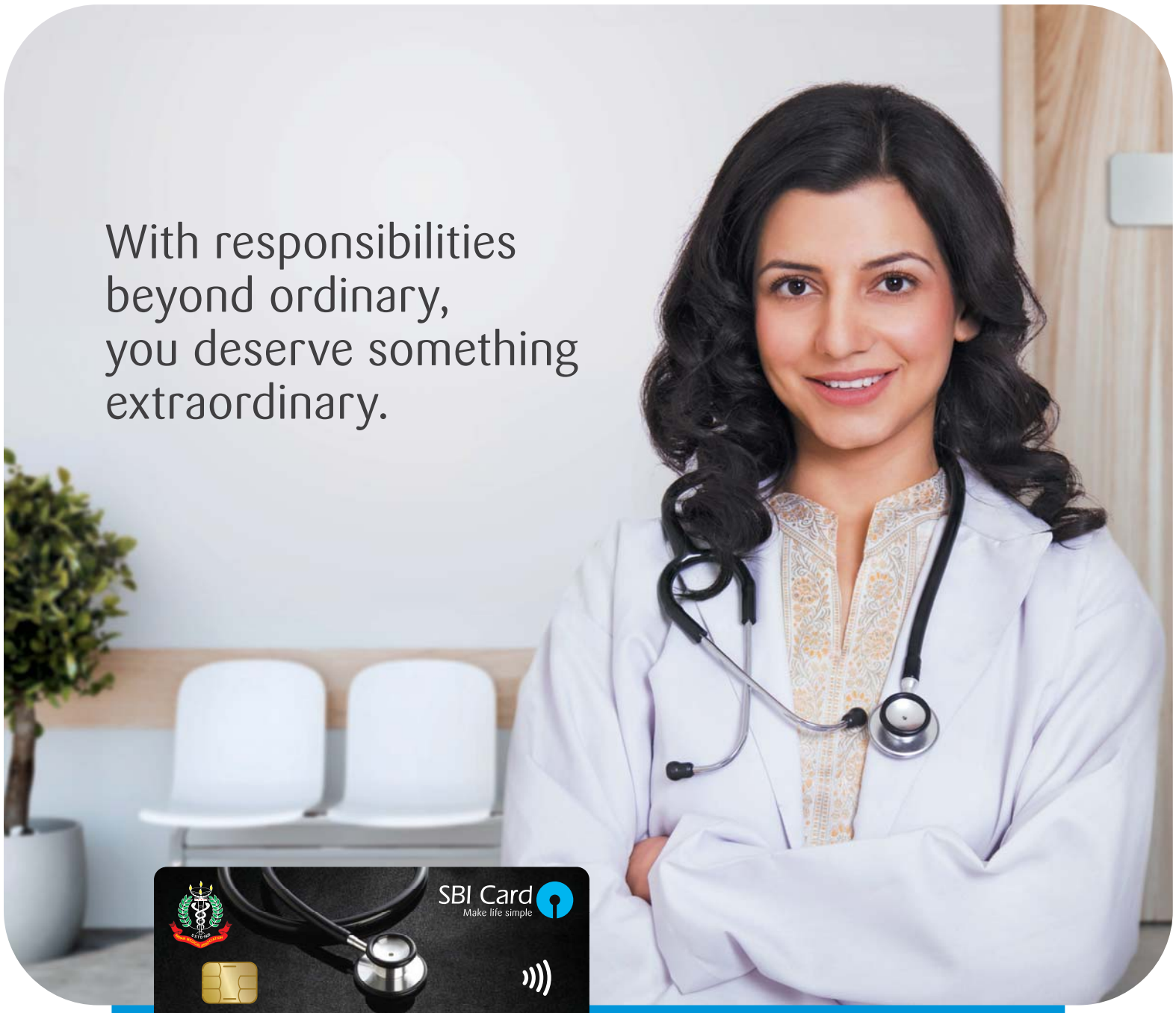

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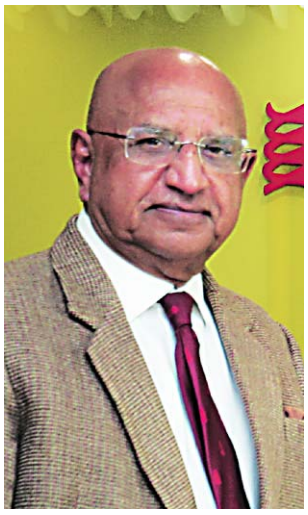

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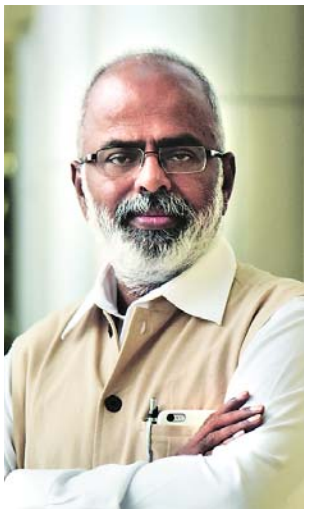

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Can the Surrogacy Bill find the right balance?

Stung by criticism that India has become a 'womb-for-hire' hub, policy makers are seeking to tighten the laws governing surrogacy. The Surrogacy (Regulation) Bill, 2018, a revamped version of the 2016 bill, cleared the first hurdle on December 19 with a nod from the Lok Sabha. It now needs to be green-lighted by the Rajya Sabha followed by the President of India, to be notified as an Act.

Media reports have highlighted how surrogate mothers are most often from the economically disadvantaged sections of society. Barely literate and mostly from tier 2/3 towns, most see surrogacy as a way to secure the future of their children and family. But do they understand the health risks of multiple surrogacies? Are they adequately protected both on the legal and medical fronts? Are they inadvertently part of the child trafficking business? And what are the rights of the unborn child, should the intended parents divorce before the child is born?

Given this context, the amendments seek to ban 'commercial' surrogacy by putting in place conditions in favour of 'altruistic' motives. The clause to restrict surrogacy to close relatives and one surrogacy per lifetime are a step in the right direction. Moreover, the couple has to be childless, Indian (ruling out foreign nationals), married for five years and heterosexuals.

However, the feasibility of these clauses is another matter. Firstly, the definition of 'close relative' is a grey area. Secondly, today's average Indian family is no longer a traditional, large close-knit clan which was the norm earlier. The underlying message seems to be that if the surrogate and intended parents are related, there will be no exchange of money. Thirdly, the parents-to-be cannot back out at any time during the surrogacy or after the birth. While the intention to protect the surrogate as well as the unborn child is laudable, the method thus seems out of touch with reality.

No one would argue against the bill's move to register surrogacy clinics, both existing and new, or the ban on advertisements/promotions of these clinics or the practice of surrogacy. The rules will also include insurance coverage for the surrogate mother for 16 months, which will cover post-partum delivery complications. This will be a boon for surrogates as reports have highlighted how such health concerns are not being adequately addressed currently. The amendments also allow the surrogate to change her mind at any time before implantation of the embryo in her womb. The surrogate mother needs to give her written informed consent in the language she understands, which will add another layer of protection.

Policy makers need to carefully, and more importantly, humanely balance the rights of surrogate mothers, hopeful parents as well as unborn children

The amendments specify that only childless couples married for five years qualify for surrogacy. The five year wait is apparently to prove infertility but experts point out that tests can today prove the same in a much shorter time. Same sex couples see these clauses as moral policing against their sexual choices.

The bill seems noble on paper but as always, a lot will depend on its implementation. Once the bill becomes law, central and state governments will have to appoint surrogacy boards at the national and state level within three months. These boards will regulate surrogacy, right from registration of clinics, ensuring the preconditions for conducting surrogacy are met (i.e. certifying the couple's eligibility for surrogacy due to proven infertility, certifying that the intended surrogate meets the set criteria on health and being a mother herself, etc) to authorising abortions during the surrogacy.

Policy makers should understand that too much regulation will force surrogacy to go underground, putting genuine stakeholders at the mercy of unscrupulous touts. They need to carefully, and more importantly, humanely balance the rights of surrogate mothers, hopeful parents as well as unborn children.

VIVEKA ROYCHOWDHURY *Editor*
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INTERVIEW

Payment channels like UPI, IMPS are very cost-efficient and real time

Digitalisation of health services and businesses within the industry has attracted the banking sector to invest in healthcare. In a conversation with **Raelene Kambli**, **Krishnakumar Dharmaraj**, Managing Director & Head, Transaction Banking - Commercial Banking, South Asia, Standard Chartered Bank explains the the company's plan for the healthcare sector in India

Tell us about Standard Chartered Bank's interest in the healthcare sector. What services do you offer? What sets you apart from your competitors?
Standard Chartered Bank, being the largest foreign bank in India, has always been a pioneer in introducing market-leading solutions which addresses real challenges faced by corporates and its clients. Healthcare is one of the focus sector for Standard Chartered and over the recent years, the bank has worked very closely with various stakeholders in the healthcare ecosystem to understand the challenges faced with an intent to devise unique banking solutions to address them. We see the ongoing digital revolution as an opportunity to further engage with various stakeholders of the healthcare ecosystem to identify innovative solutions to drive efficiencies. What sets Standard Chartered apart is the fact that we have attempted not to force-fit standard banking products created for conventional corporates onto the Healthcare ecosystem but work on unique and customised solutions which will add value to the sector. We have conducted extensive market studies and research with many stakeholders in this ecosystem and we will continue to work closely with them on an ongoing basis to be a value added partner for the sector.

> Cost efficiency in ways to receive and pay money is another area where Standard Chartered has devised solutions to specifically address this need

How can Standard Chartered bank create value for healthcare businesses in India?
Standard Chartered Bank always has clients at the core of all its activities. The healthcare business is no exception and our success with some of the most prestigious names in the healthcare segment is testament to this. Our

solutions are aimed at improving operational efficiency through use of technology and are also focussed on cost reduction. We strive to ensure that we improve the experience for the stakeholders in the healthcare ecosystem, starting from the patient to the hospital. We have implemented market leading solutions geared towards reducing wait time for billing for patients, quick and real time receivable collections and application of funds. These are a few of many solutions which have co-created along with the healthcare industry to solve some of the longstanding challenges.

What are the pain points in healthcare that your company is trying to fix?
A recurring theme from our interactions with members of the healthcare ecosystem and also something which came up in our market research was the challenge in the identification of receivables from different sources. Reconciliation is a unique theme which we have focussed on; resulting in quicker application of funds. The healthcare ecosystem was also keen to leverage the changing payment habits of consumers who are adopting more digital payment mechanisms. Payment channels like UPI, IMPS are very cost-efficient and real time thereby leading to a reduction in billing time and these are the solutions we have pioneered and driven vigorously for the healthcare sector to adopt. Cost efficiency in ways to receive and pay money is another area where Standard Chartered has devised solutions to specifically address this need.

> Standard Chartered Bank works closely with some of the most prestigious names in the industry. We take pride in the breadth of our client base within the healthcare sector spawning large hospitals to the smaller health clinics and diagnostic centres

How can hospitals enable faster realisation of cash, reduce the cost of collection, and ensure better application of funds?
This is a very challenging task as hospitals constantly face difficulty in reconciling their receipts and applying the funds. We aim to address this challenge by offering a solution to automatically identify the remitter which will aid to quicken the time taken in application of funds. Reconciliation of monies received from Insurance companies is an area that we have specifically worked on and our solutions are aimed to reduce the time taken in application of funds. In addition, our project-based approach to help hospitals adopt and transition to newer and cost effective modes of digital collections will ensure reducing the cost of collections and also aid in instant application of funds.

Who are your current healthcare clients?
Standard Chartered Bank works closely with some of the most prestigious names in the industry. We take pride in the breadth of our client base within the healthcare sector spanning large hospitals to the smaller health clinics and diagnostic centres. We also bank key insurance companies in the country and partner with other critical stakeholders such as TPAs, software service providers for the healthcare segment etc. to ensure a holistic approach in addressing the needs of the healthcare ecosystem. This is testament to the client centric approach of Standard Chartered Bank. As a policy, we do not reveal names of clients for confidentiality reasons.

What are some of the most common challenges facing your clients today? How are your helping them?
Two of the most pressing concerns for hospitals are - high wait time for billing/discharge and delayed realisation of receipts/application of funds. We have a complete suite of solutions designed to reduce the high wait time at the time of billing. Our solution on this front is a customised mix of UPI, Cards and IMPS based collections channels. These are real-time and help in reducing billing time significantly, while at the same time are cost efficient. For the challenge of delayed realisation/application of funds, we offer clients a solution which enables identification of remitter/sender and also provides enriched information around each payment received thereby further simplifying the application of funds. We are also working with clients to automate the entire banking process, including the payments process.

What opportunities you see for Standard Chartered in the healthcare sector?
The Indian healthcare industry is rapidly growing and touching new heights every year. The expectations of the stakeholders in the healthcare ecosystem is growing by the day. Healthcare sector being a focus sector, Standard Chartered is looking forward to becoming a holistic partner for this sector and aims to work with various stakeholders of this sector to create long-term value.

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MEDINSPIRE to be held at DY Patil University, Navi Mumbai from February 14 to 17, 2019

The summit will host 70+ international speakers, 400+ national stalwarts

THE INAUGURAL edition of MEDINSPIRE, an international multidisciplinary medical summit, will be held at DY Patil University, Navi Mumbai on February 14 to 17, 2019. The summit will be a platform to understand the dynamic field of medicine and its convergent, rapidly developing technologies and ideologies and their potential in advancing healthcare. The summit will be a platform for medical professionals across the globe to assimilate diverse concepts through a blanket-approach summit that can potentially transform the healthcare landscape globally.

The summit is going to host 70+ international speakers, 400+ national stalwarts, 30+ medical specialties. The expected number of delegates is 10,000. The Healthcare Management track in MEDINSPIRE will be an opportunity to learn and interact with the leaders who govern the $280 billion industry in the country. It encompasses topics focussing on super specialty business, quality, manpower retention, financial planning, medico-legal, operational excellences.

MEDINSPIRE seeks to stimulate an exchange of knowledge with the best-in-class international speakers and global stalwarts whilst providing evidence-based learning through a variety of methods like simulation workshops at Asia's first simulation-based medical training facility and hands-on training workshops to name a few. The distinguishing factor of this summit lies in its multidisciplinary nature, its vast variety of learning opportunities under proficient guidance and the one-of-a-kind expansive 72-acre medical industry interaction spread.

Competitions will be held on business model, medical legal case studies, organ donations, and inter college debate.

EH News Bureau

INTERVIEW

Cleveland Clinic puts patients first

Deepika T Grandhi, Business Development Head, India, Cleveland Clinic gives **Viveka Roychowdhury** a glimpse of the philosophy of the clinic and their plans for a deeper engagement with healthcare organisations in India

> We believe that by sharing best practices, innovative techniques and patient centered care, we can improve healthcare around the world

What were the outcomes of the visit to India?
The Cleveland Clinic team recently spent time in India with the healthcare community to better understand the gaps within the Indian healthcare system and ways in which Cleveland Clinic can help serve patients, physicians and hospitals. The Cleveland Clinic team participated in lectures, workshops and presentations with themes centered around healthy aging, patient experience, and improving lung heath.

What is Cleveland Clinic's current engagement with the healthcare community in India?
The goal of Cleveland Clinic is to further our mission of medical education, research and clinical excellence. We believe that by sharing best practices, innovative techniques and patient centered care, we can improve healthcare around the world. A large number of physicians at Cleveland Clinic are originally from India. This has allowed for a natural progression to continue relationship building with the healthcare community in India and for those who travel abroad for care.

What percentage of patients at Cleveland Clinic, US come from India?
In 2017, patients came to Cleveland Clinic for treatment from all the 50 states in the United States and 185 countries. The percentage of patients from India has been increasing over the past few years, in 2017, seven per cent of the total Cleveland Clinic patients came from the Asian sub-continent.

What is the value that Cleveland Clinic's clinical team of doctors and healthcare professionals can bring to hospitals and patients in India?
In a world that is increasingly more connected, Cleveland Clinic will continue to focus on sustainable, long-term growth that supports our mission and improves the health of individuals no matter where they live. Cleveland Clinic is recognised as a national leader and model of healthcare for the future. Cleveland Clinic puts patients first. We believe that healthcare is all about patients and caregivers, with the patient at the centre of the experience. Our culture encourages excellence, whether in quality, clinical outcomes, comprehensive research and medical education, innovation, or patient experience. We are a physician-led group practice that runs hospitals, not a hospital that employs doctors. Our salaried physicians work as a team, take on the most complex cases, and put patients' needs first. Physicians are incentivised not by the number of tests and procedures performed, but by what is best for the patient.

What are the long-term plans for India?
Cleveland Clinic continues to build relationships with the healthcare community in India, including patients, physicians and hospitals, and other members of the healthcare ecosystem.

Cleveland Clinic has an in-country representative who lives in India and is able to assist patients and physicians with their inquiries about Cleveland Clinic. In addition, our in country representative designs customised healthcare solutions for various healthcare organisations and members of the healthcare industry in India.

Could you share some information on the tie ups being considered as part of the telemedicine/ consultation venture to increase the clinic's outreach and international footprint in India?
Advances in telemedicine and health information technology are allowing us to provide patients with greater access to quality care, as well as better collaboration with the global medical community like never before.

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INTERVIEW

Modern guru of Indian diagnostics

(Hony) Brig Dr Arvind Lal, Chairman and Managing Director, Dr Lal PathLabs, a pioneer in Indian diagnostics sector has established standard operating procedures for labs, collection centres and sales operations. He has built the largest diagnostic network in South Asia, has been conferred with many accolades from Padma Shri to the first civilian doctor to be granted Honorary Brigadier's rank in the Indian Army. In an extensive interview with **Prathiba Raju**, he speaks about how Dr Lal PathLabs has disrupted the diagnostic industry

> The importance of laboratory testing is increasing day by day. 70 per cent of all clinical decisions are taken based on pathology test, which is not a small number. A patient's stay in hospital can be cut down if there is a good pathology back up in hospitals

You have crossed ₹ 1,000 crore-mark in annual revenues, recently, you have seen many firsts in your career. How has your journey been from 1995 to 2018?

Dr Lal Path Labs is 70-years-old. It was started by my late father Dr SK Lal, a retired army major, in 1949. He was a pioneer in his days and introduced many new tests in India for the first time. He passed away in 1977 after which I had to take over the lab. I was a doctor doing post graduation in Pathology, teaching undergraduates and the warden in the hostel in Armed Force Medical College (AFMC), Pune. After I took over the lab, however, there was no looking back. Since then, I have introduced many initiatives in the

diagnostic industry. For example, the HDL test for Cholesterol, which is part of lipid profile now and the first thyroid test in a private lab, was introduced by me. Not just that, but the first computer for the healthcare segment was brought in by me in 1986 as part of lab information management system (LIMS). Another milestone in the life of laboratory medicine in India is the franchise model or collection centres, which Dr Lal PathLabs has created. This has evolved to its maturity and is now the famous 'hub and spoke' model for collection centres, satellite labs and reference labs. The lab was earlier known as Central Clinical Laboratory, which was coined by my father and I changed it to Dr Lal PathLabs Pvt Ltd in 1995. Since then, the brand has played a major role in the diagnostic industry by creating standard operating procedures for each segment of its operations right from the labs to collection centres.

Your thoughts on illegal/unorganised path labs and the patchy implementation of Clinical Establishment Act?
There are over 1,00,000 pathology labs in India but majority of them are mere testing shops. Only 1,038 out of 1,00,000 labs are accredited by the National Accreditation Board for Testing & Calibration Laboratories (NABL), with hardly any government sector lab being accredited. I am happy to share with you that 32 of our labs are NABL accredited and another four in the pipeline. Thus you can see that there are very few quality labs in India. Ideally, as in developed countries, ALL labs should be accredited by the national body. In India, the first step should be to have a very strict regulation on the running of a lab as enshrined in the Clinical Establishment Act. This specifies clearly who can run a lab and the other basic requirement needed in running a lab. In most cases in India, labs are run by individuals who are not pathologists.

> The private sector cannot be neglected in our quest for quality healthcare services. By actively collaborating with the private diagnostic sector, the government can actually fulfill its dream of Arogya Bharat

How has the role of pathologist evolved in our country? Do you think the treatment in India is increasingly based on pathology findings than merely treating symptoms using antibiotics?
The importance of laboratory testing is increasing day by day. Modern medicine is evidence based medicine and 70 per cent of all clinical decisions are taken based on pathology tests. A patient's stay in hospital can be cut down to the bare minimum if you have a good pathology back up in that hospital. This reduces the cost of treatment also. For example, a patient reporting with chest pain can be due to many reasons that include indigestion, muscular pain, heart attack etc. A pathology test known as Troponin – I detects hundred percent of all heart attacks, whereas the ECG can miss detecting 35 per cent of the heart attacks — that is where lab medicine has advanced to.

65 per cent of our population dies of non-communicable diseases such as diabetes, high BP, cardiac disease, cancer etc. At the same time, we have 35 per cent dual burden of communicable disease led by tuberculosis that affects 2.8 million people and on an average, one person dying every one minute due to this disease. Apart from it, we have additionally vector-borne diseases- malaria, dengue, chikunguniya etc. In order to control all of these, we have to diagnose them correctly and that is where the pathology lab plays a crucial role.

What is your opinion on Health and Wealth Centres (HWC) and Ayushman Bharat?
With six lakh villages and 1,50,000 HWCs proposed by the government on an average, there will be one centre covering four villages. Each of these centres should comprise of pathology labs with good quality standards.

These labs will play a crucial part in the patients primary healthcare. As already mentioned, we have 1,038 accredited labs pan-India, that can be roped in, instead of blindly selecting an unaccredited local lab on the basis of having offered the lowest rate – L1. The government is yet to unfold its HWC scheme, and we hope there will be a healthy dialogue by the central and state governments with the diagnostic industry before it gets implemented. As for Ayushman Bharat, AB – PMJAY, it is too soon to start celebrating its success but we are quite optimistic about it. There are however certain grey areas in the scheme, which we have pointed out to the government. One of them is the rate they are offering that is unrealistically low for the good private players to accept. We hope these are considered and sorted out. If we want India to be the third biggest economic power by 2050, then we will have to address the question of realistic healthcare costs that should be paid to the providers. This is especially true when the private sector looks after more than 70% of India's population.

The central government is considering price caps on diagnostic tests. Do you support it?
The World Health Organisation (WHO) has come out with a significant first-ever Essential Diagnostics List (EDL) and it has been given to the Indian Council of Medical Research (ICMR) for implementation. ICMR has now circulated this list to the healthcare providers. Once the question of pricing comes about, I am sure that the government will consult the private sector before jumping to freeze them.

What are the latest cutting technologies adopted by Dr Lal PathLabs?
Latest technologies in Biochemistry, Microbiology, Molecular Diagnostics, Genetics that include Next Gen Sequencing (NGS) have been introduced. We are the first private lab in the whole of South Asia to possess an Electron Microscope to diagnose Kidney and other diseases. In another first, CSIR- Institute of Genomics & Integrative Biology (IGIB), as a part of technology transfer, has transferred to Dr Lal PathLabs 27 latest tests in Genomics to diagnose rare diseases in the field of neurology, hematology and cancer.

You last increased prices in 2016, but how cost-effective are your tests or packages and how do you balance quality and affordable price?
We have increased very minimally the price of pathology tests. It is much below the inflation rate – the price rise has been averaging a miniscule less than 1.5% per year against an average inflation rise of 5% -10%. One must realize that the rupee has devalued greatly in the last ten years and subsequently the import duty has gone up even in life threatening tests for tuberculosis, diabetes, high blood pressure and cancer. Also, the salaries have gone up along with the cost of rental properties and logistics. We have endeavoured to constantly innovate in bringing best quality standards and making sure not to make the tests unaffordable for the common man.

Going forward, what is your vision for the diagnostics industry?
Quality and accredited diagnostic lab like ours have been able to reach only 30 per cent of the population. The rest 70 per cent are in tier II, tier III cities and rural villages are still to be reached by quality lab services. Thus it is obvious that the private sector cannot be neglected in our quest for quality healthcare services. By actively collaborating with the private diagnostic sector, the government can actually fulfill its dream of Arogya Bharat. If our help is taken judiciously the entire sector can see a sea change. We can be of great assistance in the control of Non Communicable Diseases (NCDs), as our not controlling them in the next 10 years will lower our GDP by two per cent. Therefore, the diagnostics industry will play a pivotal part in making India healthy and prosperous.

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INTERVIEW

India has more laboratories then it needs, therefore all will not be able to survive

India's diagnostic sector is at cross roads where opportunities are many, yet certain barriers could be detrimental to its progress. In a brief conversation with **Dr A Velumani**, Founder and CEO, Thyrocare, **Raelene Kambli** learns about the key trends shaping the sector and the road blocks ahead

> Determining the right price for diagnostics have huge challenges. There are variable factors that determine the cost of tests

What are the opportunities you see for the diagnostic sector in India?
The Indian diagnostic industry is not less than ₹30,000 crore and ₹3000 crore is the reagent industry. Almost 95 per cent diagnostic instruments and reagents are imported. Everyone feels diagnostics as an industry has immense opportunities but the truth is that it has immense challenges too. To give you a fair idea of the situation, I would like to inform you that India has more laboratories than it needs, therefore all will not be able to survive. If all cannot survive then it is a challenge and not an opportunity.

Unlike in the education sector where we have a good system but funding is meagre, the healthcare sector is blessed with funds but we have a poor system.

Moreover, on the market front, the Indian diagnostic industry is currently dwarfed, primarily due to low per capita income and low mean age of India. With growing age, per capita income and awareness among Indians, the healthcare industry and diagnostics in particular would have 20 per cent CAGR for the next 20 years. Such an event would enable stakeholders to understand the opportunities and challenges they will face in their journey.

What are the key trends shaping the diagnostic industry in India?

- Biochemistry focussed laboratory chains are having better growth and profitability.
- Better profitability getting better investor attentions and aggressions.
- Branded and accredited laboratories growing faster than unbranded.

Should prices for diagnostics be standardised?

Determining the right price for diagnostics have huge challenges. There are variable factors that determine the cost of tests. The cost of diagnostic instruments, cost of reagents which are 95 per cent imported are some of the major factors that determine the cost.

Are you concerned that prices do not match the quality/value of diagnostic services today? Patients many a times are not even aware of the tests they are undergoing, as patient education and counselling is absent at the laboratory level. What is your opinion?
Regarding pricing, it is favourable to the common man. In the entire world, India is cheaper and hence that is not the worry. Quality continues to remain the same when compared to the rest of the world. While some existing laboratories have improved their quality of services, there are a few which have got into the business with lower quality standard. Regarding awareness, it is pathetically low but has started improving recently.

What impact will the Essential Diagnostic List (EDL) have on the business of diagnostics?
Well, EDL will only mean that there will be price control for all the test following under this.

Tell us your opinion on the impact of EDL on the diagnostic sector?
EDL says these tests should not be charged more than the listed price. Unfortunately, stake holders have no knowledge or control on them. They are predominately sick care tests. In long, the list will be longer. Will to implement will be stronger.

How do you see the reagents market shaping in India? How long are we going to depend on imports?
India continues to depend upon on imports for reagents and instruments to an extent of 80 per cent. Since volume favours profitability Japan, Europe and the US manufacturers continue to lead and dominate. Local players have quality, costing and pricing challenges.

You are of the opinion that if the country does not focus on preventive care, the nation may suffer a huge economic loss.
Yes. In any country there should be 50 per cent of testing done in individuals (who are not tagged as patients) to call it developed. In India, in 1990, it was just 2 per cent. In 2015, in 25 years it has moved to 10 per cent. By 2050, it would be 50 per cent. A stitch in time saves nine is apt in healthcare.

You also say that around 75 per cent of diagnostic tests do not help in providing accurate diagnosis of illness?
Yes. In a menu of let us say 100 tests approximately only 20 of them have false positives or false negatives. While rest have limited usages - as a stand-alone test or in conjunction with others only gives a higher probability of a disease or disorder. That is a worry and not many new and definitive tests are coming out from the researchers.

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INTERVIEW

‘We plan to set up Metropolis HistoXpert at all major hospitals across India’

Dr Kirti Chadha, Head Global Reference Laboratory, Metropolis Healthcare and **Sanjeev Nair**, Chief Executive Officer, Histoxpert, in an interaction with **Sanjiv Das**, reveals on the recently launched Histoxpert and how itoffers the convenience of digital pathology

Tissue diagnostics is poised for significant growth and development over the coming three to five years? How is Histoxpert going to revolutionise tissue testing?

Increased consumer awareness, improved healthcare spends, better healthcare infrastructure along with innovations in biomarkers, specific therapeutic interventions that will result in increased application of tissue diagnostics in the areas of targeted therapies.

A viable and profitable tissue-diagnostics set-up is dependent on comprehensive test menu, availability of subspeciality experts, trained, skilled and experienced manpower and most importantly a sizeable workload every month.

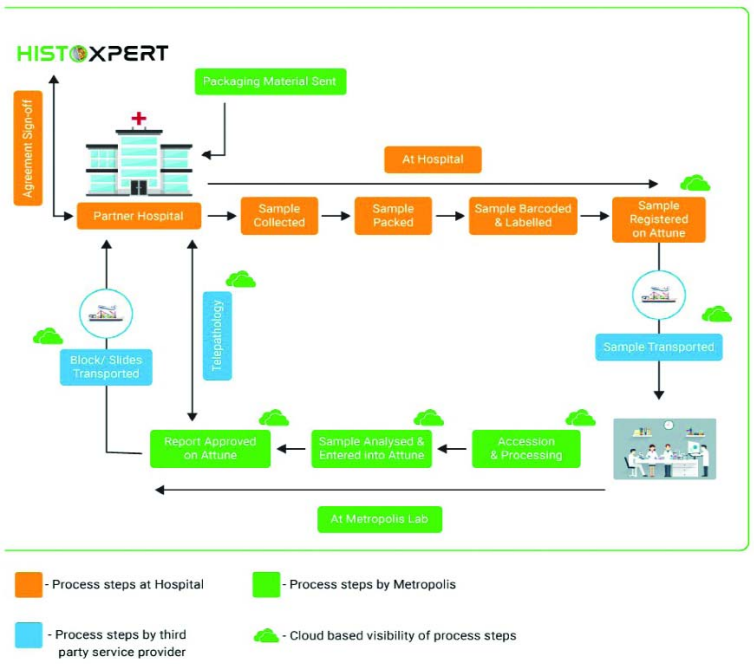
To provide results that are accurate, conclusive, replicable and consistent with faster turn-around time, diagnostic service providers all over the globe are increasingly focussing on rapidly evolving diagnostic technologies, newer innovation in the field of process automation and are adopting digital pathology. By meeting all the above requirements and running the entire set up for a hospital, Metropolis HistoXpert will greatly reduce costs and advance tissue diagnostics to the next level.

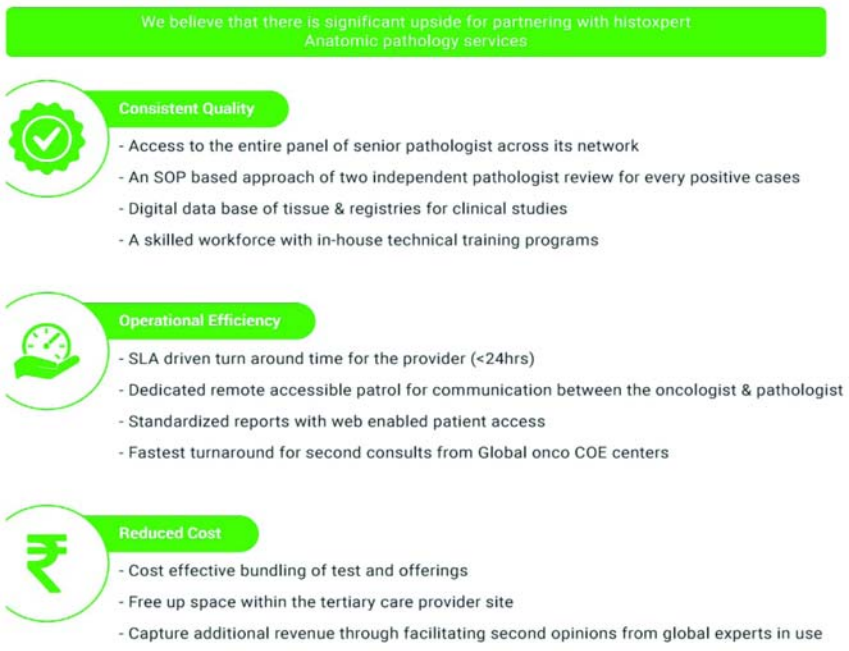
Dr Kirti Chadha, Head Global Reference Laboratory, Metropolis Healthcare

Sanjeev Nair, Chief Executive Officer, Histoxpert

Explain the process of Histoxpert. What exactly does it involve?

Under HistoXpert, Metropolis offers the convenience of digital pathology, the only US FDA approved technology for whole slide imaging. Philips is our technology partner and with Digital Pathology, specialists will save precious time in getting second opinions, reviewing slides and making treatment decisions faster. In addition, HistoXpert is based on the concept of reflex testing, saving the hassle of having to order more tests to reach a final diagnosis. This is made possible by a skilled team and a panel of sub-specialty





experts. This technology implemented by Metropolis Healthcare consists of an ultra-fast pathology slide scanner, an image management system and a display. This solution is complemented by advanced software tools to manage the scanning, storage, presentation, reviewing, and sharing of information thereby enabling digital workflows.

In which hospitals do you plan to set up this diagnostic facility?
At Metropolis, through our vast experience in professional operations of a laboratory within a hospital, we understand that it running an in-house histopathology set up is not be a viable option for hospitals with less than 500-600 samples a month. Therefore, Metropolis HistoXpert is our end-to-end automated processing and digitisation solutions to all hospitals. We plan to set up Metropolis HistoXpert at all major hospitals across India.

How much RoI are you expecting from this venture?
If you look at RoI for hospitals, the entire workforce will save precious time in not having to put resources for an exclusive department. Nor does it have to make investments in infrastructure and trained and experienced workforce. Additionally, access to Digital Pathology allows the resident oncologist and histopathologist can view slides from the comfort of their own departments. The RoI for hospitals is not just in terms of investment but also faster treatment decisions for their patients with all the technology at their service. Also, because tests and panels are bundled, the overall diagnostic cost for the end consumer is greatly reduced.

With the benefit of conclusive diagnosis, panel of experts, tie-ups with global centres for second opinions and the fastest turnaround time in the industry, Metropolis HistoXpert is poised to be an ideal 'One Stop Histopathology' partner for hospitals.

How cost effective will Histoxpert be?
Metropolis HistoXpert offers comprehensive reflex testing solution as part of its value addition. Reflex testing essentially includes a protocol based bundling of tests triggered on suspected/positive results to fundamentally reduce the turnaround time for diagnosis and average cost to patient.

What type of expert panel does Metropolis HistoXpert have?
Apart from a skilled and an experienced technical team, Metropolis HistoXpert has a panel of 15 sub specialty histopathologists in-house. In addition, we have an esteemed external panel of experts to offer second opinion on reports.

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19th ANNIVERSARY SPECIAL

TALENT REBOOT

The year 2018 saw many exciting transformations within the Indian healthcare sector. Digital technologies such as AI taking a lead in diagnostics and research, new pricing policies that led companies and healthcare providers to rethink on their strategies to do healthy businesses, the launch of Ayushman Bharat that is touted to bring new opportunity for the private sector as well as ensure quality healthcare services to all, have ascertained a momentous journey for the industry in the coming times. Well, this shift will create varied employment opportunities. According to experts, there are some healthcare jobs that will cease to exist in the future. It will be interesting and imperative to understand the new capabilities that healthcare providers will need to acquire. *Express Healthcare* in its Anniversary Special spoke to industry experts to examine new job opportunities that will come about in the future and the training required for the next-generation workforce

Employment opportunities in the future

With rapid growth and advances in medical technology in this decade, the healthcare sector will see greater demand for various specialised skills, says **Sunaina Singh**, Program Manager, Transformational Health (Healthcare) Practice, Frost & Sullivan

Rising GDP per capita is generating higher spend on consumer goods and services, which will be a big driver of labour demand. Indian healthcare sector is much diversified and is full of opportunities in every segment which includes providers, payers and medical technology. The medical treatment in India is a fraction of the cost in developed countries and has advantages over other developing countries in becoming a global hub for medical tourism.

Over 40 million new jobs are expected to be generated by 2020, as per a report titled "India's New Opportunities-2020" by the All India Management Association, BCG and the CII. Healthcare is going to be a major sector that stimulates economic growth and contributes to employment.

Moreover, India has become one of the leading destinations for high-end diagnostic services and Indian medical service consumers have become more conscious towards their healthcare upkeep, creating more opportunities. The country's pharmaceutical market is estimated to grow at a CAGR around 12 per cent over the next three years. By 2020, India could be among the top three pharma markets by incremental growth and the sixth largest globally in absolute size. Large Indian MNCs are all set to enter into foreign joint ventures and bring in investments to grow their businesses, and in the near future companies will thrive on focussed therapy areas like cardio-diabetic and oncology. While we may lag in molecule development and drug patents, increasing disposable income has led to a strong domestic market potential in India. This will result in significant employment generation across various functions, such as sales, marketing, HR, IT and operations, within the industry.

With supportive government policies, 100,000 jobs are expected to be created from Ayushman Bharat, the National Health Protection Scheme. India is experiencing 22-25 per cent growth within medical tourism and the industry is expected to double its size from $3 billion (in April 2017) to $6 billion by 2019, this will further bring in jobs in the healthcare service sector.

TRAINING AND SKILL DEVELOPMENT

A degree in health studies degree covers a broad range of topics and helps you develop the skills to follow a career in health, social care, leisure or education

- Physical therapy has become more prevalent among aging population, therefore the need for trained professionals in this field will increase
- Radiation therapists with training in machine operation, oncology patient care, biology and more will be in demand
- Registered nurses, nurse anaesthetists, nurse midwives and nurse practitioners
- Medical sonographers and technologists
- Pharmacovigilance and regulatory audits in pharma

Going forward, retraining and enabling individuals to learn marketable new skills will be a challenge in this landscape. Businesses will need to take lead for on-the-job training and providing opportunities to workers to upgrade their skills. While most healthcare organisations have missions around providing care, not all of them showcase their culture and values. They should emphasise on developing a reputation as an organisation with an excellent culture and clear mission.

- A global growth partnership company
- Offering programmes that help employees manage stress and improve health can attract candidates who understand the pressures of the healthcare environment.
- Hospitals that invest heavily in training and career development tend to be magnets for higher quality talent, making recruitment easier.
- The single biggest constraint for the success of an organisation is the ability to get and to hang on to enough of the right people. Organisations must create an official retention plan and an open feedback system from employees.
- Awards, official recognition programmes, and bonuses all help staff feel appreciated and are simple measures that often get missed. Rewards and recognition must be both intrinsic and extrinsic. Extrinsic motivation is recognition and rewards such as bonuses, whereas intrinsic motivation is even more important. This allows employees to feel connected, and feel that they have autonomy and freedom and opportunity for personal growth.
- A strong employer brand, good recruitment process, and a positive working environment will help organisations attract and retain the very best talent.

Jobs in 2010 vs jobs in 2020

Increased incidences such as heart disease, obesity and diabetes and growing health awareness and precautionary treatments coupled with improved diagnostics are resulting in an increase in hospitalisation, hence there has been growth in hospital jobs. Geriatric care, counselling, wellness and homecare are new arenas within the industry. Additionally, the advent of technology in the realm of care like telemedicine, artificial intelligence and robotics have opened new vistas in healthcare and brought a new platter of specialised jobs. Increased success rate of Indian companies in getting Abbreviated New Drug Application (ANDA) approvals and vast opportunities in R&D as well as medical tourism have opened up new landscapes as well.

In future, the government's push to improve affordable healthcare, establish new institutes and medical education will definitely play a pivotal

role in the growth of the industry. The economic environment is upbeat and conducive for business as well as employment in this sector.

The private sector emerging as a reckoning force in India's healthcare industry accounts for almost 74 per cent of the country's total healthcare expenditure. Furthermore, presence of world-class hospitals and skilled medical professionals has strengthened India's position as a preferred destination for medical tourism. Healthcare extending outside the hospitals to homes for basic medical needs is also growing rapidly and will witness further growth.

Precision medicine is a paradigm shift from broad therapies to targeted therapies and will transform clinical practice and treatment outcomes. Telemedicine is already a fast-emerging trend in India; with major hospitals like Apollo, AIIMS, and Narayana Hrudayalaya having adopted telemedicine services and entering into a number of public-private partnerships (PPP).

Areas for a greater demand

Pharma would see demand for regulatory professionals, especially for professionals with Europe and the US market experience. There will be several openings in the pharma sector across manufacturing, quality and regulatory roles. Pharma companies are already having requirements like medico marketing, quality (training, internal audit, data integrity, etc.), engineering, business technology, manufacturing (production, operations and tech services and project) etc.

Diagnostics and healthcare would see increased demand for a range of occupations, including collection and homecare professionals, nurses, home health aides, personal care aides and health technicians. While the pharma sector will see huge demand for sales and product specialist roles, the need for high-skilled R&D and innovation professionals would still be a challenge for the Indian market.

We believe a plethora of new jobs and specialisations will emerge in India

- Reconstructive surgery,
- 3D Printing specialists,
- Robotic clinical documentation scribes,
- Companion robot technicians
- Precision medicine compounding pharmacists,
- Epigenetic counsellors,
- Lifestyle strategists,
- Deep learning experts,
- Health data scientists,
- IoT business analysts, and more.

Preparing for future jobs in healthcare

Amol Naikawadi, Joint – Managing Director, Indus Health Plus speaks about how healthcare organisations will need to change their HR practices in these changing times

The healthcare job market is currently undergoing an immense transformation and would continue to do so in the near future. To curb the increasing burden of NCDs, and to change the direction of healthcare from curative to preventive, the government is bringing in new schemes in health and wellness, which in turn is increasing hiring in all verticals across healthcare and wellness. The demand for professionals will especially increase in the Tier 2 & 3 cities as well as non-corporate hospitals.

As the government is investing and sponsoring wellness and healthcare delivery across all verticals, from diagnostics to treatment, a lot of non-medico jobs will also increase. Earlier, only medicos and paramedics were considered to be a part of healthcare. The trend has already started moving on a new curve, where the different support functions are strongly catalysing the delivery of health facilities. Apart from speciality doctors, nurses, technicians, radiologists, there will be increased hiring in the marketing, IT, F&B and supply chainfunctions too.

Currently, healthcare infrastructure in the rural and suburban areas are underdeveloped, underutilised and also not at par with what we have in Tier 1 cities and metros. So, a majority of jobs will be created in those areas to cater to the health needs of the people.

Changing dynamics in job culture

In 2010, the healthcare market was focussed on treatment only. Therefore, the jobs were also into core healthcare areas. The resource allocation's horizon is expanding with each day. Additionally, healthcare is no longer limited to doctor – patient relationship, the whole market is moving towards creating an enhanced customer experience. For example, at Indus, to fulfil our mission of making healthcare available, accessible and affordable for everyone, we have strengthened our technological platforms and incorporated new innovations. We aren't limited to having doctors in our organisation – we have people from varied skill sets, such as IT, AI experts, scientists, data analysts, marketers, online and offline creative experts, service and delivery professionals. The whole idea behind this is to increase health awareness and education, customer experience and engagement.

A big chunk of talent from premier institutes that goes abroad for further studies and better opportunities will also stay back. The organisations will also nurture the talents and use their potential to keep themselves abreast of the competition

Just to given an instance, we have people who studied the market in terms of how we can enhance the wellbeing of people through preventive healthcare. That helped us come up with DNAwise, a personal genetic test. Currently, we have bioinformaticians, genomicscientists, genetic counselors, molecular biologists on board for the product. In the future, we will also be looking at hiring from genetic epidemiology, genetic public health, Bio IT, data science to take our product to the next level.

Tranformations and job culture

With technological advancements and volumes of data being generated in the health field, 2020 would also be focused on data. Data can be used in various ways to implement wellness strategies for individuals. Considering this, talent would come from interface of biology, computer science, physics and mathematics. The job market would evolve with such an interface.

As discussed above, many jobs will open up even for professionals from non-biology domains. A big chunk of talent from premier institutes that goes abroad for further studies and better opportunities will also stay back. The organisations will also nurture the talents and use their potential to keep themselves abreast of the competition.

Are we prepare?

A significant amount of R&D and collaboration will be taking place all over the healthcare field. To meet the needs, professionals with some academic/industry experience would be preferred to take on the jobs as compared to fresh talent. As new opportunities develop, it will be difficult to match the exact requirements for the job profiles. Organisations will have to hire and upskill them according to the particular requirement.

Organisations will also have to work on salary structures to match the global competitive market. A lot of changes will come into picture in terms of training, infrastructure and facilities. Along the same note, typical healthcare delivery centres like hospitals will be creating the right kind of work environments and policies to attract the right and diverse talent pool.

The 21st century healthcare jobs

Dr Rajendra Patankar, COO, Nanavati Super Speciality Hospital, talks about healthcare jobs which will be driven by digital technologies

Healthcare industry will grow rapidly in the coming years. This industry has opened many more jobs opportunities. The healthcare job that will be trending in future will be:

Precision medical compounding pharmacist- Aggravating drug specialists will direct robots that deal with the procedure. However, feeding the robots with the correct data about the patients dependent on their hereditary qualities and individual attributes characterised by medicinal imaging and investigation will be integral.

Health Finance Planner- Adoption of new technologies are expensive. With the fast pace of new innovation improvement for human services, almost certainly, propelled, quality medicinal services may very well be excessively costly. Repayment by medical coverage may not generally be accessible, and this pattern will offer ascent to another job for money related specialists—wellbeing funds organiser. Much like helping with salary charge filings, the wellbeing accounts organiser will enable individuals to pick the correct medical coverage inclusion for their necessities and plan for wellbeing occasions (for example, disease dependent on foreordained hereditary hazard, and unexpected) by putting from the get-go in the correct choices to produce adequate assets.

Reconstructive 3D Printing surgery- 3D printing applications for human services have made considerable progress, from custom orthopedic inserts to organoids produced using living cells for medication testing, and now utilising live cells for living tattoos that distinguish explicit biomarkers in perspiration.

Repayment by medical coverage may not generally be accessible, and this pattern will offer ascent to another job for money related specialists—wellbeing funds organiser

Later on, we will see consume or mishap unfortunate casualties being given new skin (and most likely more) that was developed utilising their cells and 3D printed for use in reconstructive medical procedure.

We will require another type of 3D printing professionals who spend significant time in creating tissues.

Robotic Clinical Documentation Scribes- Clinical documentation is a careful procedure; specialists most likely invest hours on this, rather than concentrating on patients. While a blend of voice acknowledgment, normal dialect handling and man-made brainpower will computerise this errand later on, it will at present need a human boss to edit and guarantee the documentation is precise, as any mix-ups in this pivotal procedure could be hindering to quiet results.

Developing the right talent

The organisation should organise a training programme for doctors and other non-medical staff. Career growth by building a hierarchical structure that takes into account profession pathing requires some serious energy and procedure. Having the capacity to indicate hopefuls where they can go and how they arrive is crucial. It must demonstrate that it can give the correct assets to proficient advancement. Lacking in this area will ensure high turnover.

The understanding of vision and mission

Today' generation really needs to understand 'why' behind what the company does. They need to know the purpose behind their work and believe in the mission. They want to know their work matters and how it benefits the greater cause. Having a great mission and purpose statement is a good start but it has to be genuine. Consistency and follow-through are imperative. The mission and purpose must be evangelised from the top. Prizes and acknowledgment must be both characteristic and outward. Outward inspiration includes open acknowledgment and outer rewards, for example, rewards and acclaim. Natural inspiration is much increasingly imperative.

This enables workers to feel associated, as they are on things, that they have self sufficiency and opportunity and open door for self-improvement.

New era, new job opportunities

Gerald Jaideep, CEO, Medvarsity Online shares insights on the new job opportunities in the coming future

According to Indian Brand Equity Foundation (IBEF) the healthcare industry is projected to reach approximately 8.5 trillion by 2022 with tremendous opportunities for all involved. In India alone each year the growth rates are above 15 per cent CAGR. Additionally, the growth for medical and health service managers is expected to rise by 17 per cent gradually till 2024, while the other occupations are expected to rise by approximately 6 per cent.

The healthcare industry is going through a growth phase with regards to the job market. This growth can be looked at differently based on the urban or rural market. With over 15000 hospitals enrolled as part of the Ayushman Bharat initiative in the rural areas and tier 3 cities, the demand for qualified and skilled healthcare professionals is increasing.

State governments across the country are working towards providing incentives to specialists/doctors who are willing to provide services to rural areas under the AB-PM-JAY programme. Additionally, investments are being made to improve the quality of infrastructure and professionals available for managing these centres at rural and primary health centres. With the introduction of courses to certify Ayush doctors in modern medicine, the volume of practicing professionals is likely to go up.

On the other hand, in the urban context, there is rapid consolidation taking place in the private healthcare market. Increased corporatisation of the healthcare industry is leading to high demand for management professionals, HR professionals, data scientists, technologists and others. Highly skilled doctors are also in demand in tertiary care hospitals with larger number of patients choosing to seek out specialised care as their first consultation with doctors.

Areas that will attract more talent

The fields of Emergency Medicine (EM), diabetes, cardiology and MBA in hospital and healthcare management will have a great demand of skilled professionals in the years ahead. Facts like India emerging as the diabetes capital of the world with 73-million diabetic patients, cardiovascular diseases being the number one reason for mortality and only a hundred MD-Emergency medicine seats available is increasing the need for skilled resources .

Additionally, opportunities are emerging for managers and administrators across the spectrum of healthcare services such as small and large clinics, hospitals, nursing homes, and medical colleges, apart from allied industries such as health insurance, medical KPOs, pharmaceutical and medical device companies.

Education needed to support such jobs

The degrees that are required to make a career in these growing areas range from a graduation to an MBBS graduate, depending on the course and its level of advancement. Courses such as emergency medicine and cardiology requires an eligibility of being an MBBS graduate, whereas management in healthcare and nutrition based courses requires a student to be a normal graduate. Additionally, some of the courses are sectioned into levels, where each level has a different eligibility. For example our masterclass in diabetes is divided into three levels, where level one is open to all graduates in medicine, dentistry and nursing and level three only to MBBS graduates.

Freshly minted MBBS graduates with just one-year of internship behind them may not be very well equipped to take on the industry needs and would require specialised training to handle the clinical or non clinical responsibilities effectively in certain specialities. This is because India is seeing an increase in the number of healthcare concerns and a highly limited number of specialists available.

Organisations to be future ready

While recruiting the right kind of talent, healthcare organisations needs to have a strategic vision aligned to its goals. We are living in an era of technology where everything is interconnected over the intangible platform. An organisation should start from applying the right technology for the recruitment and create an effective pipeline of candidates. Parallely, a company should always keep in mind to consistently add value within the organisation which can increase the value proposition. Employee satisfaction needs to be kept in mind and to sustain that a continued professional development should also be taken into consideration. Also, right branding plays a big part in showcasing the image of the organisation to the stakeholders and employees.

Future jobs market in healthcare

Siddhartha Bhattacharya, Secretary General, NATHEALTH, speaks about the job trends for healthcare in the coming times

Healthcare is a high priority industry and a source of major employment globally. India has a large shortage for doctors, nurses and allied workers against WHO standards. The shortage is more acute as one moves from urban to peri-urban and rural areas. With the right policy framework, skilling, partnerships and an enabling digital standards and connectivity, it is possible to grow the sector while creating employment.

The Government of India has made a commitment towards universal health coverage with the announcement of Ayushman Bharat. This will entail creation of jobs across different spectrums of healthcare like preventive, promotive and curative spectrum. In the coming times, there will be a greater focus on delivering care in frontline communities where people live and integrate the continuum of care through digital health and data analytics. It is possible that with the right interventions and financing, healthcare sector can be one of the top three employment generators in India, providing stable and quality employment across all economic cycles.

Human resources for health, including health professionals and supporting human resources at all levels, are a key input in the delivery of health services. Expenditures on human resources across the public and private sectors account for an average 69 per cent of total health system expenditures across countries from all regions of the world. In India, the sector is substantial and employs around 5 million citizens. According to the most recent data for India, there are 0.7 physicians and 1.7 nurses per 1,000 inhabitants (WHO, 2014), which is an estimated 0.9 million doctors and 2.4 million nurses away from the WHO recommended levels of 1:1,000 and 2.5:1,000, respectively. Additionally, each physician on average requires support from 5.6 full-time employees such as nurses and administrators. As such, if India commits to increasing public expenditure on health, meeting international human resource targets alone would create millions of jobs. Importantly this growth would benefit all levels of health care professionals from physicians to allied healthcare professionals and administrative staff.

Job trends in future

With shortage of medical staff and the contemporary socio-economic structure, it is challenging to convince medical professionals to relocate in rural regions and we can't expect this situation to change drastically in the next decade(s). Therefore, in the interim, we need to explore options on how to harness technology to convert complex workflows into simpler ones by translating jobs into standardised care pathways that can be automated and delivered under supervision of a competent doctor or a technician. If we breakdown medical interventions into processes, it can be carried out with adequate skill and training by any frontline and allied healthcare workers and nurses. Thus, leveraging frontline and allied workers for healthcare delivery under the supervision of doctors, using technology, is going to be a major trend. Another major trend will be the way healthcare data is generated, preserved, shared and analysed for intelligent decision making based on big data, AI and machine learning.

In future, there will be a shift in the nature of the jobs. Beyond growth in existing roles, we will see new roles that leverages technology and enables better interpretation of data and decision making to improve quality and services delivery. Moreover, the interaction between machines and humans will be seamless. The skillset is going to be more about interpreting data and harnessing the power of machine learning and analytics to develop decision support systems to accurately interpret results. Artificial intelligence will create higher-end opportunities. Many of the core repetitive skillsets may get redundant as machines will automate those processes. Therefore, the industry will have to re-tool and re-skill itself in the modern age.

How prepared are our workforces for this change?

As India prepares to deal with the twin challenges of communicable and non-communicable diseases in the decades ahead, a remodelled healthcare delivery system will have to take shape. The system needs to be agile and responsive to the needs of chronic care being delivered as close to people's home as possible. There is also a better need to forward and backward integrate the referral pathways. The major growth in the industry will come out of the emergence of care delivery models in ambulatory care centers, clinics, and to the home. Modern healthcare focuses on slowing or arresting chronic disease progression, minimising hospital care and reducing the impact of chronic disease.

The industry growth will lead to horizontal and vertical integration of the value chains, which will lead to future workforce to be more patient centred, value driven, and knowledge focused. There is a need to address future health needs associated with 21st century challenges, including demographic, epidemiological and technological changes, including considerations on transformation of health workers' education, new types of jobs, career progression.

The need to attract the right talent

Healthcare industry can be an engine of economic growth. The industry can offer immensely satisfying career where one can positively touch many lives apart from achieving good career growth. As the industry consolidates, grows and attains a critical sector status, there is a need for active engagement between industry and education to develop the technical, clinical and leadership talent that can propel the industry into next level. Apart from attracting the right talent, industry will need to retain the talent and provide meaningful career opportunities to many of its doctors and nurses who find better opportunities outside India. This will entail significant medical education reforms and locating future centers of medical education closer to high employment catchment areas. Healthcare can look at skilling models in other industries like Information technology where there is a significant expertise in working with education system in India to develop employable talent through rapid skilling and aptitude development.

Imparting skills and enhancing employment opportunities

Dr Pulijala Srinivasa Rao, CEO, Apollo Medskills Ltd (AMSL) informs that in the next 10 years, India will require a huge skill manpower in healthcare sector

Healthcare sector is the least automated sector where there is an immense need for trained and skilled professionals for offering quality services to the patients. Skill development and knowledge enhancement in the healthcare sector is the need of the hour. India continues to face a skilling challenge of vast proportions. It is estimated that 104 million fresh entrants to the workforce will require skill training by 2022, and 298 million of the existing workforce will require additional skill training over the same time period.

Growing skill gap

Healthcare is one of the largest industries today both in terms of revenue and also size of employment, one of the biggest challenges that we face here is lack of skilled manpower. And, in a country like India not just shortage of skilled manpower but also lack of infrastructure for healthcare training and skilling is also a challenge. Globally, there is a shortage of about 80 million workforce. India, as we talk, is short of six million paramedics today. If you look at the WHO standards, 2.9 beds are required for every 1000 population and in India, we have only 0.9 beds. In order to meet this requirement, we need to add one lakh beds each year both in public and private hospitals. So, every bed needs about six to eight manpower. So, one lakh beds would need eight lakhs skilled resources.

Apollo MedSkills Ltd (AMSL), since its inception in 2012, has committed to specifically impart skills for unemployed youth, school dropouts, and women particularly from backward regions and rural areas to enhance their employment opportunities. These are models that can be emulated, whether it is to ensure gainful employment for the paramedics through basic skilling or reskilling and upskilling of doctors and nurses.

Future job trends

Allied and Healthcare Professionals (A&HPs) constitute an important element of the health human resource network, and the skilled and efficient A&HPs can reduce the cost of care and dramatically improve the accessibility to quality driven healthcare services.

Apart from skill development, many medical and management professionals are looking for up-skilling and re-skilling opportunities to enhance their knowledge and skills on the emerging trends in the healthcare industry. To address this demand and prepare the professionals who aspire to upgrade themselves, Apollo MedSkills has partnered with a wide range of education and healthcare institutions in India and across the globe including, Health Education England, Bolton University, University of Hyderabad, Kaziranga University, AISR, The William Light Education to jointly offer a variety of programmes with joint certification. Thus, creating a pool of trained professionals for the sector.

Some of the emerging areas like home healthcare and telemedicine, there is a severe shortage and there is a need for technicians in big numbers. Overall, in the next 10 years, India will require a huge skill manpower in this sector. India would need 80 million additional healthcare workforce globally in next 10 years. There are also emerging niche areas like healthcare analytics, sports

medicine and rehabilitation, health informatics, health data science etc. We were talking only about the two bottom levels of the healthcare pyramid allied health and healthcare support services so far, but we also need people across healthcare human resource's pyramid. At the top, we have super-specialty doctors and then general practitioners, nurses, allied health professionals and healthcare support services.

The government has been driving a variety of programmes with nation's well-being as the core objective. In order to implement these programmes including Ayushman Bharat, the Skill India Mission, the government would need a large number of trained workforce to make these programmes happen on ground successfully.

An individual's health management and risk mitigation mechanisms associated with their health are the major areas that these programmes embark upon. There is a huge scope for training the youth of the country to cater to the multiple layers of education in healthcare where at the bottom of the pyramid is healthcare support service education, allied and paramedical education is placed at a level above that who become employable by the sector for delivering the best patient-care.

Next generation healthcare programs will be more Artificial Intelligence (AI) and healthcare data science based. As for data analysis we can't use it only as marketing purposes but it can lead to clinical outcomes. We will be working with engineering and clinical graduates preparing them for future jobs in health industry.

In our country, the main causes of death are road accidents followed by cardiac diseases and then comes neurological diseases and so on. Apart from emergency situations, there are many people who are in need of partial, complete and time-to-time care takers due to their age, illness or for various other reasons. Some of the job roles which are in high demand in allied healthcare are home health aides, phlebotomy, pharmacy assistants, dialysis technicians, emergency technicians, cardiac experts. In every such emergency situation, there is a need for skilled professionals like emergency medical technicians to handle the situation by giving first aid and then rush the patient to the hospital for further treatment. There is a huge shortage for such technicians who play a vital role in saving lives and where the emergency technicians are in great demand.

Challenges in training and retaining skills

At Apollo MedSkills, we have aligned ourselves to the goals of Skill India movement and our initiatives are integrated with the industry demand. During mobilisation of the target group for training, our strategy is different for different levels of training. We carefully avoid aspiration mismatch as much as possible, because we are working on training workforce who will be in the job roles of saving lives in future. Students should have commitment and empathy and the ability to work under stress. There are two levels of screening; apart from the regular educational qualification screening wherein most of programmes eligibility criteria mandates for pass in class 10+2 in biology as a subject; aspiration level that is difficult to measure. When the students are exposed to certain practical situations like drawing of blood, seeing things related to human physiology, there is a resistance to continue in the healthcare field. They may drop out. Hence, we have created an Aspiration Gauger that ensure the right information to the student about their job role.

The second level of screening happens when they enroll for the training programmes and attend the class room sessions. Job environment counseling helps them to learn about the challenges they may have to face so we may see some drop outs at this stage as well.

Students who can strike the right balance in the aforesaid situations will continue and progress in their career in the healthcare industry.

Our programmes address

the skilling, up-skilling and re-skilling training needs that create employability opportunities and a robust career path. Healthcare is an area that is concerned to every age-group and hence our programmes are designed for short, mid and long term duration. School health programmes, workshops and seminars, healthcare awareness drives are conducted in association with corporates, schools, and educational institutions. The innovative and differentiated approach that we adopt in designing the curriculum for the students enables them to carve a path and eventually progress in their career.

The skilling programmes are aligned to the emerging trends in the industry and relevant for the changing lifestyles in the society. Our programmes train the candidates in a variety of skills required for future job roles including geriatric aide, home health aide, nurse assistant, pharmacy assistants; X-Ray technicians, phlebotomy technicians, diabetes educator, radiology technicians, dialysis technicians. After completion classroom and on-job-training, the students will be assessed by the industry experts - Health Sector Skill Council (HSCC) and Apollo MedSkills Limited and a certificate is issued by the assessing authorities upon successful completion of the course.

The up-skilling programmes for nurses - Global Learners Programs, Tiara are offered in association with the government bodies and international partners. Upon successful completion of these programs, the nurses are provided with a join-certification that opens up a wide range of job opportunities to learn, earn and return with an enriching experience in the global healthcare industry. Workshops and seminars are conducted on specific topics as per the need of the industry so that the professionals can acquire skills with appropriate training.

The re-skilling programmes are designed for all the layers of staff in a hospital set-up like government hospitals, corporate hospitals, clinics, multispecialty hospitals, diagnostic centres where there is an immediate necessity for learning the best practices followed by the industry to provide quality care to the patients.

Digital healthcare and new job roles

Healthcare is impacted by three B's - Bandwidth (Technology), Bytes (Cloud storage leading to predictive data analytics) and Biology (Genetics and Molecular biology). The courses in health informatics, public health, healthcare data analytics and molecular biology and translational medicine are just emerging in the Indian market. While the private sector is adopting into the future trends, there is still a lot to do to catch up with the global trends in healthcare. With changing dynamics in the healthcare industry the organisations should develop strong training and development arms within the healthcare organisations. There is a scope for finishing schools in healthcare to bridge the gap between the college education and changing industry needs.

In my opinion, the industry least effected by automation is healthcare. While the current roles in healthcare (doctors, nurses, allied health, healthcare managers) will exist, new roles will like home health aides and geriatric aides for the growing geriatric population and cultural changes happening in the family structures. With technology complimenting the healthcare operations new roles like e-health consultants, data analytics managers, tele-health technicians will emerge. With increasing research in genetic and molecular basis of disease, genetic counsellors and Molecular medicine consultants will emerge in this area.

Future of work

Vikas Gangwani, Senior Vice President - Corporate HR , Human Resources, Max Healthcare speaks about the hiring trends in healthcare

Healthcare as an industry in India has evolved greatly in the last 25 years, moving from being informal, unorganised and small-scale sector to privatisation leading to establishment of larger institutions, which successfully moved nimbly to carve out new territories much beyond primary and secondary care and focussed to deliver world class tertiary and quaternary care.

The new healthcare reforms, regulatory changes and medical technology disruption have all resulted in completely redefining roles within the healthcare organisations. In order to keep up the volume, velocity and variety of the changing business dynamics, the jobs are continuously evolving with greater emphasis on skill enhancement, analytically driven and performance based and multi-dimensional.

Transformation in job roles

The sector is undergoing massive transformation, one of the emerging trend within healthcare is the advent of new business models such as telemedicine - including tele-radiology, remote surgery, provision of healthcare services at home including post-surgery care, medical testing at home which means the industry needs new skills and be ready for new models of working. Rise in medical tourism in India with increasing medical expenses around the world, health care sector in India would be a great provider of new jobs particularly at the level of frontline health workers, allied health professionals and other healthcare workers such as mental health counsellors, elderly care-providers, nurse practitioners and so on. We expect to see a continued surge in super specialities under oncology cardiology, endocrinology, neurology, transplants, etc. along with people inclining towards Alternative Medical Therapy. Digital competencies will be the foundation upon which the job skills of the future are based. However, technological know-how will not be enough to compete effectively since future jobs will involve knowledge creation and innovation – to explore experiment and find interesting solutions to complex problems that business keeps tossing at you. Greater focus will also be on a variety of "human/ soft skills," which will help workers embrace the rapid onset of change, allowing them to think creatively and collaboratively and learn to getting in touch with one's emotions, having empathy and listening.

Some roles of the future in the Healthcare Industry:

- 3D Printing Technologists
- Therapists / Therapy Assistants – both for physical and mental wellbeing
- Genetics testers
- Healthcare at home assistants for critical illness, post-surgery recovery, senior citizen healthcare
- Robotic assistance
- Medical tourism marketing
- Analytics roles
- Remote surgery doctors

Moreover, greater emphasis on roles for both personal care aides and home health aides as well will be seen as the future of jobs in healthcare.

Need for training and skill development

Super specialised degrees under the traditional streams of medical sciences and courses under Biomedical Engineering, Artificial Intelligence, Machine Learning and Data Mining; advanced degrees in physical therapy, counsellors, home care providers and practitioners, etc., shall play a key role in the years to come.

Currently in India, there is dearth of quality talent in the sector and the gap is only going to widen there has been a shift in perception towards healthcare professionals in the past few decades. With the current academic scenario in the field of core medicine, nursing and paramedics, a huge chunk of students graduate without being ready for the industry. There needs to be a change in core functional skilling by academia backed by industry.

Continuous education backed by individuals and organisation aided by blended learning (on the job learning, social learning, self-paced learning mode) shall be of vital importance, more than ever before.

Demand for 3D printing expertise is flourishing

Gaurav Loyalka, Co-founder of Novabeans informs that 3D modeling and printing are one of the most sought after skills and these jobs will see a rapid growth in the medical sector.

3D printing is developing incredibly in the healthcare sector, right from visualisation aids for surgeries, the technology offers numerous benefits viz better surgical preparation, significant reduction of surgical costs and more opport unities for better patient education.

The demand from medical institutes and research centre for skilled 3D printing resources are increasing day by day. From prosthetics to human tissue, 3D printing promotes medical advancement and saves lives. As such, the 3D printing industry will need more engineers, designers and modelers who have a biomedical or scientific background in order to further innovate and produce highly advanced 3D-printed products.

The demand from medical institutes and research centre for skilled 3D printing resources are increasing day by day. From prosthetics to human tissue, 3D printing promotes medical advancement and saves lives

The areas where job opportunities are on the horizon :

- 3D anatomical medical models designers
- Digital dentistry workflow
- Customise prosthetic designing
- FDM and SLA 3d printing technologies medical integrator
- Medical 3D printing and scanner engineers (SMEs)
- Biological and scientific modeling engineers
- 3D printing teachers and trainers

The 3D printing medical courses and medical workshops is first of its kind in the area of creativity and computerised manufacturing techniques in health sector. It is designed to enhance the creativity and technical skills of materials, 3D concepts, model designing, computer aided designing, real world objects creation, machines, manufacturing, motor skills, prototyping and new technology adoption. Novabeans helps schools to establish 3D printing labs across India, we offer Illinois University certified training course for students and medical professionals to help them better adopt the technology at early stage in health sector and in other verticals.

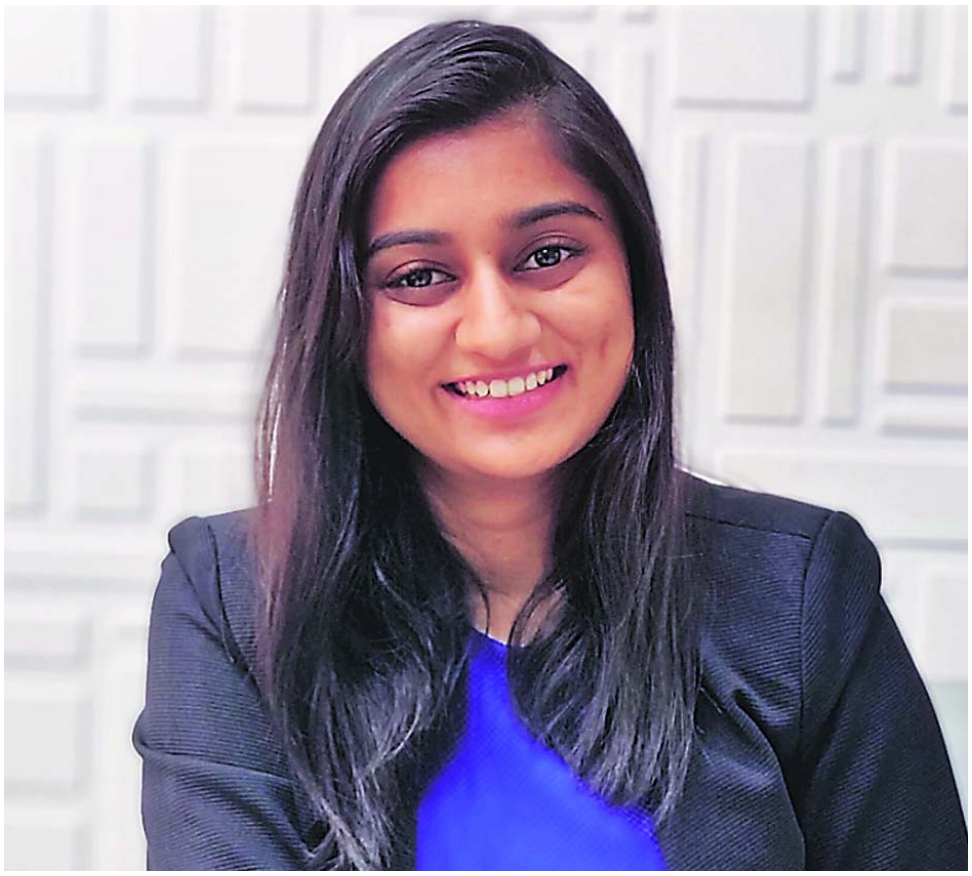
3D printing in India is in a very nascent stage when compared to various developed economies across Europe, America and Asia, primarily because of high pricing and lack of ecosystem. But the future holds high promises as many startups are emerging with interesting innovations and diverse applications in medical sector due to affordability, ease of use, quality of rapid production. Most of the enterprises and medical institutes are opening in-house innovation centres.

3D printing applications in medical fraternity:

- Prosthetics and orthotics clinics which once used conventional plaster casts – which usually take between one to two weeks to deliver – have been replaced with 3D printing techniques for custom-made devices that can be delivered within a day
- 3D printed prosthetics development is being used more and more in hospitals and clinics. The ability to quickly repair and adapt any part of the prosthetics is incredibly useful, especially as the body changes.
- The computer process enables medical staff to save work (digital files), share them with colleagues for review and keep a digital record of a patient's history of devices.
- Surgical Guides : Creating patient-specific models from CT and MRI scans expands from medical research into practical application with the ability to prepare doctors for surgeries, thus drastically reducing surgery times. Taking this one step further, there are numerous examples of using medical scan data to 3D print implants tailor-made to the patient.
- Lot of advancement is happening in bones and cartilage in the past few years. Research labs are yet to bioprint a meniscus that can withstand the kind of pressure and pounding that a real one can, engineers are well on their way to understanding how to apply these properties.
- 3D printers simplify your existing workflow and reduces chairside time, allowing clinicians to perform precise, cost-effective surgeries with better clinical outcomes. Cost per surgical guide ₹16000 – ₹50000 has grown down to ₹260 - ₹540. The reduction in time from three weeks to just 2.5 hours.
- While an entire organ is yet to be successfully printed for practical surgical use, scientists and researchers have successfully printed kidney cells, sheets of cardiac tissue that beat like a real heart and the foundations of a human liver, among many other organ tissues.
- There are many benefits of 3D printed anatomical models for preoperative planning and enhanced patient consent in various surgical specialties and fields, including orthopedic, cardiothoracic, vascular, oral and maxillofacial, oncology, plastics, reconstructive, urology, pediatric, and interventional radiology.

Medical 3D printing gaining ground

Medical 3D printing is not new in the healthcare sector, the segment which enables surgeons to design their own implants and choose the best possible solution for their patients. With advancement in technology, this industry is gaining momentum gradually, especially in the healthcare sector, finds **Firoza Kothari**, Co-founder and CTO of Anatomiz3D



Utilisation of 3D printing in the medical field started about 20 years ago, when it was only applied for printing bone replicas. The process was slow and expensive due to the novelty of the technology and restricted availability back then. Overtime, with advances in technology, the capability expanded to being able to study soft tissue data. With improvements in CT/MRI imagine and DICOM to 3D softwares, the segmentation of data has improved over time, ensuring accuracy and reliability. The increase in the speed of printers has reduced the final product lead time from few weeks to just a few days. Research in materials development has allowed printing in various opacities, flexibilities and colours, which in turn allows for a better simulated experience. Not just plastic, Metal 3D printing has also been a huge boon to the industry because of its capability to print custom designed implants in medical grade titanium and cobalt-chrome. Expiration of some patents has opened the market for different players to make the technology easily accessible to more people, thereby reducing costs.

3D printing is the next revolution for healthcare, considering it allows for 2D anatomy to be brought to life. Surgeons can pre-plan and practice their surgeries on these models and ensure a personalised approach to treat their patients. It saves operating time, reduces blood loss, anaesthesia time and speeds up recovery. This leads to an overall reduction in the cost of operation.

They can understand and prepare for all the issues they might face in the operation theatre, safeguarding the patients from any unexpected trauma. Service providers from the 3D printing healthcare community can enable the surgeons to design their own implants and choose the best possible solution for their patients. Being able to contribute to the well being of those in need, is definitely a job to look forward to.

Considering the industry is still in its infancy, the skills are acquired on the job. We do not have many trained professionals who have studied the technology. However, this scenario is changing. Some colleges have taken up the initiative to offer advanced courses in additive manufacturing, where they teach about DEFAM (Design For Additive Manufacturing), various 3D printing technologies, materials, applications, post-processing etc. It is important to start similar courses for people in the biology fields.

The field of additive manufacturing requires a mixture of specialists, especially in medicine. To give a few examples:

- Biotech/Biomedical Engineers/Bsc. Biology/MBBS graduates who understand anatomy and surgical practices. Their profile fits best as design engineers and business development executives. Their role involves contacting and communicating with the medical teams to understand their requirements and replicating that from the CT and MRI data. It involves designing 3D printable patient anatomy, custom implants, prosthetics and orthotics. They are also the ones who end up consulting doctors on which material would best fit their requirements based on the applications.
- Mechanical/Electrical engineers who understand 3D printers and Inorganic/Organic designing. Their role is to design/study the parts and 3D print them in the appropriate technology. It is their duty to ensure that the 3D printers run with accuracy. Repair and maintenance of the 3D printers is one of their core roles. They can even build their own 3D printers through invention or replication. Post-processing and ensuring optimum quality of the 3D printed output is their responsibility, either by doing it themselves or training other people.
- Industrial designers aim to solve problems by thinking out of the box. They figure out ways to improve a product which allows ease of use and increase in functionality. They come up with innovative designs that enhance implants, prosthetics, orthotics, medical devices, etc. providing the end user with a more refined and advanced product.
- Material specialists/Metallurgy engineers play a huge role in improving and maintaining the quality of powders/resins. Their research makes different grades of materials available to the market. Research in plastics allows for representation of anatomical data as per required simulation and that in metal helps with improving the properties of medical grade materials/alloys such as titanium, chrome-cobalt, etc.

Apart from the above, anyone with a passion to learn something new and endure challenges will find themselves fitting well in this industry. It is an entrepreneur magnet. The potential that this industry holds and the exposure one receives at this pioneering stage is humungous and the trend only shows an upward growth.

Evolving 3D printing technology to revolutionise medical industry

Dr Ajay Kaul, Chairman and HOD, Cardiothoracic and Vascular Surgery, BLK Heart Centre informs that 3D printing is a compelling new technology that has the potential to revolutionise cardiac interventions

Medical applications for 3D printing are expanding rapidly and are expected to revolutionise healthcare. Medical uses for 3D printing, both actual and potential, can be organised into several broad categories, including: tissue and organ fabrication; creation of customised prosthetics, implants, and anatomical models; and pharmaceutical research regarding drug dosage forms, delivery, and discovery.

3D printing makes surgery safe

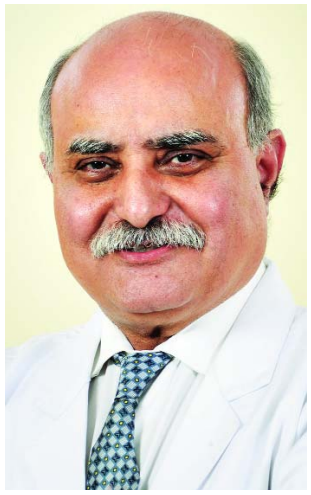
The application of 3D printing in medicine can provide many benefits, including: the customisation and personalisation of medical products, drugs, and equipment; cost-effectiveness; increased productivity; the democratisation of design and manufacturing; and enhanced collaboration. 3D printing is a compelling new technology that has the potential to revolutionise cardiac interventions. The rule of 3D printing is that before surgery, the doctor and surgeons can find out the anatomy of the organ. As we get a physical prototype of the organ, it makes easy and better diagnostics and understanding. For instance, size of heart valve varies from person to person and with the availability of this technique, it is easy to plan exactly the sizing. India is at par with rest of the world in terms of medical advancement. In a country like India where there is scarcity of organs donation this technique is quite helpful and evolving. Around 20 cases per year end up with the use of this technology in any country, same like India.

Not many cases end up employing the use of 3D, but till now around 15-20 cases have used this technology across India out of which six are from BLK Heart Centre. It is definitely going to improve in India. When we started working upon it since last year, it was difficult for us to coordinate with the printing and its technology but now we are completely able to diagnose and feel easy to use. Similarly many doctors are unaware of this, but very soon they will come across and will improve.

What is 3D Printing?

Three-dimensional (3D) printing is a manufacturing method in which objects are made by fusing or depositing materials—such as plastic, metal, ceramics, powders, liquids, or even living cells—in layers to produce a 3D object. 3D printing is expected to revolutionise medicine and other fields.

There are about two dozen 3D printing processes, which use varying printer technologies, speeds, and resolutions, and hundreds of materials. These technologies can build a 3D object in almost any shape imaginable as defined in a computer-aided design (CAD) file. (In a basic setup, the 3D printer first follows the instructions in the CAD file to build the foundation for the object, moving the print head along the x–y plane. The printer then continues to follow the instructions, moving the print head along the z-axis to build the object vertically layer by layer. It is important to note that two-dimensional (2D) radiographic images, such as x-rays, magnetic resonance imaging (MRI), or computerised tomography (CT) scans, can be converted to digital 3D print files, allowing the creation of complex, customised anatomical and medical structures.



3D Printing in cardiovascular diseases

3D printing is a powerful technology with the potential to significantly change the practice of medicine. In the field of structural heart disease, this rapidly evolving technology can make a powerful impact. Current conventional cardiac imaging modalities such as echocardiography (EKG), cardiac computed tomography (CT) or magnetic resonance imaging (MRI) primarily utilise two-dimensional (2D) methods that require significant expertise and experience to interpret. In the field of paediatric or congenital cardiology, complex structural heart disease requires precise anatomical delineation before intervention. Consider a heart no larger than a walnut with multiple levels of abnormal connections.

3D printing produces a replica of the patient's anatomy. In patients with complex congenital heart disease (CHD), this allows precise understanding of the patient's anatomy and the resultant physiology. This technology solves some of the challenges of 2D imaging by enabling more informed decisions and precise pre-surgical planning.

For surgical planning, 3D models enable detailed planning based on a physical model that can be held, manipulated in real 3D space, and scrutinised to plan various aspects of the surgery, including surgical approach, incision, cannulation technique, etc.

This sort of precise pre-surgical planning may lead to shorter operative times and fewer operative complications. Shorter cardiopulmonary bypass time, circulatory arrest time and fewer residual lesions requiring re-intervention are desired outcomes of precise pre-surgical planning from 3D printed models. These improvements in the operating room may translate to quicker recovery and a shorter post-operative hospital stay.

Cardiac 3D printing is a nascent field, and at this time there is limited data to prove these beneficial outcomes. However, utilisation of this technology is growing, and, with time, the potential benefits of 3D printing will evolve drastically.

Diversity in 3D printing

With applications in congenital heart disease, coronary artery disease, and surgical and catheter-based structural disease, 3D printing is a new tool that is challenging how we image, plan, and carries out cardiovascular interventions. 3D printing has made a huge difference in the field of surgery of heart and aneurysm. Usually this method is popular in planning of heart operation, spine and other orthopaedic procedure. As this has nothing to do with the patient's body during surgery there are no ill effects on them. Any organ or tissue can be made in nearly any imaginable geometry through the translation of x-ray, MRI, or CT scans into digital .stl 3D print files. In this way, 3D printing has been used successfully in the healthcare sector to make both standard and complex customised prosthetic limbs and surgical implants, sometimes within hours.

In the upcoming days, this itself will grow and develop with more advanced 3D models along with functional models where materials are more like the organs. Functional models along with organ like material could help us understand the diagnosis much better.

Advantages over traditional method

Therapies based on tissue engineering and regenerative medicine are being pursued as a potential solution for the organ donor shortage. The traditional tissue engineering strategy is to isolate stem cells from small tissue samples, mix them with growth factors, multiply them in the laboratory, and seed the cells onto scaffolds that direct cell proliferation and differentiation into functioning tissues.

3D bio printing offers additional important advantages beyond this traditional regenerative method.

Talent upgradation: The need of the hour

Ranjan Pandey, Sr Vice President, Human Resources, Fortis Healthcare speaks about the job trends in healthcare in times to come

Unlike other sectors, healthcare is relatively new and growing at a CAGR of 17 per cent during 2016 – 2022 to reach $ 372 billion from $ 10 billion. If an industry is growing at this rate, there is bound to be expansion and requirement of talent. The sector currently employs 319780 employees and is the fourth largest employer. About 100,000 jobs are expected to be created under Ayushman Bharat, the National health assurance scheme initiated by the current Government.

Job trends in future

The doctor to patient ratio in India is pretty low as compared to developed countries. We will need 2.07 million more doctors by 2030 to have the WHO recommended doctor to population ratio of 1: 1000. We will also need more nurses, paramedics and other healthcare professionals. With hospitals coming up at the current pace, we will also need healthcare administrators for running them.

There is going to be a lot of emphasis on digitalisation in this sector. Telemedicine has huge potential in taking healthcare to rural areas. The area around patient medical records is going to see a lot of changes.

At present, the healthcare sector is the fourth largest employer in India and is expected to grow at a similar pace. Rising incomes, greater health awareness, lifestyle-related diseases and increasing access to insurance will contribute to growth.

There will be major changes in the healthcare job market. This will mean:

- More categorisation in specialities.
- The doctors' focus should move more towards preventive healthcare, the basic doctor responsibilities should move to specialised nurses and technicians. But in order to sustain this model, we need bridge courses for enabling medical personnel to prescribe to the requirements and perform basic clinical jobs.
- Retention and new career paths for nurses and paramedics - at present nurses are largely treated as support staff. We need newer norms under the medical council to enable them to take on doctor's responsibilities as physician assistant, nursing practitioner and nursing anaesthetist.
- Better infrastructure for quality education in medical and nursing institutes.
- The focus should also be reverse brain drain .i.e. bringing back India-origin medical talent working outside of India

Areas that will see a great demand

There is a paradigm shift in how healthcare was viewed 10 years ago vs, how it is perceived now. As per the India State-Level Disease Burden report, India faces a double whammy on the disease front: lifestyle or non-communicable diseases that are the bane of the rich world, as well as communicable diseases of the developing world, hence we are witnessing a demand surge for specialisation in cardiology, physiology, oncology, urology, geriatric and orthopaedics. Also, our society has become more aware as compared to a decade ago. It is recognising the importance of super specialities instead of visiting the general physician next door for specific ailments. Skilled nursing talent will also be in great demand.

Skills for the future

Future healthcare workforce should be able to adapt to the latest technological advancements such as robotics, AI, cognitive skills and there is a critical need for medical data analysts who can help in predictive assessment in the medical domain.

> The focus should also be on improving educational infrastructure and investments in training and development. At present, the organisation is not spending enough on T&D programmes

The healthcare sector with its immense growth plans will need talent with multiple skills, the primary ones being bachelor of medicine and surgery and higher specialisation in medicine. For nurses, basic courses in nursing will be a pre-requisite. Apart from these we would need paramedics, technicians, engineering personnel and administrative staff on the operational front at hospitals.

The Government of India is working towards improving the doctor population ratio and has added over 5,800 PG seats in government medical colleges in calendar year 2017.

Under the Union Budget 2018-19, the government has allocated ₹ 452.25 crore ($ 69.86 million) for the upgradation of state government medical colleges (PG seats) at the district hospitals, ₹ 794.07 crore ($ 122.66 million) for government medical colleges (UG seats) and government health institutions.

Organisations of the future

At present, we are not amply prepared for the workforce change requirements. The shortage of productive manpower is a situation that persists and will continue in future as well. It's about time that talent assessment and technology should work in partnership to improve efficiency instead of working in isolation. The focus should be on combining man and machine. It will not only be more productive but a more efficient way of better patient care.

The focus should also be on improving educational infrastructure and investments in training and development. At present, the organisation is not spending enough on T&D programmes. Also, as per the Deloitte Human Capital Trend Report for 2017, healthcare organisations plan to make significant progress in adopting cognitive and artificial intelligence in the next three to five years.

Organisations in future will need to do the following:

- Invest in education – by providing financial education assistance for low income groups, specifically nurses and technicians
- Introduce benefits such as sabbatical leave for higher education
- Provide learning and growth opportunities within and outside of the organisation
- Create a safe atmosphere to work for medical staff
- Technology enhancement
- Lastly, competitive pay

IUIH's Digital Hospitals will redefine healthcare delivery

Indo UK Institute of Health (IUIH) is all for optimising inpatient and outpatient settings and integrate digital technologies into traditional hospital services to truly create a health system without walls. The company throws light on how technology and healthcare delivery will merge to influence the future of hospital design and patient experience

As the cost of healthcare services continues to rise, Indo UK Institute of Health (IUIH) is looking for long-term solutions to minimise inpatient services in the integrated medicities it is coming up across various states in India. Here's a glimpse of how technology and healthcare delivery will merge to influence the future of hospital design and patient experience.

According to Dr Ajay Rajan Gupta, Managing Director & Group CEO, IUIH, " Increasingly, a growing number of inpatient health care services are already being pushed to home and outpatient ambulatory facilities. IUIH is all for optimising inpatient and outpatient settings and integrate digital technologies into traditional hospital services to truly create a health system without walls."

DR AJAY RAJAN GUPTA,
MD and Group CEO, Indo UK Institute of Health (IUIH)

Increasingly, a growing number of inpatient health care services are already being pushed to home and outpatient ambulatory facilities. IUIH is all for optimising inpatient and outpatient settings and integrate digital technologies into traditional hospital services to truly create a health system without walls

Here's how technology integration will possibly help:

(1) Centralised digital centres (something akin to air traffic control for hospitals) will enable decision making, continuous clinical monitoring, targeted treatments (such as 3D printing for surgeries) etc.

(2) Digital and artificial intelligence (AI) technologies can help enable on-demand interaction and seamless processes to improve patient experience.

(3) Robotic process automation (RPA) and AI can allow caregivers to spend more time providing care and less time documenting it.

(4) Digital supply chains, automation, robotics, and next-generation interoperability can drive operations management and back-office efficiencies.

Healthcare IT is therefore being seen by stakeholders as an essential key to make the entire process of healthcare delivery a very uncomplicated process. What is required is proper integration of all these technological innovations with the existing healthcare systems so that it becomes a lot easier to address the emergency requirements of the patients without glitches of any kind. Along with better patient care, healthcare informatics also cuts down the costs involved and improves the overall reliability in the services provided.

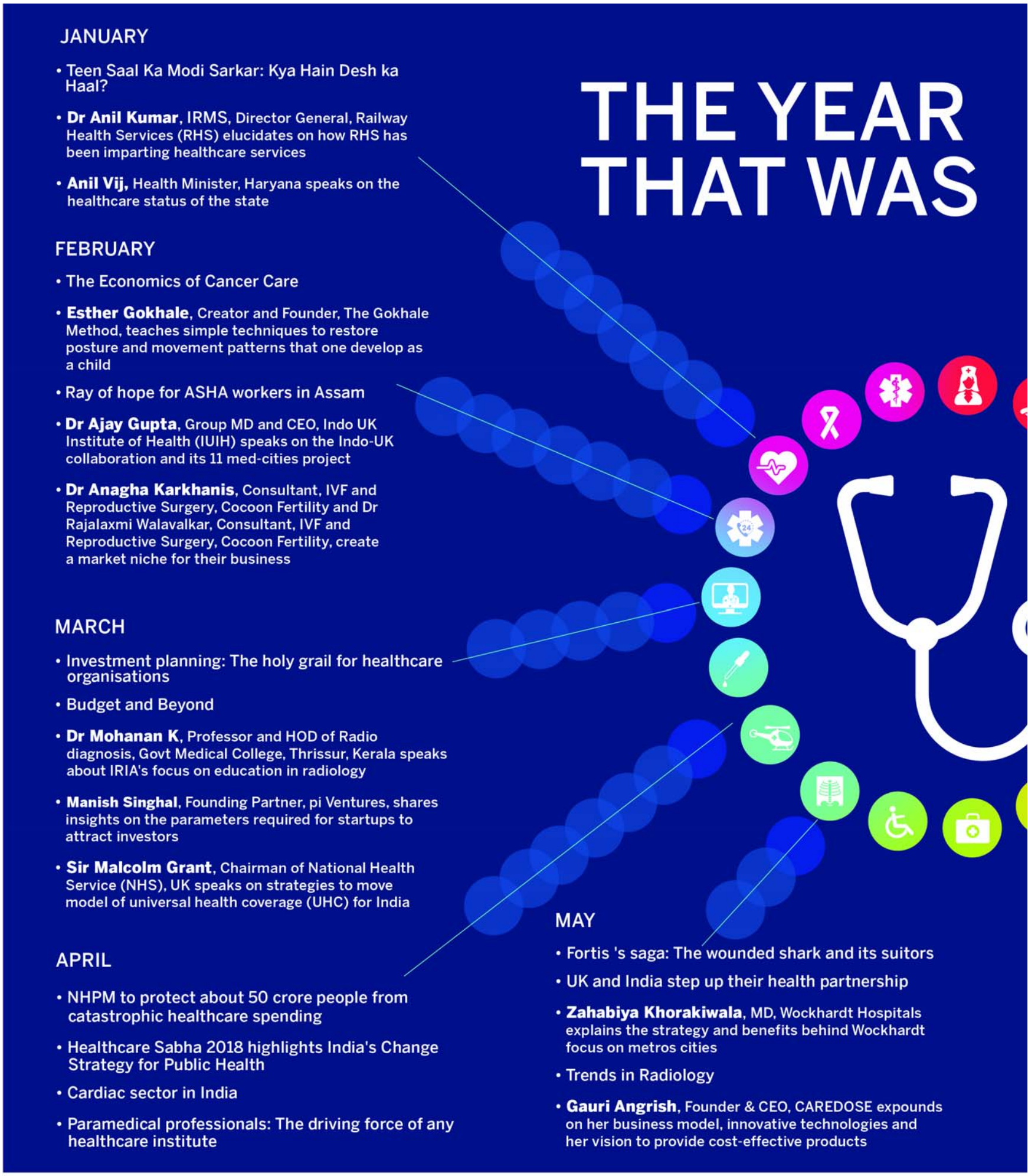
"There is no doubt that within the forthcoming decade, healthcare services will go highly digital, and with an exception of complex procedures and intensely critical patients, the need for human intervention will be minimal. Converting the conventional hospital into a digital hub will require huge investments, as well as a clear understanding of the technologies and processes," says Matthew LeMasonry, Director of IT and PMO, IUIH.

However, there are some prerequisites for the establishment of digital hospitals in terms of enterprise digital strategy including a culture of digital transformation, adoption of technology which affords better communication, use of collected data in the most intelligent, efficient and ethical manner, investments in upgrading the skills and knowledge of the workforce and of course due attention to cybersecurity, adds Matthew LeMasonry, Director of IT and PMO, IUIH.

MATTHEW LEMASONRY,
Director of IT and PMO, IUIH

Healthcare services will go highly digital, and with an exception of complex procedures and intensely critical patients, the need for human intervention will be minimal. Converting the conventional hospital into a digital hub will require huge investments, as well as a clear understanding of the technologies and processes

THE YEAR THAT WAS



19th ANNIVERSARY SPECIAL

NOVEMBER

- Building the DNA for a healthy nation
- **Gerald Jaideep**, CEO, Medvarsity Online looks to transform medical education through technology, constant updation, a global faculty pool and a wide circle of local clinical partners
- SIPS 2018: Seminar on Inventory, Procurement and Supply Chain Management held in Goa
- AI, Big Data Analytics and Cyber Security: Key drivers transforming life sciences companies
- Why healthcare schemes in India fail?
- The path ahead in public health: A pharma perspective

DECEMBER

- How can investment and acceleration can make healthtech startups truly AYUSHMAN?
- Can technology democratise Indian healthcare?
- Pushing boundaries in cancer diagnosis
- Dr Manjiri Bakre, CEO & Founder, OncoStem Diagnostics, reveals how their test can revolutionise breast cancer treatment, help avoid chemotherapy for low-risk patients
- Satkam Divya, CEO, KlinicApp explains the concept of digital pathology

OCTOBER

- Asha workers: In need for empowerment
- **Dr Kamini Walia**, Senior Scientist with the Indian Council of Medical Research, New Delhi, explains the importance of EDL
- How can blockchain technology transform the healthcare sector?

SEPTEMBER

- Ayushman Bharat: All set to shake things up
- AB is a welcome step in the direction of achieving Universal Healthcare: Ashish Modi ,Joint CEO, Rajasthan State Health Assurance Agency
- PPPs, precision diagnostics to carry GE Healthcare forward
- Rajiv Mathur, Founder, Critical Care Unified, elucidates on the need to provide home healthcare services in an organised and structured manner
- Assam's boat clinic: The boat of life

AUGUST

- Healthcare Senate: Celebrating the business community in healthcare
- Radiology and Imaging Conclave 2018 launched
- Teleradiology and its future
- Radiation safety in radiology: How to protect patients and healthcare providers?
- Is radiology a viable business?
- Access strategies in the era of price control
- Express Healthcare Excellence Awards celebrate the spirit of excellence and leadership

JULY

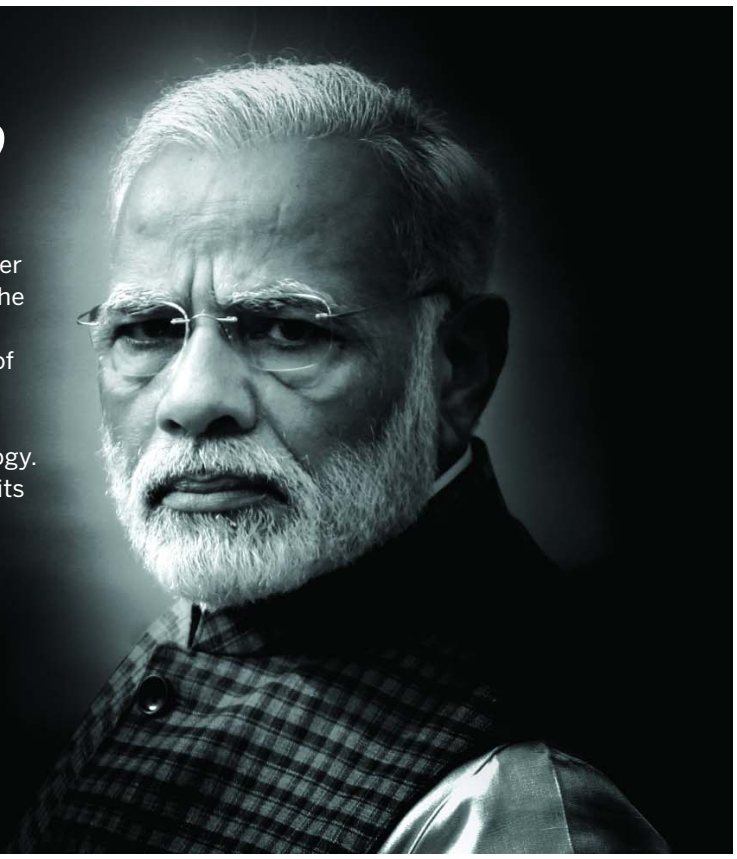
- The growth mindset of successful companies
- Dr V Mohan's eye for quality par excellence
- Medtronic's continuous commitment to innovation
- Microsoft's digital India vision
- Philips Healthcare's betting on digital technologies
- **Tenzin Thargay**, Co-founder, LetsMD, elucidates on how the company aims to make healthcare accessible and affordable

JUNE

- Capping TB By 2025: A colossal task?
- Is India's healthcare industry ready for a digital transformation?
- Role of RPA in improving healthcare and insurance industries
- **T Sundararaman**, Dean, School of Health System Studies, TISS, speaks about healthcare trends in 2018
- **Dr Nupur Kohli**, Founder Director, Netherlands-India Information Services, NIIS Health, elaborates on the synergies between the countries

EXPRESS HEALTHCARE (JANUARY 2018)

MODI SARKAR KE TEEN SAAL
KYA HAIN DESH KE SEHAT KA HAAL?



Health has been one of the priority areas in the current government's manifesto. Prime Minister Narendra Modi's government, which came to power in May 2014, had pledged universal healthcare for all Indians and promised the much needed reforms in healthcare by way of improving public healthcare infrastructure, increasing doctor-patient ratio, ensuring better governance of health programmes, uprooting corruption, streamlining processes, framing new policies that would set high standards ensuring quality healthcare and, above all, revolutionising healthcare delivery with the help of digital technology.
It has been three years since the Modi administration officially commenced its functions. Till date, the administration has taken some significant steps towards achieving its goals yet a lot more needs to be done.
What will the 'Modi Sarkar' do next to bridge the gaps in healthcare? Has the government really brought about the change that they promised to bring?
How has the government fared in terms of bringing in accessibility and affordable of healthcare for all?
Will Modi's ambitious goals see light or remain pipe dreams?
In this issue, stakeholders of the healthcare industry in India share their sentiments and opinions about these questions and review the reforms initiated by Modi Sarkar

EXPRESS HEALTHCARE (FEBRUARY 2018)

The Economics of Cancer Care

It is time for healthcare stakeholders to synergise and strategise to navigate the complex maze of cancer economics to ensure delivery of affordable and equitable cancer care in India

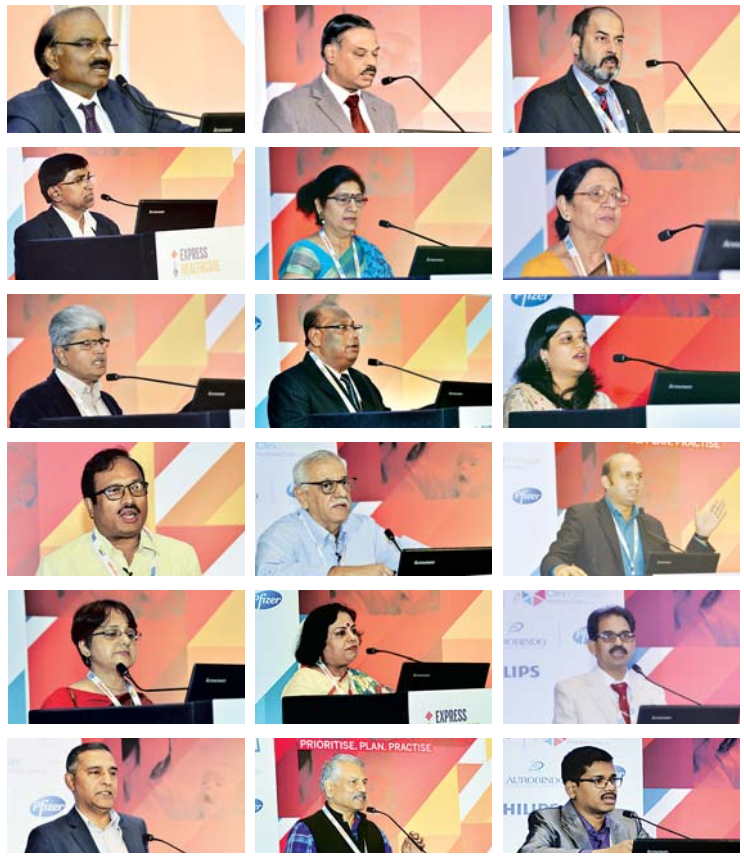
EXPRESS HEALTHCARE (MARCH 2018)

The Union Minister's announcements for healthcare has made the public health sector and private healthcare players very optimistic of the coming times. According to the Finance Minister, the ambitious plan to roll out healthcare coverage for 10 crore families will make it the world's largest government funded healthcare programme.
The private sector looks at this as a great opportunity to partner with the government and expand their businesses.
Express Healthcare looks at the real impact of the Union Budget on the healthcare sector

EXPRESS HEALTHCARE (APRIL 2018)

A NEW PARADIGM IN INDIA'S PUBLIC HEALTH

The two-day conference saw public health experts deliberate on strategies to eliminate barriers to increase efficiencies in delivering quality, reliable and equitable health services in India. Moreover, public health torchbearers from various states were also honoured at the Express Public Health Awards held concurrently



EXPRESS HEALTHCARE (MAY 2018)

Once, there was a big blue ocean; home to many sea creatures big and small. The ocean, with all its immensity and magnificence was a thriving ground for every marine life. There were several aquatic kingdoms that dwelled and flourished in the deep blue. Amongst them, was the prosperous empire of the great shark. His province known to be teeming with riveting flora and fauna was a place that everyone wanted to be. The illustrious shark, was popular for his knack for smart warfare. Many appreciated his greatness but also feared his warfare. He was also acclaimed to be excellent in striking partnerships that helped him to expand his dominion far and wide. Over the years, the glory that the shark attained made him so self-absorbed and proud that he slowly began to ignore his people and province.

One unfortunate day, a ferocious storm hit the the ocean. The storm was so mighty that it wiped out many kingdoms. The situation in the deep blue worsened when a huge war broke out. Every creature big and small fought for its survival. The great shark fought fiercely to save his realm, but to his dismay, everything was lost. Everything that was built in several years came crashing down, the beautiful empire was tarnished. He was left wounded and now, he would soon become prey to the hungry sea creatures that loomed around his territory as they have smelt blood.

The shark tries to swim to the other end where he will find help. But the sea is still rough... What will the great shark do to save himself? Will he manage to tide over to the other end and find help?

EXPRESS HEALTHCARE (JUNE 2018)

EXPRESS HEALTHCARE (JULY 2018)

Growth is a priority for most healthcare businesses, but one that's elusive and difficult to achieve. Some healthcare players do it really well, delivering sustainable growth year after year. What makes those companies so special? And what can we learn from them?

EXPRESS HEALTHCARE (AUGUST 2018)

EXPRESS HEALTHCARE (SEPTEMBER 2018)

The government's big-ticket reform - Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (PMJAY), is all set to take flight. The first phase of the world's largest health insurance plan will be rolled out in 14 states and two union territories on September 25. The programme intends to change the healthcare landscape of the country by providing a insurance cover to 10 crore households, i.e. 50 crore individual beneficiaries with ₹ 5 lakh per family per year. The ministry officials handling the scheme tout it to be a revolutionary scheme and a boon for the Economically Weaker Sections (EWS) who are usually pushed into a debt trap due to healthcare costs.

After unfurling the Indian flag on 72nd Independence Day at the ramparts of the Red Fort, Prime Minister Narendra Modi, announcing the official launch of AB-PMJAY said, "On 25th of September, the birth anniversary of Pandit Deen Dayal Upadhyaya, the Pradhanmantri Jan Arogya Yojana (PMJAY), will be launched throughout the country. No poor person of the country will have to face difficulty in dealing with diseases. Nor he would have to borrow money from a moneylend

EXPRESS HEALTHCARE (OCTOBER 2018)

EXPRESS HEALTHCARE (NOVEMBER 2018)

EXPRESS HEALTHCARE (DECEMBER 2018)

INTERVIEW

'AFMS believes service before self'

Lt. Gen Bipin Puri, VSM, PHS Director General Armed Forces Medical Service (DGAFMS) shares details about military medicines and the need for research work, its intent behind starting aDNA profiling centre, role of IT in Armed Force Medical Service (AFMS)

What is your vision as DGAFMS?

I have tried to bring in the IT imprint in AFMS and sincerely believe in aligning with the Prime Ministers Digital India campaign. In times to come, IT will have a huge impact on healthcare, particularly tele-medicine can help us in a big way to get connected with high altitude areas. Recently, with help of the Indian Space Research Organisation (ISRO) we have established 53 tele-medicine nodes, which will help us to enable medical consultation between soldiers deployed at the Siachen glacier and other forward posts along the borders. Such remote posts are cut off for several months due to extreme weather conditions, now can communicate through satellite-enabled tele-medicine nodes with the nearby tertiary hospitals.

INTERVIEW

Making virtual healthcare feasible

Prasad Kompalli, CEO & Co-Founder, mfine, shares his views on how Artificial Intelligence (AI), mobile health can transform healthcare delivery in an interaction with **Prathiba Raju**

How did the concept of mfine evolve? What is your USP as many such softwares are available? Why you are tying up with hospitals instead of doctors directly?
mfine comes from the idea to make access to quality healthcare easy and simple. We strongly believe that technology, in particular mobile Internet and AI can transform healthcare delivery in India leading to better quality and experience for the consumers.

While we understood the complexities of the healthcare sector, we also saw an opportunity to deliver higher level of quality and experience for consumers with technology. We zeroed in on high quality and on-demand access to be the foundation of what we would build. To bring in the much needed trust and quality, we partner with trusted and premium institutions such as KIMS- Hyderabad, Apollo Bangalore, CloudNine, Femiint Health and Aster CMI Hospitals.

How will mfine help for a better primary healthcare delivery — both in urban and rural areas?
When you look at Indian healthcare industry, it is characterised by very low doctor-patient ratio (1:1700) and more than 70 per cent of medical bills are paid out-of-pocket by patients. Not much is being done at the primary and secondary care level to prevent further expensive and life threatening complications. Technology is an inevitable solution to this problem. mfine leverages on the massive adoption of smartphones and mobile Internet to dramatically change the access and reach of specialists doctors. We envisioned and are building a one-of-its-kind virtual hospital that brings the best care providers and state-of-the-art tech together. We have built an AI powered diagnosis engine that can be infinitely scalable assistant to those top specialist doctors.

How does your technology help hospitals to maximise patient outreach. How do people see or accept the concept of cloud clinic?
With technology, we are able to take the high quality care beyond the walls of the hospitals. We help users to consult their doctor without physically visiting one. From answering to health queries, providing proper consultations and enabling long-term care, all can be done on mfine through the user's mobile. You can simply give the symptoms that are bothering you; select the hospital and the doctor you wish to talk to and start your consultation within 10 mins. mfine has senior doctors from reputed hospitals available for online consultations. The power of this phenomenon is immense. The discreteness and the personalisation one needs in healthcare is now possible and we can cater to all kinds of people and their varied requirements.

The cloud clinic is essentially designed to deliver high quality care from the biggest and the best in healthcare via an always-on, on-demand service. Our differentiation also comes from the fact that we are creating a digital assistant for the doctor and at the same time building a robust mobile health companion for the patient. We are focussed on bringing trusted, reputable and high-quality hospitals into digital space and are not a

marketplace of individual doctors. Our AI-powered tech system can scale quality care and make it reach to millions of people. These two aspects make us very unique in the way we build mfine as a tech-led and consumer experience focused business.

How are you deploying AI to speed up decision-making? How is mfine poised to leverage it?
As per a report by the Centre for Internet Society (CIS) India published earlier this year, AI could help add $ 957 billion to the Indian economy by 2035. AI can be a very powerful assistant that can scale a doctor's time and reach. In our case, our algos are able to collect the relevant info about the patient's illness along with their medical/lifestyle history to prepare a comprehensive case sheet for the doctors. The case sheet also includes options for diagnosis and templates for treatment plans. This not only helps the doctors to be more efficient but also reduces human errors dramatically. We are able to identify the treatment protocols and translate them into simple actions for the consumers such as medicine reminders for improving treatment adherence, suggestion and alerts for monitoring long-term chronic conditions etc.

How many consultation happen in a month and how much do you want to achieve in the next fiscal?
We have done more than 55,000 consultations on mfine by some of the top doctors across Bengaluru and Hyderabad and are currently at a run rate on 10,000 consultations per month. We would like to achieve half a million consultations by end of 2019.

How many hospitals you are partnered with? How will you use the patient data?
We have over 200 doctors from 70 leading hospitals consulting across 18 different specialities. We leverage AI/ML systems in combination with standard medical protocols, to make high quality care reach consumers across the country. We have built our disease diagnosis models based on million of data records that are coming from public domain research information, hospitals partnerships. There is reinforcement learning going on everyday with all the data that is getting created as people are using mfine to consult doctors and the doctors are making notes.

Do you think patients are aware of such apps, how do you see the adoption level of your app?
I believe the doctors and hospitals are excited about mfine. In metro cities like Bengaluru and Hyderabad, people are more aware and also value the quality care we provide. Most people might have this notion that acute conditions always require a hospital visit. This isn't the case for all medical conditions. Non-emergency health concerns can be addressed through digital space. We believe that mobile can be a game change in the delivery of primary health care. From access, to diagnosis, to preventive healthcare, technology can disrupt the future of "visiting a doctor".

With the roll out of Ayushman Bharat and upcoming HWC, how will this help such start-ups initiative like yours.
It's actually great to see the government recognising the problem of care delivery and implementing initiatives such as Ayushman Bharat. It will also help increase the infrastructure level capabilities for all of us to benefit from. More tech usage as envisaged in PMJAY will also move the entire ecosystem forward and patients and doctors will grow comfortable with newer care delivery methods like digital and mobile. We would love to contribute ideas, technology or in any other way appropriate to democratise access to quality healthcare.

What is the scope of startups future in the healthcare sector?
More and more startups now are focussing on domestic consumption and fundamental areas like education, healthcare. We see huge innovations coming up in this sector. Worldover tech-lead, universal healthcare is the next big frontier to cross and India is no exception. In India, with mobile, health devices, we have a big chance to leapfrog other developed markets and quickly deploy newer care delivery processes and systems.

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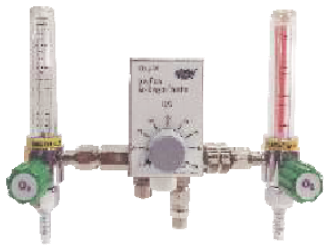

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INTERVIEW

Fujifilm wants to build robust Indian medical diagnostic space

Masahiro Ota, Corporate Vice President of Fujifilm Corporation & Managing Director of Fujifilm Asia Pacific, shares his views on how Fujifilm is strengthening its presence in the Indian medical devices market

How are the business prospects for Fujifilm in the APAC region and how does it look at its growth in India?
Currently, our main business areas in the Asian region are healthcare segment, digital imaging and graphic imaging, and we are growing over 10 to 20 per cent. Medical imaging is one segment, which is growing exponentially in Thailand, Singapore, Malaysia and Eastern Korea. So, we are trying to implement the same in India as well. In Thailand, we are the number one players and we have high market share in other mentioned countries too. We now expect to improve our market share in India.

Can you throw light on the digital mammography solutions Fujifilm offers?
Mammography is the most powerful tool for detecting breast cancer, and early detection is the key to improve survival rates. We are bringing innovative solutions like digital mammography to help women detect the disease early. I am proud and pleased to say that as of now, we have more than 3,400 happy users of our digital mammography solutions across the world; among them, 26 installations are in India. We are also making efforts to create awareness among women about breast cancer and promoting campaigns such as the Pink Ribbon to promote the early discovery of breast cancer. We need a holistic, comprehensive and life-course approach to improve women healthcare.

Where does India stand among the Asia Pacific countries, particularly China?
In Asian countries like Thailand and Indonesia, demand is huge but the market is shallow. In India, cities like Mumbai, Bengaluru and Chennai are growing fast and thus these are our priority regions in the country. I worked for almost 10 years in China. So, I would say that India is 20 years behind China when it comes to infrastructure like airport, highway, high-speed railway systems and infrastructure. India needs to disrupt.

What are your focus areas?
We have a lot of scope in medical business in India. This sector will definitely have lots of opportunity — endoscopy, IVD, ultrasound and healthcare IT, for instance. Fujifilm brand always lays emphasis on improving the quality and the affordability of healthcare.

What are the specific innovation/techniques brought in for the Indian healthcare requirements by Fujifilm?
Keeping in mind the Indian requirements, we have developed the CR system Prima T. We are selling around 3,000 to 4,000 units in

India every year. This model digitises the X-ray waves and was developed based on the inputs taken from India. We have installed CR machines in many government hospitals which do not even have doctors and hospitals in tier II and tier III cities. For example, in Assam, we have installed 100 CR systems in remote areas. The machines have digitised X-rays where it is connected through the tele-radiology system; so, a doctor sitting in Delhi can examine the reports and they can diagnose immediately. The CR system can be easily installed in limited spaces, is user friendly and requires less electricity. It is a robust system which brings upon a smart workflow. For this, we have tied up with KRSNAA Diagnostics. They have acquired CR machines from us for their project in Assam. It is a high-quality service at a low cost.

How do you see the new technology disrupting the medical segment globally? Any new products/ services scheduled to be rolled out?
We are entering in an era of Artifical Intelligence (AI) and Internet of Things (IOT), and Fujifilm is already working together with Japan's top doctors to improve diagnosis with the latest technology. We hope to continue the same with other countries, as it improves patients and the community. For example, when a doctor is performing mammography, he can miss certain minute details. However, if an AI-based machine is being used, it can assist the doctor more accurately and faster. Fujifilm is further developing AI-enabled X-ray and endoscopy machines. We are also planning to launch Fujifilm SILVAMP TB LAM for the detection of tuberculosis (TB) in people living with HIV (PLHIV) in 2020.

Can you explain about Fujifilm's newest mammography solution Amulet Innovality? How will it help patients?
Fujifilm's Amulet Innovality uses advanced tomosynthesis technology which enables the conversion of digital breast images into a 3-D reconstruction of the breast, in contrast to the flat images produced by traditional 2-D digital mammography. The advanced tomosynthesis technology reveals the internal structure of the breast, thus simplifying the detection of lesions that get overlooked in a routine mammography. The latest 50 micron 3-D mammography enables technician to obtain a clearer view of the breast tissue, facilitating identification of early-stage breast cancer and reducing the need for additional tests and biopsies. With this new technology, we take care of doctors' concerns in terms of resolution, operators – in ease of use and for patients, it is the comfortability offered. We have done 26 installations in India — majorly in cancer hospitals and cancer centres and it is one of the best mammography solutions. It facilitates early detection of cancer and the patient undergoes less radiation exposure even than a standard chest X-ray.

What are the CSR activities of Fujfilm?
By using our technology, and affliation with big hospitals, we are creating awareness among people about non-communicable and communicable diseases. We are trying to make the common public aware of the breast cancer and TB and how early stage of diagnosis and screening helps. Such practices are conducted by the US, Japan and European countries.

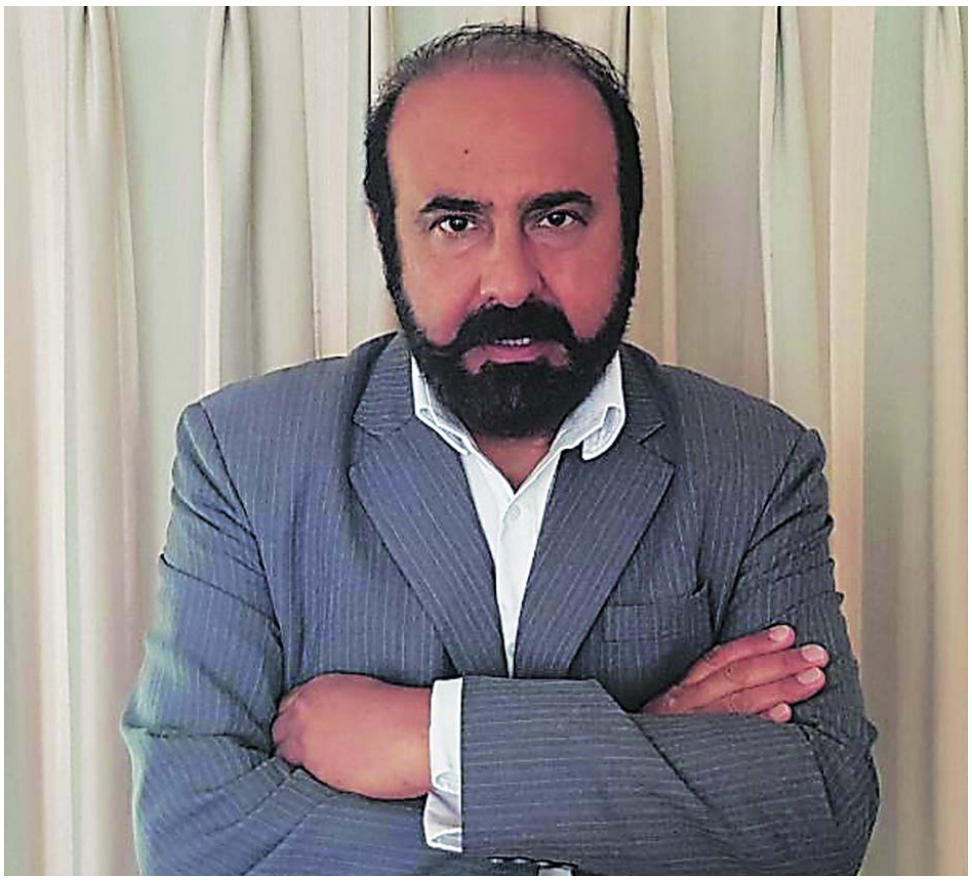
INTERVIEW

The technology launched by Evergen India is a new concept in the market

Evergen Systems offers solutions to tackle the problem of air pollution in hospitals. **Sukhbir Sidhu**, Founder & CEO, Evergen, reveals more about how the company evaluates the actual problem and accordingly strategises the installation of technology to bring out a visible changes in the levels of the air pollution in a short span of time

How does the quality of indoor air in hospitals impact patient outcomes?
Hospital air quality that is compromised by pollutants can lead to patient infections and negatively affect hospital employees. These facilities are supposed to be sterile and clean, enabling patients to recover from illnesses. But hospitals that do not maintain an effective air cleaning regime may find that airborne contaminants become a health issue within a facility that is intended to protect people from getting sick. With outdoor air pollution becoming worse every year, maintaining good indoor air quality at hospitals has become even more challenging but no less important. And hospital air quality isn't just an environmental problem; it has actual human costs as well.

A study by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) found that indoor air quality that was improved by effective ventilation reduced acute respiratory illnesses (ARIs) by 23 percent to 76 per cent. Furthermore, hospitals are already plagued by a number of airborne viruses, bacteria and contaminants, which results in a statistically higher number of ARIs than in occupations where these pollutants are not as concentrated. Hospitals with poor or ineffective ventilation systems are at a higher risk of incubating illnesses caused by airborne contaminants, and these illnesses will have a debilitating effect on the productivity of hospital staff who will either have to work at reduced capacity, or miss work entirely due to respiratory illnesses.



What is the annual spend of hospitals in India on improving air quality? Give figures for variations in bed strength, speciality area, urban, etc. How does this compare with spends by overseas health care facilities?
I am afraid data on the annual spend by the hospitals on improving air quality is not available. Having said that more and more hospitals in India have started working towards improving the indoor air quality in their facilities. Since hospitals and healthcare facilities must comply with ASHRAE and other regulatory standards with respect to air change rates, humidity requirements, and pressurisation. ASHRAE Standard 62.1 is the most commonly referenced standard to meet appropriate HVAC system design.

To maintain proper air quality ASHRAE has created new standards. These require more fresh air and exhaust large volumes of conditioned air which in turn raises energy cost. Engineers and owners of healthcare units are facing a major challenge to find solutions without tripling the cost of building operation and maintenance system.

What are the systems generally used to control the quality of air in healthcare facilities?
Hospitals commonly use a variety of filters (paper/HEPA) to remove particles and gases from the air. HEPA filters are capable of removing some particulates from the air but there are many harmful contaminants in the air that aren't particulate matter. HEPA filters are unable to remove Volatile Organic Compounds (VOCs), viruses, molds and bacteria's; unfortunately particulates under 0.3 micrometers cannot be removed safely from the air with a HEPA-based air purifier.

With time these filters get clogged up and become less effective as they require constant inspections and regular replacement which in reality does not always happen. Noteworthy is the fact that frequent replacement of filters is critical since pathogens collected on the filter can include live organisms and eventually pathogens are re-released into the air.

Hospitals are complex buildings that require specialised pollutant removal mechanisms to control hazardous emissions for the comfort of patients, visitors, administrative staff, and health staff. Besides, hospital building design and IAQ issues must be considered

from cradle to grave process.

Given the sad state of ambient air quality in most cities in India, how will improving indoor air quality be a sustainable solution?
Numerous studies show that poor air quality directly reduces people's productivity and increases the chances of ill health through catching air borne bacteria and germs.

Air conditioning, as common man knows, is the control of temperature, humidity and quality of air simultaneously.

IAQ is defined as the process of providing air which is comfortable in every way and does not cause negative health effects, disease or sickness in humans and is devoid of dust, smells, draughts and noise as much as possible. The nature of air is such that it doesn't just get cleaned up by itself. We need special equipment to monitor and control IAQ. The capital costs as well as running cost of the HVAC plants are the deciding factors to maintain the required quality of air for different applications. The more stringent requirement of quality of air the more capital cost and running cost. Indoor air quality is a prime factor, during the design stage and critical factor during the maintenance stage of HVAC systems. Governments across the world have begun to address IAQ problems through various measures. IAQ in hospital is more critical as the patients have less immunity. Hospital buildings involve complex installations. It is a known fact that in a typical hospital the level of airborne infectious contaminant increases proportionately with the increase in the number of infected individuals. Therefore IAQ concept in hospital is emerging as a modern field of specialisation among engineers and health care professionals.

How can hospital managements judge the quality of air improvement systems? What are the accreditations, track record highlights and red flags they should look out for when choose an indoor air quality purification and monitoring system? What are the long-term solutions to purifying air?
The best way is to routinely monitor air quality. However, the high cost of precision monitoring systems makes this prohibitive. One option is to engage consultant companies with state-of-the-art measurement technology and many years of diagnostic experience to maintain healthy indoor air quality. The most cost-effective option is to install technology solutions for efficiently cleaning air. Installing active ionisation air cleaners coupled with sanitisers and ionisation cells will ensure clean and healthy air. As this technology does not use filters that can clog up there is no degradation of performance and no filters to replace. Due to the low operation and maintenance costs of this technology, overall it is much less cost than conventional paper/HEPA filters.

NEWS

Oxair's oxygen systems wipe out hospital cylinder costs

Representatives from Oxair Gas Systems India will be available on Stand H58 at Arab Health Show 2019, Centre Hall 2 Stand H58, Dubai World Trade Centre to be held from January 28-31

Oxair Gas Systems' new India venture will be taking centre stage with the company's showpiece oxygen generating equipment at next year's Arab Health Show in Dubai's World Trade Centre from January 28-31, 2019.

Representatives from Oxair Gas Systems India will be available on Stand H58 to give a demonstration and answer any questions about the company's latest high purity oxygen delivery systems supporting the health service in even remote parts of the subcontinent, as well as providing a safer and cost-effective alternative to conventional cylinders in local hospitals and medical facilities.

A leading global manufacturer of advanced gas process systems, Oxair's Indian subsidiary will also be showcasing the OA120 Medical Oxygen Generator Pressure Swing Adsorption (PSA) system, which can produce the equivalent of 12 cylinders a day (7 M3 capacity).

The company eagerly awaits the world's healthcare decision-makers at Stand H58 in Centre Hall 2 to show them the amazing cost-saving and safety benefits of its systems compared to traditional gas cylinders. These high quality medical devices are designed to last and deliver consistent, high purity oxygen to hospitals and healthcare facilities of all sizes.

Oxair's Medical Oxygen Generators PSAs are registered medical devices under ISO 13485, which makes them fully compliant for use in all hospitals and medical facilities around the globe regardless of remoteness. As the equipment provides hospitals with the ability to control their own supply of 94 per cent pure oxygen, it eliminates the chance of succumbing to failures in the oxygen cylinder supply chain. Clinicians are guaranteed a constant source of high quality oxygen that can be piped directly to the patient's bedside on demand.

The system is designed with ease of use in mind and comes with a user-friendly full colour touch screen requiring no extensive technical training. In addition, due to high quality parts being used to produce superior valving and piping, the system requires less maintenance, has low power consumption and guarantees high performance levels throughout its long lifespan.

The Arab Health Exhibition presents the perfect platform in a region where healthcare expenditure is accelerating to meet an anticipated rise in the number of patients. Over 700 projects involving hospitals, clinics and research centres worth billions of US dollars are under various stages of development.

These developments will need regular supplies of life-saving gas. Installing oxygen generators can not only significantly reduce a hospital's oxygen costs, but also improve the health and safety standards for its staff due to them no longer handling dangerous high-pressure cylinders while eliminating the noise pollution associated with their delivery.

Jim Newell, CEO, Oxair, explained, "This is a major show for Oxair India and a chance to connect with the right people us so early in the year in a vital target market. Oxygen generators are the future for healthcare to reduce the reliance on cylinders except as a back-up for medical needs."

Oxair's technology is suitable for small to medium-sized hospitals and has minimal impact on the workplace thanks to its specially designed muffler which makes it one of the quietest PSA systems on the market. The system can be engineered to integrate with any existing system, or designed from scratch. Oxair's medical oxygen generators can also be used to fill cylinders for backup use.

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Carestream spotlights Medical Imaging Technology at India's largest orthopaedic conference

Carestream Health demonstrated its expanding portfolio of medical imaging systems at the 63rd Annual Conference of Indian Orthopaedic Association (IOACON 2018) at Coimbatore.

Carestream representatives showcased the unique benefits of the CARESTREAM OnSight 3D Extremity System that equips hospitals, orthopaedic practices and other imaging services providers with high-resolution 3D images,that offer advanced anatomical detail to help orthopaedic specialists make more accurate diagnostic and treatment decisions.

Carestream's system has a large detector that easily captures a 3D image of the extremity in a single rotation

The OnSight system captures high-quality, weight-bearing imaging studies for patients with a wide range of injuries and conditions of the knee, foot, ankle and other extremities.

Unlike traditional CT technology, Carestream's system has a large detector that easily captures a 3D image of the extremity in a single rotation. A patient simply places the injured extremity into a donut-shaped bore in the system. Since the patient's head and body are not confined, patients do not experience the claustrophobia that often occurs with CT systems.

"Orthopaedic specialists around the world are adopting the OnSight 3D Extremity System because it offers high-quality, lower-dose 3D imaging and delivers greater convenience for physicians and their patients," said Sushant Kinra, MD, Carestream Health India.

Other products showcased at the conference were the Carestream Vita Flex CR System, Carestream DRX Core wireless Detector and the DryView 5700 Laser Imager.

Carestream focusses on delivering innovation that is life-changing—for patients, customers, employees, communities and other stakeholders—while enhancing operations for a broad range of healthcare facilities and helping medical professionals provide quality care.

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Why ambient light is important in the reading room?

Anantha Narayanan, Country Manager, EIZO Corporation, gives an insight on how ambient light can be of great use to radiologists to bring in more contrast and fatigue

Controlling ambient lighting in reading rooms is vital to ensuring that radiologists can see scans and notice potential problems as optimally as possible. There are two main reasons why it's important: contrast and eye fatigue.

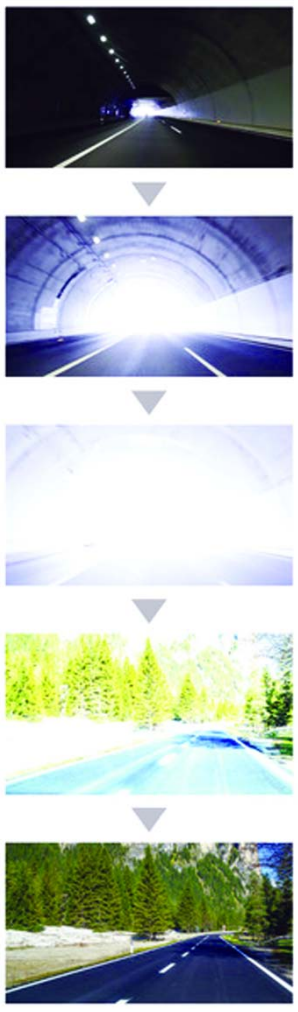
When viewing medical images, one of the most important factors for accurate diagnosis is contrast. The higher the contrast, the more differences in shades our eyes are able to see. Most medical monitors aim to provide high contrast screens, which is certainly the first and most important way to increase contrast. But even with a high contrast monitor, ambient light can greatly reduce contrast.

The most obvious ways ambient light affects contrast is through:

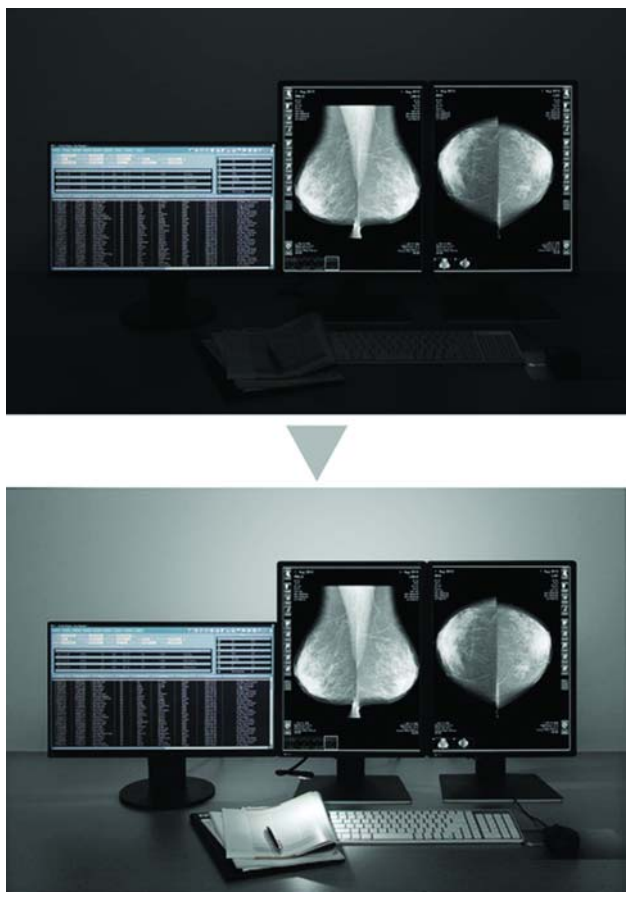
1) Diffuse reflections: when light is reflected uniformly across the screen, whitewashing the blacks on screen.

2) Specular reflections and glare: When light is reflected onto the screen directly from an external light source, or reflected off of an object, causing glare or a 'specter' of the object to appear on screen. This can be distracting and reduces the contrast at that specific location.

However, the most major way that ambient light can reduce contrast is by affecting the eyes' ability to adapt to a certain level of light. At any one time, the human eye can detect a contrast ratio of 1000, however this ratio is not definite, but rather relative. For example when in a dim tunnel you will be able to see most things clearly. When you suddenly exit into the sunshine outside, most objects will be brighter than the objects in the tunnel, so they will appear as white to your vision. This is because in the dim tunnel, the darkest objects become 'black' to your perception, and the bright objects become 'white' to your perception. Anything brighter than the dim light would automatically register as 'white' to your vision – thus when you step outside you will suddenly be blinded because the majority of objects will be brighter than anything in the tunnel.



This is relevant in the reading room, because if the screen and ambient light are quite different (either brighter or darker) your vision will constantly be readjusting between the ambient light and the screen. Despite your eyes adjusting to the screen, as soon as you look away to a brightly lit wall, light or object – your eyes will begin readjusting to this change in contrast. So, when you look back to your screen you will no longer have optimal vision until several minutes have passed.



> The best way to control ambient light is with dim lights that are positioned behind the screen

In general it is recommended that the ambient lighting matches the brightness of your screen – which is stated to be 20 to 40 lux when the screen is at a brightness of at least 350cd/m2 (or 420cd/m2 for mammography), as per the American College of Radiology guidelines. However, the European guidelines for quality assurance in breast cancer screening diagnoses recommends 20 lux or less. Studies have shown that ambient lighting below 7 lux is too dark, and over 100 lux is too bright, so regardless of which recommendation is followed – ambient light must not be too dark or too bright. Additionally, before beginning work, a radiologist should allow their eyes to adjust for about 15 minutes to bring their vision to the optimal level.

Another way ambient light can affect reading accuracy is through by causing eye fatigue. The quality of human vision is incredibly varied – depending on environmental factors as mentioned earlier, and also on physiological factors. Eye fatigue – apart from being uncomfortable – can also temporarily degrade one's vision. Having optimal vision is vital in radiology, so it's important to reduce any eye fatigue.

In a room where the ambient light is greatly different to the screen, every time you move your eyes from the screen to another location, your pupils will either dilate (if the ambient lighting is less) or contract (if the ambient light is greater). This constant dilation and contraction tires the muscles in your eye – leading to eye fatigue. This can also increase the amount of time that is needed for your eyes to adjust to a new setting.

Eye fatigue can also be caused by glare and reflections on the screen, which causes the eyes to refocus each time vision is passed over the brightened area.

The best way to control ambient light is with dim lights that are positioned behind the screen. As overhead lights – even dimmed ones – can cause glare and reflections it is recommended to position lights behind the monitor.

However, many radiologists may find that this environment is too dark to comfortably read papers and make notes. For this reason a small light positioned below or beside the monitor is ideal for illuminating papers and notes on the desk.

In this way the ideal ambient lighting level can be achieved without causing discomfort on the eyes, or reflections on the screen.

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